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**Knowledge and attitudes of pediatric nurses regarding
pain management in Palestinian hospitals in West Bank**

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**Knowledge and attitudes of pediatric nurses regarding
pain management in Palestinian hospitals in West Bank**

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Knowledge and attitudes of pediatric nurses regarding pain management
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Dedication

I thank the Almighty God for life this far and blessings during this time of study.

Everything I have achieved is through His power.

My heartfelt gratitude to the following people and institutions:

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- ❖ To all pediatric nurse participants for making this study possible.
- ❖ To all hospitals that facilitate my mission during the study.
- ❖ To all my friends for the continued inspiration, prayers and support.

Declaration

I certify that this thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged , and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institute.

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Date:13/5 /2018

Contents:

Declaration.....	i
List of Figures:	viii
List of appendices	ix
List of Abbreviations	x
Abstract.....	xi
Chapter One: Introduction	1
1.1 Introduction	1
1.2 Background and Significance of Study	3
1.3 Study Justification	6
1.4 Problem statement	6
1.5 Aim.....	7
1.6 Objectives	7
1.7 Research Questions	7
1.8 Research Hypothesis	8
1.9 Operational definitions	8
1.10 Theoretical Framework.....	9
Chapter Two: Literature Review	14

2.1 Introduction	14
2.1.1 Concept of pain.....	14
2.1.2 Types of pain	15
2.1.3 Post-operative pain	18
2.2 Pain theories	20
2.2.1 Specificity theory.....	20
2.2.2 Pattern theories	20
2.2.3 Gate Control Theory	21
2.3 Factors Influencing Pain.....	22
2.3.1 Age	22
2.3.2 Gender	23
2.3.3 Genetic makeup	23
2.3.4 Cultural factors	23
2.3.5 Fear and anxiety.....	24
2.3.6 Past experience of pain	24
2.3.7 Consequences of untreated pain	25
2.4 Pain Assessment in Children	25
2.4.1 Behavioral measurement of pain	28
2.4.2 Physiological measurement of pain.....	29

2.4.3 Self-report	30
2.5 Pain Management in Children	33
2.5.1 Pharmacological pain management	34
2.5.2 Non-pharmacological pain management	35
2.6 Studies about knowledge and attitudes deficits	36
2.7 Barriers to adequate pain assessment	43
2.8 Pain educational intervention studies	45
2.9 Summary.....	47
Chapter Three: Research Methodology	48
3.1 Introduction	48
3.2 Study population.....	48
3.3 Setting and sample size	48
3.4 Sampling frame	49
3.5 Inclusion and exclusion criteria:.....	49
3.6 Study design	50
3.7 Sample size calculation	50
3.8 Instrument.....	50
3.9 Validity and Reliability of the instruments	53
3.10 Data collection.....	54

3.11 Ethical considerations.....	54
3.12 Procedure	55
3.13 Data analysis.....	55
Chapter Four: Results	57
4.1 Introduction	57
4.2 Sample distribution.....	57
4.3 Demographic and professional variables.....	58
4.4 Inferential Hypothesis:	68
4.5 Pharmacology related questions:	69
4.6 Pain assessment and management Questions	72
Chapter Five: Discussion and Recommendations	80
5.1 Discussion.....	80
5.2 Limitations.....	85
5.3 Recommendations	85
Appendices:	87
References	110
ملخص.....	121

List of Tables

No.	Table Title	Page
3.1	Learning outcomes classification levels	53
4.1	Demographic characteristics of participants	60
4.2	Professional data of participants	60
4.3	Correct answers of pharmacology related questions	61
4.4	Correct answers of pain assessment and management questions	63
4.5	Correct answers of non-pharmacology related questions	65
4.6	Distribution of nurses according PNKAS scores	65
4.7	Questions most frequently answered correctly	66
4.8	Questions most frequently answered incorrectly	68
4.9	The participants' pharmacologic questions according to gender (T .Test)	70
4.10	The participants' pharmacologic questions according to age(One Way ANOVA)	70
4.11	The participants' pharmacologic questions according to education(One Way ANOVA)	71
4.12	The participants' pharmacologic questions according to years of pediatric nursing experience(One Way ANOVA)	71
4.13	The participants' pharmacologic questions according to existence of pain management protocol(One Way ANOVA)	72
4.14	The participants' pharmacologic questions according to presence of pain management committee(One Way ANOVA)	72
4.15	The participants' pain assessment and management questions	73

	according to gender(T test)	
4.16	The participants' pain assessment and management questions according to age(One Way ANOVA)	73
4.17	The participants' pain assessment and management questions according to education(One Way ANOVA)	74
4.18	The participants' pain assessment and management questions according to pediatric nursing experience(One Way ANOVA)	74
4.19	The participants' pain assessment and management questions according to the existence of pain management protocols(One Way ANOVA)	75
4.20	The participants' pain assessment and management questions according to the presence of pain management committee (One Way ANOVA)	76
4.21	The participants' non-pharmacologic questions according to gender(T Test)	76
4.22	The participants' non-pharmacologic questions according to age(One Way ANOVA)	77
4.23	The participants' non-pharmacologic questions according to education(One Way ANOVA)	77
4.24	The participants' non-pharmacologic questions according to pediatric nursing experience(One Way ANOVA)	78
4.25	The participants' non-pharmacologic questions according to the existence of pain management protocols(One Way ANOVA)	79
4.26	The participants' non-pharmacologic questions according to the presence of pain management committee(One Way ANOVA)	79

List of Figures:

No.	Figure Title	Page
1.1	Conceptual framework of study	11
2.1	Wong-Baker Faces Pain Scale	32
2.2	Numeric Rating Scale	33
2.3	Visual Analog Scale	34
4.1	Distribution of respondents according to each hospital	59

List of appendices

No.	Appendix Title	Page
1	Participant Informed Consent	81
2	Demographic Data for Nurse-Participants	82
3	Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain	83
4	Key Answers of Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain	93
4	REC Permission Letter	103

List of Abbreviations

AAP	American Academy of Pediatrics
AHCPR	Agency of Health Care Policy and Research
APS	American Pain Society
CBH	Caritas Baby Hospital
CHEOPS	Children's Hospital of Eastern Ontario Pain Scale
FLACC	Face, Legs, Activity, Cry, Consolability
HSBs	Health Seeking Behaviors
ICU	Intensive Care Unit
IM	Intramuscular
IRB	Institutional Review Board
IV	Intravenous
JCAHO	Joint Commission in Accreditation of Healthcare Organizations
MoH	Ministry of Health
NCD	Non-Communicable Diseases
NKAS	Nurses' Knowledge and Attitudes Survey
NRS	Numeric rating scale
NSAIDs	Non-Steroidal Anti Inflammatory Drugs
PHIC	Palestinian Health Information Center
PNKAS	Pediatric Nurses' Knowledge and Attitudes Survey
PO	By Mouth
PRN	As Needed
RCH	Red Crescent hospital
REC	Research Ethics Committee
SPSS	Statistical Package for Social Sciences
TPPPS	Toddler-Preschooler Post-operative Pain Scale
VAS	Visual Analog Scale
VDS	Verbal Descriptor Scales
VRS	Verbal Rating Scale
WHO	World Health Organization

Abstract

Background: Pain management is a necessary aspect of nursing care of pediatric patients. Literature review asserts nurses continue to have knowledge deficits and ongoing negative attitudes toward pain management. Nurses are at the forefront in patient care and the appropriate skills, knowledge, and attitudes in pain assessment and management is essential in order to provide optimal patient.

Purpose: To assess the current level of knowledge and attitudes of pediatric nurses regarding pain management, and to determine if there is a relationship between demographic, professional data and nurses' knowledge, and attitudes toward pain management in Palestinian hospitals in West Bank.

Instrument: Pediatric nurses' knowledge and attitudes survey (PNKAS) was used in this study to assess the level of nurses' knowledge and attitudes regarding pain management in children among pediatric nurses in Palestinian hospitals.

Method: Descriptive, quantitative cross sectional study was performed at 14 hospitals among 256 nurses who work in general pediatric wards in West Bank.

Results: The total mean score on PNKAS scale was 50.4%, highest score was 84.8%, and lowest score was 25%. The majority of participants 83% had less than 60% of correct answers, while 15% of nurses their scores were between 60-79%. However only 2% of nurses who had 80% or above in PNKAS scores. Also it's noticed that demographic and professional factors such as nurses' age, gender, education, and work experience do not have a significant effect on nurses' knowledge and attitudes scores. Most nurses demonstrated lack of knowledge about pain management. About 98.4% of nurses had misconception about incidence of opioid addiction, 94.9% of them also had knowledge deficit about incidence of respiratory depression in opioid management, and 91% of nurses

believe that children over report their pain. The findings of this study showed that pediatric nurses in Palestine have insufficient knowledge and improper attitudes regarding pain management.

Recommendations: Construct and implement several strategies to enhance nurses' understanding and application of relevant knowledge and practice by educational programs, continuous training in clinical field. Moreover nursing faculties should examine the content of nursing courses for depth, accuracy, and relevance of pain assessment and management information that reflect current standards of practice. In addition Developing an integrated approach to teach students about pain management and providing students with the opportunity to taking successive pain courses and implement reflective learning intervention.

Chapter One:

Introduction:

1.1 Introduction

Pain is one of the most stressful situations that every child will experience in some point, it is often described as the most distressing part of the hospital stay, whether it is from common bumps and bruises, or because of more chronic conditions such as gastrointestinal issues, headaches, or diabetes (Turk & Dworkin 2004). As many as 40% of children and teenagers complained of pain that happens at least one time per week. Chronic pain affects at least 15-20% of children (Goodman & McGrath 1991). Further pain prevalence studies done thereafter, have reported similar prevalence rates ranging between 20% and 27% (Taylor et al., 2008; Groenewald et al., 2012). Nursing staff spend more time with patients in pain than any other health care providers, In most hospital settings, nurses are the first health personnel approached by admitted patients requiring assistance. Moreover many painful procedures are routinely performed by nursing staff. So nurses need to get appropriate knowledge about pain to understand, assess, evaluate, and do best intervention to relieve pediatric pain. Pain is "an unpleasant sensory, individual, multifactorial experience influenced by culture, previous pain events, beliefs, moods, and ability to cope" (Morton 1997, Ortiz et al., 2015). Although pain may indicate tissue damage, it can be experienced without an identifiable cause. Significant variability occurs in the degree of disability experienced in relation to pain, and there is individual variation in response to pain treatments (Eccleston 2001). Pain is a subjective experience that "has sensory, emotional, cognitive, and behavioral components that are interrelated with environmental, developmental, socio - cultural, and contextual factors," and is often considered

inadequately assessed and undertreated (American Academy of Pediatrics. Committee on Psychosocial Aspects of Family et al. 2001). Untreated pain related to illness or medical care may have significant long-term and short-term physiological or psychological consequences for the hospitalized child. The physiological or psychological implications of mismanaging pain can have a significant impact in both human and economic terms (Twycross, 2002).

Unfortunately, health professionals, including nurses, have historically underestimated the existence of pain in children; therefore, pain management has often been less than optimal (Wells et al., 2008). The role of the nurse in pain management includes the entire nursing process. The nurse do assessment for presence of pain, makes plan of pharmacological and non-pharmacological pain management strategies with the medical team, implements the plan, and evaluates the effectiveness of the interventions (American Society for Pain Management Nursing. and American Nurses Association, 2005). Many factors have been identified that influence effective pain management such as lack of knowledge and attitudes on the side of health care providers. In addition to inaccurate, insufficient, and poor nurses' knowledge and attitudes in assessing and managing children's pain. Previous researches have revealed many complex and interrelated factors that have contributed to the under treatment of pediatric pain, including professionals' misconceptions about pain medications especially respiratory depression and addiction in children, however many studies showed that incidence of respiratory distress and addiction due to pain medications among children is rare (Vincent & Denyes, 2004). Surprisingly some nurses still believe that assessment tools are subjective, useless and inaccurate, and they rely on children's response and behaviors and ignore children's self-report which is considered as golden standard in assessment pain intensity (Young, 2005). In developed countries, training programs have been shown to improve the response of nurses to pain in children

(Ozyazicioglu & Arikan, 2008; Zhang et al., 2007). On the other hand, limited data from some developing countries suggest that nurses lack training in pain management for a variety of reasons such as poor health resources, lack of systemic strategies, and initiatives relating pain management in children (Bosenberg, 2007; Queiroz et al., 2007; Rampanjato et al., 2007). In the absence of formal training in pain management, the knowledge, and attitudes of individual nurses toward pediatric pain become more important. Furthermore, it is imperative that nurses possess the theoretical knowledge that underpins the skill of pain management. Lack of this knowledge undoubtedly will result in incompetent clinical practice. Basic nursing education, therefore, must prepare nurses with the knowledge required to execute the tasks related to the provision of care for a patient experiencing pain. Accordingly, this study will investigate the level of knowledge and attitudes regarding pain management among pediatric nurses in west bank hospitals in Palestine.

1.2 Background and Significance of Study

Palestinian community is a youthful one, in which people under the age of 15 are forming a high percentage 39.4% of the total population in Palestine (PHIC, 2016). According to Ministry of Health (MoH) data, 48% of MoH budget spent on the treatment of various diseases especially non-communicable diseases (NCD). These health services are provided to children abetween the ages of 3-18 years (MoH, 2016). Although the characteristics of children who recieve treatment are different, Pain is a common experience and almost inevitable. Pain results from a combination of different conditions, including the disease or medical condition, the incision, and the surgical procedure, as well as the type and dose of anaesthesia used during the surgery. Despite decades of research in the area of pain management, improvement in pharmacological treatment, and enormous technological advances, many studies have concluded that patients especially pediatric patients do not receive adequate pain management (Cheng & Hester, 2003; Van Hulle Vincent & Denyes,

2004). Effective pain management from the nurse's perspective depends on multidimensional factors such as good communication skill between nurses and patients, appropriate nurse's knowledge, attitudes and beliefs about pain and pain medications (Erickson & Weiskopf, 2000; Taylor, 2002; Rejeh et al., 2009). A deficit in any of these factors can compromise the delivery of optimal pain management (McDonald et al., 2000). Children and their families have the right to expect pain management that is both timely and effective. The accurate assessment and effective management of a pediatric patient's pain is a crucial nursing activity requiring the nurse possess an accurate theoretical knowledge base of pain and its assessment and management and appropriate attitudes. The assessment of nurses' knowledge and attitudes will bring to light information that may assist in the development of appropriate strategies to address educational needs related to pediatric pain assessment and management.

When pain is not assessed appropriately it can lead to undertreatment. Under-treated acute pain can cause serious medical complications, may impair recovery, and can potentially progress to a chronic pain condition (D'Arcy, 2007). Under-treated chronic pain can limit daily activities, increase disability, negatively affect the quality of life, create suffering, cause anxiety, depression, anger, fear, and increase the risk for suicide (Berry et al., 2006). A previous study reported that children with poorly managed pain may have longer stays in hospital, higher readmission rates, more frequent outpatient visits, delayed healing of wounds, and altered immune functions (Smart, 2005).

Such poorly managed pain has profound long-lasting consequences and it increases emotional and behavioral responses during future painful events. Therefore, the importance of nurses' role in assessing pain to prevent such complications has been recognized internationally and at the local level (JCAHO, 2000). Nurses can avoid all

undesired negative health outcomes of poor pain management by performing effective pain assessment. However, from experience it was noticed that patients and their families are relying heavily on nurses, hoping that nurses could advocate for them and protect them from unnecessary pain. Unfortunately nurses knowledge and attitudes seem to be lacked in some pain assessment and management areas. As it is known that there is a limited number of pain management courses established in health sectors which make nursing schools the main source of pain assessment and management information for nurses.

Accordingly, this study will contribute to nursing education, nursing practice, nursing administration, and nursing research in Palestine.

- nursing practice: the findings of this study will create awareness in assessment and management of pediatric pain of nurses. Recommendations of this study could be used as guidelines for nursing practice in pediatric pain management.

- Nursing administration: this study may be the first research on the pediatric pain management of nursing in Palestine; the findings will be milestone for future planning and policy making of nursing administration in Palestine.

- Nursing education: This study will provide baseline data for future revising the nursing curriculum in Palestine. The findings of this study will help to improve educational program, especially for pediatric pain management in nursing.

- Nursing research: this study will help to a better understanding how Palestinian nurses assess and manage pediatric pain and level of knowledge that they have in their setting. The information of this study should be used to help develop programs that enhance knowledge and attitudes of nurses to manage pain in children. this research will be milestone for further researches in future.

1.3 Study Justification

One of the fundamental duties of nursing is to reduce suffering, and alleviate pain. Unfortunately this has been an especially poorly fulfilled duty in the pediatric patients. While the literature review highlights the fact that the misconceptions regarding pain in children are widespread. Since there is no studies carried out in our country to assess pain management knowledge and attitudes. There is a vital need for better understanding of the factors that influence our ability to achieve optimal pain management for children. Thus a study on knowledge and attitudes will help identify knowledge deficits regarding currently accepted principles of pain management practice as well as beliefs that could interfere with optimal care. The study is anticipated to increase awareness that pain management should be seen as a priority in health care provision and mandate the need for educational interventions and the distribution of protocols.

1.4 Problem statement

The World Health Organization (WHO) has declared that pediatric pain treatment is a public health concern of major significance (Zeitoun., 2013). Many children are hospitalized annually, and most of hospitalized children experience high levels of pain. According to the Agency for Health Care Policy and Research (AHCPR, 2002) and the Joint Commission in Accreditation of Healthcare Organizations (JCAHO, 2000), patients' pain is being inadequately assessed despite the introduction of pain management standards. Poor pain assessment contributes to inadequate pain management. Therefore, pain assessment can be seen as central to the proper management of the pain. However, reviewing the current state of nursing knowledge, it seems that it is insufficient in some areas to achieve reliable pain assessment and management (Louise, 2006; Stubhaug & Breivik, 2007). Many issues may be influencing nurses' ability to assess and manage pain

such as: insufficient pain information in educational courses in curricular context, lack of guidelines, policies, and continuous education relating to pain management in clinical field, the misunderstanding of the subjectivity nature of pain, using of inappropriate pain scales to patient characteristics, and not relying on patient self-report. These identified gaps in the literature indicate a need for more detailed assessment of nurses' knowledge and attitudes of pain assessment and management in order to identify the accurate nature and depth of their knowledge and attitudes (Ferrell et al., 2015; Miftah et al., 2017).

1.5 Aim

The purpose of this study is to examine the level of knowledge and attitudes of pediatric nurses regarding pain management in Palestinian hospitals in West Bank hospitals.

1.6 Objectives

The aim of this study is to assess the level of nurses' knowledge and attitudes about pain management in children within the context of Palestinian hospitals. The objectives of the study are:

1. To assess the level of nurses' knowledge and attitudes regarding pain management in children among pediatric nurses in Palestinian hospitals in West Bank.
2. To determine the relationship between nurses' knowledge, attitudes and selected demographic data.
3. To determine the relationship between nurses' knowledge, attitudes and selected professional data.

1.7 Research Questions

1. What is the level of pediatric nurses' knowledge and attitudes regarding pain management in Palestinian hospitals in West Bank?

2. What is the relationship between selected demographic variables and pediatric nurses' knowledge and attitudes toward pain management?

3. What is the relationship between selected professional variables and pediatric nurses' knowledge and attitudes toward pain management?

1.8 Research Hypothesis

1. There is no significant difference in level of knowledge and attitudes scores among pediatric nurses toward pain management in Palestinian hospitals in West Bank.

2. There is no significant relationship between pediatric nurses' knowledge and attitudes, and their demographic variables about pain management in Palestinian hospitals in West Bank.

3. There is no significant relationship between pediatric nurses' knowledge and attitudes, and their professional variables about pain management in Palestinian hospitals in West Bank.

1.9 Operational definitions

For the purposes of this study, the following operational definitions will be utilized:

Pain knowledge: information and skills acquired by a person through experience or education; the theoretical or practical understanding of pain subject (Esther, 2012).

Attitudes: "An evaluative reaction to some object of thought, intention to behave, and the assessment of a person's supporting belief (Friedrich & Verive, 1991).

Pain assessment: an evaluation of the reported pain and the factors that alleviate or exacerbate it, as well as the response to treatment of pain (WHO, 2005).

Patient self-report: "is defined as subjective verbal report of patients' pain level experienced by him or her (American Academy of Pediatrics, 2001).

Merriam-Webster online dictionary (2014) has described comfort in several ways: (1) to cause someone to feel less worried, upset, frightened; (2) to give comfort to someone; (3) to ease the grief or trouble of; (4) to give strength and hope to; (5) a state or situation in which you are relaxed and do not have any physically unpleasant feelings caused by pain, heat, cold, etcetera; and (6) a state or feeling of being less worried, upset, frightened; during a time of trouble or emotional pain. From the definitions above, comfort ranges from positive (giving strength and hope) to negative (not to have any unpleasant feelings) and can be used as a noun, verb, adverb, or adjective. By the multiplicity of these definitions, it can be seen that comfort is a holistic, interchangeable term.

1.10 Theoretical Framework

Since human being is composed of multidimensional, integrated factors that affect health, and these factors are interrelated and can't be separated. It is important to treat the whole patient. This means treating not only the physical needs, but also emotional, psychological, and spiritual needs. Treating the whole patient includes providing adequate pain relief according to (Kolcaba & Wilson, 2002). Kolcaba's theory is applicable to this area of nursing because patient comfort is cited as a goal in its standards of care and is an established value for many nurses(Kolcaba & Wilson, 2002). The specialized definition of comfort, developed from reviews of multidisciplinary literature on comfort and nursing literature on holism, is "the state of being strengthened by having needs for relief, ease, and transcendence met in four contexts of experience (physical, psycho-spiritual, sociocultural, and environmental)" (Kolcaba, 1992). Comfort theory is a nursing theory developed in the 1990s by Katharine Kolcaba. In this theory, human needs are addressed. Kolcaba described

comfort as existing in three characteristics: relief, ease, and transcendence. Also, she described four contexts in which patient comfort can occur: physical, psycho-spiritual, environmental, and sociocultural (Kolcaba & Tilton, 2006).

Kolcaba's major assumptions:

- 1.Children have holistic responses to complex stimuli.
2. Comfort is a desirable holistic outcome that is germane to the discipline of nursing.
3. Children and their families strive to meet, or to have met, their basic comfort needs; it is an active endeavor.

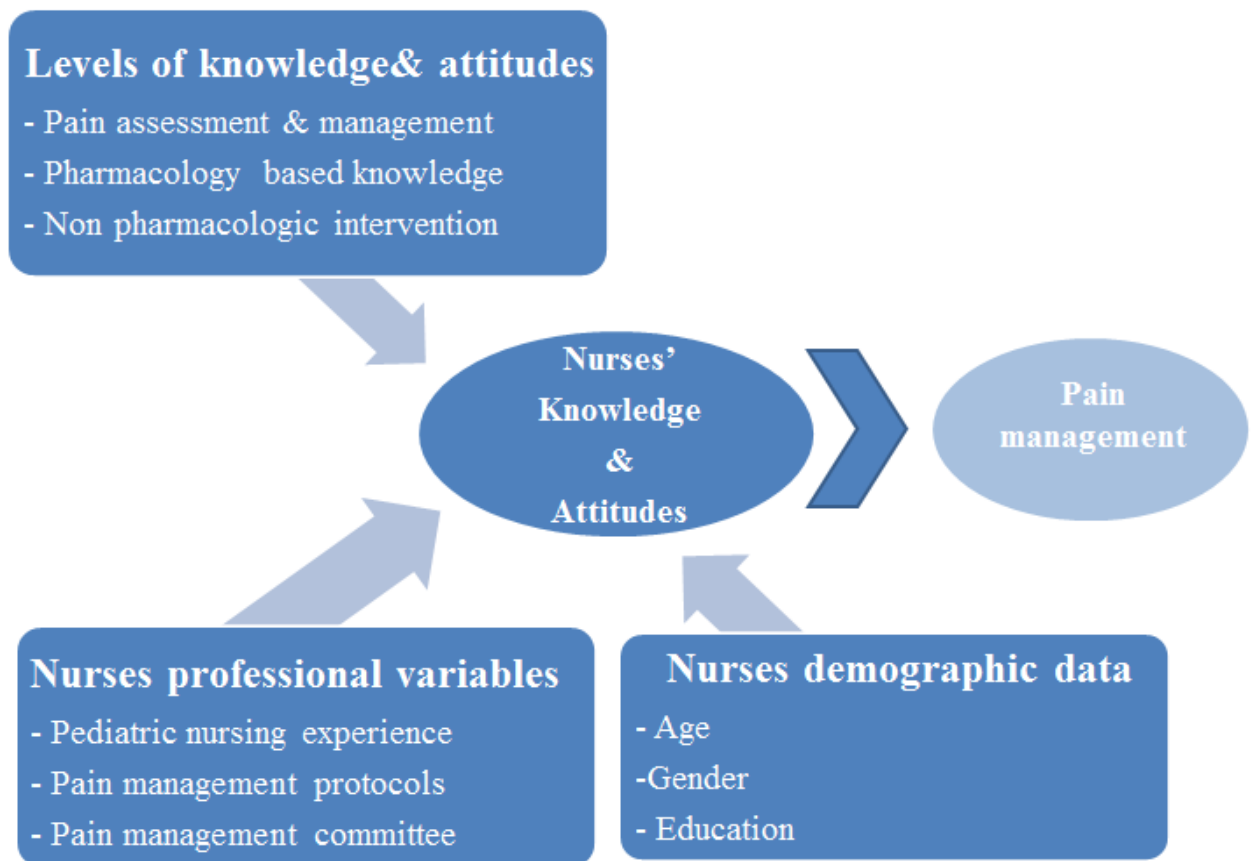


Figure (1.1): Conceptual framework of study

Comfort theory as it relates to nursing is best understood when divided and described in 3 parts. Part 1 states that nurses must have adequate knowledge and attitudes to assess the holistic (physical, psycho-spiritual, sociocultural, and environmental) comfort needs of patients in all settings. Furthermore, nurses implement a variety of interventions to meet those needs and measure or assess patients' comfort levels before and after those interventions. This part of comfort theory also describes positive and negative intervening patient and nurse variables over which the nurse has little control, but that have considerable impact on the success of comfort interventions. Examples of these variables are the patient's financial situation, cognitive status, extent of social support, and prognosis.

Part 2 of comfort theory states that enhanced comfort strengthens patients to consciously or subconsciously engage in behaviors that move them toward a state of well-being. These behaviors are called health-seeking behaviors and provide rationale for implementing comfort interventions. For example, patients in the perianesthesia setting, health seeking behaviors might include decreased blood loss, no complications, increased healing, increased mobility, and the ability to take oral fluids. Health seeking behaviors are related to what is called institutional integrity in part 3 of comfort theory. Institutional integrity is defined as the quality or state of health care organizations in terms of being complete, sound, upright, professional, and ethical providers of health care. It is measured by many indicators, including cost of care; length of stay; staff turnover rate; and patient, nurse, and patients satisfaction (Wilson & Kolcaba, 2004).

Major concepts and definitions used in theoretical framework

- Healthcare needs are those identified by the patient/family in a particular practice setting .

- Comforting interventions are nursing interventions that are designed to address specific comfort needs of recipients. This includes physiological, social, financial, psychological, spiritual, environmental, and physical interventions.

- Intervening variables are interacting forces that influence recipients' perceptions of total comfort. This includes factors such as past experiences, age, attitude, emotional state, support system, prognosis, and finances.

- Enhanced comfort is an immediate desirable outcome of nursing care, according to Comfort Theory. When comfort interventions are delivered consistently over time, they are theoretically correlated a trend toward increased comfort levels over time, and with desired health seeking behaviors (HSBs).

- Health-Seeking Behaviors (HSBs): the concept of HSBs was first introduced by Scholtfeldt (1975), and it consists of 2 parts:

- Internal HSBs: healing, immune function, white blood cell count, etc.

- External HSBs: health related activities, functional outcomes, peaceful death.

- Institutional Integrity is defined as the values, financial stability, and wholeness of health care organizations at local, regional, state, and national levels.

Best practices are those standard operating developed by an institution for specific patient/family applications after collecting evidence. While best policies are protocols and guidelines, that standardize practices developed by an institution for overall use after collecting evidence (Kennedy, 2002; Kolcaba, 2003; Domingo et al., 2010).

Kolcaba's Comfort Theory is applicable to many populations including Alzheimer's, hospice, postanesthesia nursing, women and childbirth, pediatrics, and ambulatory care. Comfort Theory states enhanced comfort strengthens patients to consciously or

subconsciously engage in behaviors that move them toward a state of well-being. These behaviors are called health-seeking behaviors and provide rationale for implementing comfort interventions.

Ultimately, Comfort Theory involves the process of comforting actions performed by a nurse for a patient. According to this theory, patients experience comfort needs in stressful health care situations. Patients and their families meet some needs but other needs remain unmet. These needs can be identified by a nurse who then implements pharmacologic and non-pharmacologic comfort measures to meet the needs. In order to achieve that, nurses have to had adequate knowledge, with appropriate attitudes to be able to assess and evaluate patient's comfort needs. Comforting measures can provide pain relief, help ease distress or help support the patient to go through the experience or condition. Subsequently. This reduces the individual and national cost of recovery.

Chapter Two:

Literature Review:

2.1 Introduction

Pediatric pain is a multifaceted, complex phenomenon requiring a multidimensional approach. An accurate and current knowledge base is required to effectively assess and manage a child's pain. This chapter presents a review of literature relevant to the research purpose of this thesis. The literature review is organized into sections: 1) literature related to the concepts of pain, 2) types of pain, 3) nurses' knowledge deficits, and attitudes with respect to pain will be presented in this discussion.

2.1.1 Concept of pain

Pain is a universal human experience and is the most common cause of seeking medical assistance (Turk & Dworkin, 2004). Traditionally, pain was considered only 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 (Cohen et al., 2008). Recent research shows that feelings of pain have distinct relationships to the physical, emotional, and cognitive aspects of individuals. Pain has no boundaries and can affect anyone, regardless the age or gender. It disrupts everyday living activities and can significantly reduce the quality of life for suffering people (D'Arcy, 2011). This view of pain has expanded our understanding of pain and given us new ways to understand its characteristics.

Pain was defined by the International Association of Pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” (Harvey, 1995). The definition indicates that pain is a complicated entity and has not only a physical component but an emotional personal experience as well (Cohen et al., 2008). Pain was also defined as “whatever the experiencing person says it is and whenever he says it does.” By this definition we cannot measure pain objectively. Pain is always subjective and can only be viewed in terms of the person's experience, and only the suffering person knows how the experience feels. Because pain is a private, internal event that cannot be directly observed. 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 not able to properly express their levels of pain (Jenerette et al., 2015).

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; Smart & Cottrell, 2005)

2.1.2 Types of pain

Pain has been categorized into different types. This is according to 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 and identifiable cause, such as injury, operation, or a disease, and will disappear after the injury is healed or the disease resolved (D'Arcy, 2007; Oakes, 2001). This pain lasts for a short period of time, ranging from one moment to less than three to six months. This type of pain is usually accompanied by

physiological and behavioral responses. Physiologic indicators for acute pain include increased blood pressure, heart rates, and respiratory rates. Behavioral responses include increased levels of anxiety, facial expressions, sleep disturbances, restlessness, irritability, aggression, and difficulties in movement (Sekhon et al., 2017; Hatfield & Ely, 2015; Oakes, 2001). The duration 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, financial problems, low self-esteem, and withdrawal from social environment and these are more common in patient with chronic pain (Holzemer, Tesler, & Savedra, 1998; Palermo & Chambers, 2005; Sekhon et al., 2017).

Based on source, pain is classified as nociceptive and neuropathic pain. Nociceptive pain is most common types of pain following tissue injury and sometimes called "physiological pain". This provokes a pain-producing stimulus that sends an electrical impulse across a pain receptor in the tissues that have been injured 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 (Shipton, 2013). Somatic pain is divided as somatic and cutaneous pain, and arise from bones, tendons, nerves, and blood vessels, while cutaneous pain originates in the skin or subcutaneous tissue (Jarrell, et al., 2011).

Cancer pain: Patients who are diagnosed with cancer, they experience pain due to cancer itself or \ and cancer treatment (Fisch et al., 2012). Cancer pain can be the result of tumor growth and compression, metastases, or cancer related therapies such as procedures and testing, surgical pain, radiation, chemotherapy, and phantom pain (Treede et al., 2015).

Cancer pain can be both acute and chronic in nature. Cancer pain is more common in patients with advanced stage or metastatic (Apolone et al., 2009). about half of cancer patients experience interference in daily activity caused by pain, even when treated, is often severe enough to impair their ability to function. 62%of pediatrics have pain at diagnosis, while 62–90% have pain at the end of life (DiMaio et al., 2004; Yates et al., 2002).

Neuropathic pain is also known as non-nociceptive or pathological pain. It is caused by direct injury to the structure of the nervous system. Abnormal firing of nerves giving pain without a stimulus. Patients describe neuropathic pain as a sensation of burning, stabbing, or shooting, they may also complain of numbness or pins and needles. Often this pain may continue after the injury is healed and nor well localized. This pain occurs commonly in patients recovering after operation associated with nerves such as amputation of a limb or disease involved with nerves like Guillain-Barre syndrome (Tesfaye & Selvarajah, 2012; Nooten et al., 2017)

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, 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 situations 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 pain killers (Pillay & Lalloo, 1989).

2.1.3 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 disappear (Smart & Cottrell, 2005). The most severe post-operative pain occurs within 48 hours after surgery depending on the site and type of surgery (Jacob & Mueller, 2008). 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, some chemical substances such as histamine, bradykinin, substance P, and prostaglandin stimulate peripheral pain receptors then transmit pain impulse to the spinal cord via afferent nerve fibers. This process 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). Many factors play an important role in expression and coping of pain such as age, gender, past experience of pain, or socio-cultural group (Pogatzki-Zahn, Segelcke, & Schug, 2017). 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 (Broome et al., 1996; Vincent & Denyes, 2004). The consequence of inadequate pain management is that pain becomes chronic and persistent followed by the progression of disease (Loeser & Melzack, 1999).

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., 1996; Twycross, 2007). 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, 1999). A study in Bangladesh indicated that currently analgesic practices in relieving children's pain are 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 postoperative 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. 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, 2007) 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.

2.2 Pain theories

In the literature there are many theories of pain such as, the specificity theory of pain; the pattern theory of pain; the gate control theory. All of these theories have been proposed and developed to understand the mechanism of pain and ways to alleviate it (Coffey & Mahon, 1982).

2.2.1 Specificity theory

The specificity theory suggests that pain is a specific sensation and that the severity of pain is related to the area of tissue damage. Müller (1842) recognized that the brain receives information about external objects through 5 senses, seeing, taste, hearing, smell and touch. Von Frey (1894) expanded this concept and deduced that the skin was consisted of four types of sensory spots that responded to specific sensations. However, given that this was still focused on the relationship between physical sensation and experience of pain (Dubner, 1978; Melzack et al., 1996; Moayedi & Davis, 2013).

2.2.2 Pattern theories

In an attempt to modify theories of pain; a "quantitative theory of feeling" had been proposed in (1929). This theory ignored findings of specialized nerve endings and many of

the observations supporting the specificity theory of pain. The theory stated that any somesthetic sensation occurred by a specific and particular pattern of neural firing and that the spatial and temporal profile of firing of the peripheral nerves encoded the stimulus type and intensity. (Lele, Sinclair, & Weddell, 1954) supported this theory and added that cutaneous sensory nerve fibers, with the exception of those innervating hair cells, are the same.

2.2.3 Gate Control Theory

The gate control theory of pain developed by Melzack and Wall in 1965 (Melzack & Wall, 1965). They proposed that tiny neural networks distributed along the dorsal horn of the spinal cord are responsible for reducing the pain in a specific body location when an intense tactile stimulation is applied at the same place. We practice this concept in our daily life when rubbing the spot where an injury has just occurred. Researchers observed that there are many factors such as thoughts, emotions, and expectations can influence our perceptions of pain. For example when patient expect something to hurt, it probably will hurt worse. If the patient is angry or frightened, pain may seem more intense than it would if patient was calm.

Unlike an actual gate, which opens and closes to allow things to pass through, the "gate" in the spinal cord operates through differentiating between the types of fibers carrying pain signals. Pain signals traveling via small nerve fibers are allowed to pass through while signals sent by large nerve fibers are blocked. They explained Gate's mechanism as the following, after an injury, pain signals are transmitted to the spinal cord and then to the brain. Melzack and Wall suggested that before the information is transmitted to the brain, the pain messages meet "nerve gates" that control whether these signals are allowed to pass through the brain. In some cases, the signals are passed along more readily and pain is

experienced more intensely. In other instances, pain messages are minimized or even prevented from reaching the brain at all. This gating mechanism takes place in the dorsal horn of the body's spinal cord. Both small nerve fibers (pain fibers) and large nerve fibers (normal fibers for touch, pressure, and other skin senses) both carry information to two areas of the dorsal horn. These two areas are either the transmission cells that carry information up the spinal cord to the brain or the inhibitory interneurons which halt or impede the transmission of sensory information. Gate control theory is also often used to explain why massage and touch can be helpful pain management strategies during childbirth. Because the touch increases large fiber activity, it has an inhibitory effect on pain signals ("The gate control theory of pain," 1978; Melzack & Wall, 1965; Peláez & Taniguchi, 2016).

2.3 Factors Influencing Pain

The perception of pain is influenced by age, gender, genetic make-up, cultural factors, fears and anxiety, and past experience of pain (Bradbury, 2003). These factors must be taken in consideration by nurses when dealing with patient with pain.

2.3.1 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, but they express pain by their behavioral response. These responses are associated with vocalization, facial expressions and body movements. Older children are able to report their pain appropriately, except children who are very sick and cognitively diminished. Nurses need to use words familiar to them and with parents' assistance. Thus, when assessing pain, nurses should be aware of different ways of

assessing pain and consider the developmental stage of each age group so that nurses can choose appropriate pain assessment tools (Crisp & Taylor, 2008).

2.3.2 Gender

According to many studies, women are more sensitive to pain than men. 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 while females report diffused areas of pain (Crisp & Taylor, 2008; Jones & Zachariae, 2002).

2.3.3 Genetic makeup

Based on genetic makeup, Ethnic groups experience pain in different ways. 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 (Crisp & Taylor, 2008; Jamison & Edwards, 2012).

2.3.4 Cultural factors

Cultural beliefs and values affect individuals' 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 different among different cultures. In some cultures, any expression of pain is considered shameful. Some ethnic groups look to the pain as a punishment for doing mistakes. For others, pain looks like a test of faith, it's part of life and still others view pain as a challenge to be overcome (Dewi et al., 2007). These cultural differences must be noted in nursing practice when dealing with pain.

2.3.5 Fear and anxiety

Fear and anxiety is another important factor influence pain. Anxiety related to fearful event can increase the intensity of pain (Tsao et al., 2006). Fear tends to increase the perception of pain and vice versa. This connection occurs in the brain because painful stimuli activates portions of the limbic system that 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 (Jones & Zachariae, 2002). Nurses need to address both pain and anxiety by using all appropriate measures to relieve suffering.

2.3.6 Past experience of pain

It is common that children who have previous experience of multiple or prolonged pain will be less anxious and more resilient of pain than those who have had little experience of pain (Lovering, 2006). Children who have a past experience of adequately 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, Bahrampour, & Kohan, 2007).

Pain is a universal concept that is experienced in many ways from birth to death. Sometimes children cannot 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 (Smart & Cottrell, 2005). Nurses need to know all factors and cultural differences in responding to pain during the assessment and management of a patient's pain. Nurses should respect every individual and strive to alleviate pain and suffering in performing their duties.

2.3.7 Consequences of untreated pain

Pain is a noxious stimulus that can threaten homeostasis. The adaptive response to such a stress involves physiological changes that, in the initial stages, are useful and are also potentially life-saving but with prolonged activation become fatal (King & Fraser, 2013). Unrelieved pain can result in negative health outcomes such as; increased morbidity; increased hospital stays; increased recovery time; delayed return to normal life activities; and increased risk of chronic pain. Untreated pain also can be responsible for varied physical and psychological effects which are summarized in the following points (Bulow et al., 1995; Finestone, Alfeeli, & Fisher, 2008; O'Sullivan & Beales, 2007; Samieirad et al., 2017): Rapid, shallow, splinted breathing, which can lead to hypoxemia and alkalosis. Inadequate expansion of lungs and poor cough, which can lead to retention of secretions and atelectasis. Increased heart rate, blood pressure and myocardial oxygen requirements, which can lead to cardiac morbidity and ischemia. Increased stress hormones (e.g. cortisol, adrenaline, catecholamine), which in turn increase the metabolic rate, impede healing and decrease immune function. Slowing or stasis of gut and urinary systems, which leads to nausea, vomiting, ileus and urinary retention. Muscle tension, spasm and fatigue, which lead to reluctance to move spontaneously and refusal to ambulate, further delaying recovery. Behavioral disturbances; fear, anxiety, distress, sleep disturbance, reduced coping, developmental regression.

2.4 Pain Assessment in Children

Assessment of a patient's experience of pain is a crucial component in providing effective pain management. A systematic process of pain assessment, measurement and evaluation, enhances the health care teams' ability to achieve a reduced experience of pain; increased comfort; improved physiological, psychological and physical function; and increased

satisfaction with pain management. Pain is not a simple sensation that can be easily assessed and measured. Nurses should be aware of the many factors that can influence the patients overall experience and expression of pain, and these should be considered during the assessment process (Wilson, 2007).

The experience of pain is complex, according to Silkman (2008) who describes the multi-dimensional complexity of pain in physiological, sensory, behavioral, socio-culture, cognitive and affective. The physiological dimension includes; the patient perception of pain and body's reaction to the stimulus. The sensory dimension concerns the quality of the pain and how severe the pain is perceived to be. This dimension includes: patient perception of pain's location, intensity and quality. The behavioral dimension refers to how the patient response to the pain through verbal and non-verbal behaviors. The social-cultural dimension concern the influence of the social context and culture background on the patient pain's experience. The cognitive dimension concern 'beliefs, attitude, intention and motivation related to pain and its management. The affective dimension concern with feeling and emotion related to pain experience. The Physiological and Sensory dimensions of pain experience explain the cause and characteristic of parson's pain and within these dimensions may focus on a specific parameter, such as pain intensity, quality, location, duration and aggravating and alleviating factors (Ferrell et al., 2015).

Intensity; evaluation of pain severity is an important aspect of complete pain assessment and should be conducted in appropriate manner that suitable to the population. Pain intensity defined by Twycross (1994) "the least stimuli at which the person are perceives as a sensation". many tools are developed for the clinical assessment of pain intensity such as the Visual Analog Scale (VAS), Verbal Descriptor Scales (VDS). These tools have been validated for use with older adults, as well as the general adult population (Herr et al., 2004).

Quality; in the assessment of pain, information about pain quality is so useful. Melzack and Torgerson (1971) were among the first to systematically study words that people used to describe pain. They composed a list of 102 words from the clinical literature on pain and organized them into classes that describe sensory and affective and evaluative properties of pain. Examples of these sensory words (constant “burning” pulsing intermittent “shooting” or “electric shock-like” pain) (Melzack & Torgerson, 1971). It has been demonstrated clinically that patients with neuropathic pain are significantly more likely to use six particular sensory adjectives (“electric-shock,” “burning,” “tingling,” “cold,” “pricking,” and “itching”) to describe their pain.

Location; the location and distribution of the pain is important clinical information because most patients have 2 or more sites of pain. In Neuropathic pain it often correlates with the degree of neural lesions (Chong & Bajwa, 2003). Patients with chronic pain are often asked to complete a body diagram to document pain distribution, which has been shown to be useful in younger patients. Having the patient point to the painful area can be more specific and help to determine interventions (D'Arcy, 2011).

Duration; The duration of the pain includes; whether its onset was sudden or gradual; and whether the pain is intermittent, continuous, or paroxysmal. Breakthrough pain refers to a transitory exacerbation or flare of pain occurring in an individual who is on a regimen of analgesics for continuous stable pain (Fink, 2000; Portenoy, 1990). Patients need to be asked, “if is your pain always present, or does it come and go?” or “Do you have both chronic and breakthrough pain?”. Alleviating factors; Asking the patient to describe the factors that reduce the pain will help to determine the interventions, “What are things that make the pain better or worse?” Analgesics, non-pharmacologic approaches such as (massage, relaxation, music or visualization therapy, heat or cold), and nerve blocks are

some interventions that may relieve the pain. Other factors such as movement, physical therapy, activity, intravenous sticks or aqua-puncture, depression, sadness, and bad news may affect the intensity of pain (D'Arcy, 2011; Fink, 2000).

Anderson and colleagues found lack of pain assessment was one of the major problematic barriers to achieving optimal pain treatment (Anderson et al., 2000). Accurate pain assessment is essential to ensure that pain is managed effectively. Without assessment, it is difficult to identify the nature of pain. Effective communication is basic element 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 factors, and accompanying symptoms. nurses can get information about these factors by asking about pain history, doing physical examination, observations, and using various pain assessment scales appropriate to age. There are three types of pain measures: 1) behavioral measures 2) physiologic or biological measures, and 3) self- reports (Jacob & Mueller, 2008).

2.4.1 Behavioral measurement of pain

Behavioral pain measurement can provide a complete picture of the total pain experience. These include distress behaviors such as vocalization, facial expressions, and body movements associated with pain (Jacob & Mueller, 2008). Behavioral pain assessment is useful for measuring pain in infants and pre-verbal children who do not have enough language skills to express their feeling of pain. These types of pain measures are also useful for children with mental disturbances and confusion that inhibit their ability to communicate appropriately. 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 children. These measures depend on a trained observer watching

and recording the pain behaviors. there are 3 common used behavioral pain measurement tools such as Face, Legs, Activity, Cry, Consolability (FLACC) scale; The Children's Hospital of Eastern Ontario Pain Scale (CHEOPS); and The Toddler-Preschooler Post-operative Pain Scale (TPPPS). The first one is most common tool that used for operative and non-operative pain. While the last two tools are mainly specific to use with post-operative pain assessment.

The FLACC Scale: This scale was developed by Merkel, and Lewis, in 1997. It is a behavioral scale for scoring 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. Each category is scored on the 0-2 scale which results in a total score of 0-10. Assessment of Behavioral Score as the following: **0** = Relaxed and comfortable, **1-3** = Mild discomfort, **4-6** = Moderate pain, and **7-10** = Severe discomfort/pain. 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) (Herr et al., 2011; Jacob et al., 2007; Merkel et al., 1997; Lewis et al., 2010).

2.4.2 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 & Mueller, 2008).

2.4.3 Self-report

Self-report is considered as the golden standard for pain measurement in a pediatrics. Although it is accepted that accurate pain assessment is based on a variety of valid and reliable measures, use of self-report measures is considered as one of the best descriptions of the character of pain (Mann & Carr, 2008), and pain control will only be achieved when the patients' self-report is then completely accepted. Despite recommendations that nurses ask patients about their pain status, studies still find that this is not normally what happens. For example, according to a study surveyed 180 Registered nurses in 14 UK hospitals and found that the majority of nurses did not follow recommendations for asking patients about their pain (Schafheutle, Cantrill, & Noyce, 2001). This is confirmed by similar findings reported in earlier studies (McCaffery & Ferrell, 1997). Self-report assessment is useful for those who are able to communicate verbally by using cognitive characteristics particularly for school age children (Ely, 2001). 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, Numeric rating scale (NRS), 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 ranging from happy appearing to sad appearing with tears on the face. It 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 (Holzemer, Tesler, & Savedra, 1998; D'Arcy, 2011).

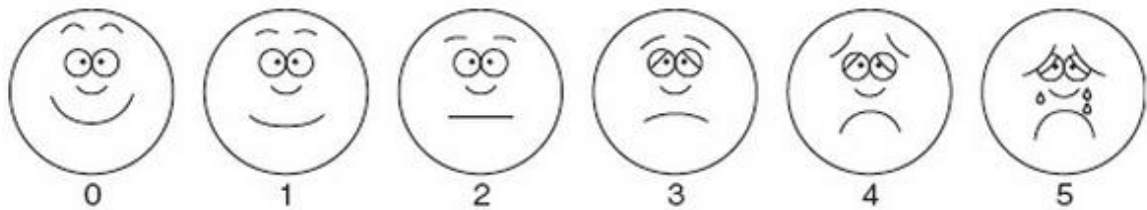


Figure (2.1): Wong-Baker Faces Pain Scale

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 (Tesler et al., 1998; D'Arcy, 2011).

The most commonly used one-dimensional pain scale is the Numeric Rating Scale (NRS). This scale is made up of a horizontal line with the beginning point marked 0, or “no pain,” and the opposite end marked 10, or “worst possible pain.” Patients are asked to rate their pain from 0 to 10, choosing the number that best represents the intensity of the pain they are experiencing. Generally the pain in the 1–3 range is considered mild pain, 4–6 indicates moderate pain, and 7–10 is the highest level, or severe level, of pain. This scale is useful for assessing efficacy of pain interventions. For example, by asking the patient for a

numeric rating prior to pain medication and then asking the pain rating after half an hour or one hour, healthcare providers can measure the efficacy of the medication (D'Arcy, 2007).

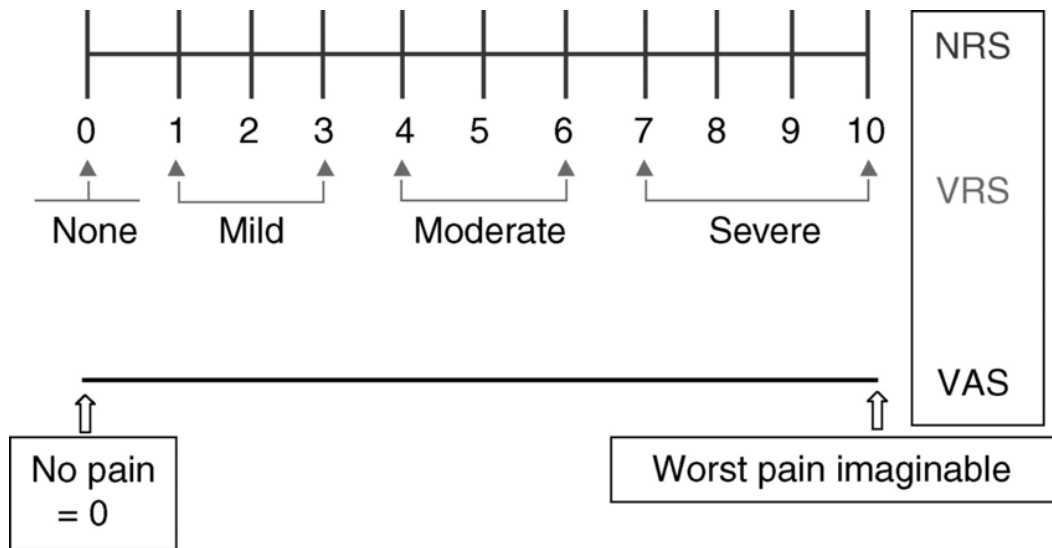


Figure (2.2): Numeric Rating Scale

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 (Timby, 2009).

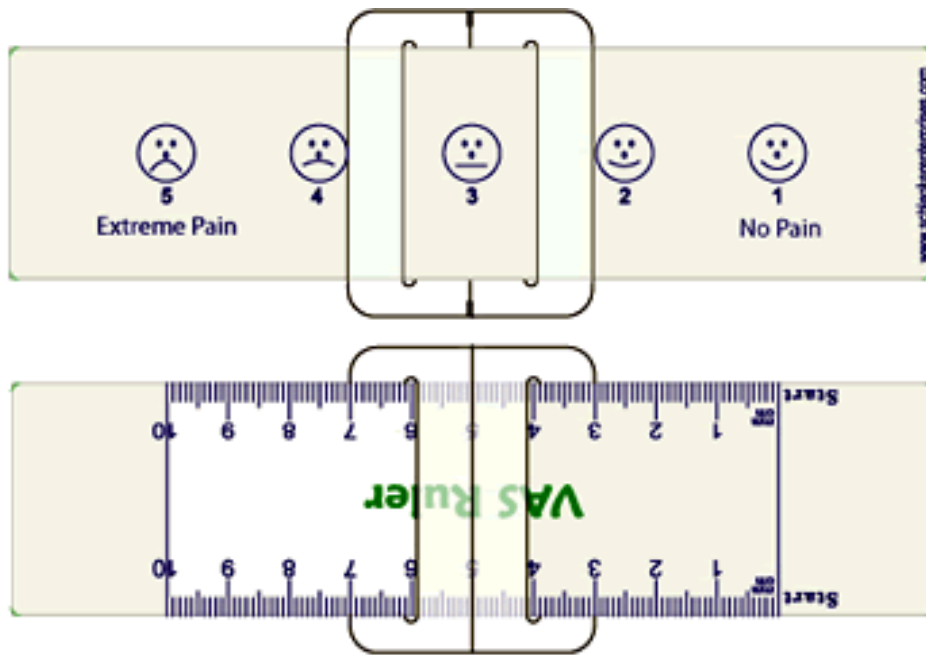


Figure (2.3): Visual Analog Scale

In summary, it is clear that for the complete assessment and management of pain in children, nurses have to ask, observe and use 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.

2.5 Pain Management in Children

Because pain management is complex and not easy job, many pediatric pain centers developed strategies for pain management in children. These approaches aim to: recognizing pain, minimizing pain safely in children, preventing predicted pain; control the pain rapidly, and continuing control after discharge from hospital. Pain management strategies consist of pharmacological and non-pharmacological approaches. Whenever possible both pharmacological and non-pharmacological approaches should be used (Twycross, Dowden, & Bruce, 2009).

2.5.1 Pharmacological pain management

Pharmacological pain management is used to relieve pain through medication. There are two basic groups of pain medications: non-opioids and opioids.

Non-opioid analgesics: Non-opioid analgesics relieve pain by acting in peripheral nerve ending to reduce the inflammatory mediators. This group includes drugs such as acetaminophen (Acamol), and non-steroidal anti-inflammatory drugs (NSAIDs) such as acetylsalicylic acid (Aspirin) and ibuprofen (Isofen). The specific actions and dosages of these drugs vary. In general, this group had analgesic, antipyretic, and anti-inflammatory effects and are useful for mild to moderate pain (Naeem et al., 2016; Sinatra, 2009).

Opioid analgesics: Opioid (narcotic) analgesics are derivatives of opium and include drugs such as morphine, codeine, and methadone. These medications provide a sense of euphoria by binding to specific opiate receptors throughout the central nervous system (Sinatra, 2009). Despite of different effects of these drugs, morphine is considered the gold standard for severe pain management. When morphine is not a suitable choice, hydro morphine and fentanyl are effective alternatives.

Both opioids and NSAIDs have some side effects as all drugs. The major concerns with opioids are respiratory depression, sedation, nausea, vomiting, mental confusion, constipation, skin rash, and orthostatic hypotension. The most serious complication arising from opioids is respiratory depression. Even the incidence rate is rare, nurses must be ready for immediate and appropriate intervention. 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 (Benyamin et al., 2008; Sinatra, 2009). Signs of tolerance are decreased period of pain relief. Opioids have a tendency to cause dependence

when used for a long time. Early signs of dependence are withdrawal symptoms such as lacrimation, rhinorrhea, and sweating. The later signs of withdrawal symptoms are restlessness, irritability, tremors, anorexia, and dilated pupils (Jacob et al., 2008; Wong & Ingenito, 1993). There are medications that called as "adjuvant agents" such as antidepressants, anticonvulsants, neuroleptics, psycho-stimulants, corticosteroids which are used with combination of opioids to minimize side effects of opioids (Jacob et al., 2008).

Placebo: A placebo is a "sugar pill" or "normal saline" or "sterile water" as injection with no active ingredients. Even so, research has found that placebos produce satisfied results in almost half of the people who take them. Placebo effects don't mean that the patient is acting and doesn't feel pain, also it isn't used to determine if the pain is real or not, the important thing behind this point is the psychological part is very important when dealing with patient in pain. Pediatric nurse must have knowledge about the role of opioids, non-opioids, and adjuvants; uses, doses, side effects, and drug interactions. Moreover, they should be able to decide the most effective method of pharmacological pain management for the patient as individual (Jacob et al., 2008).

2.5.2 Non-pharmacological pain management

Non-pharmacological pain management is an approach to a comprehensive method of pain management of children. These methods are used in combination with pharmacological methods of pain management in order to enhance pain relief and to be more effective. Also it is not an alternative to pharmacological pain management. Categories of non-pharmacologic approaches are classified to three strategies, there are cognitive or behavioral strategies, which include distraction, relaxation, imagery, and breathing techniques. The second category is physical or cutaneous strategies, which include heat/cold, vibration, massage, position changes, and trans-electrical nerve stimulation.

Finally, there are environmental or emotional strategies such as touch, reassurance, or interior decorating of the room; which can be made familiar and pleasurable to children with combination of toys or colorful paintings and pictures and can help in reducing pain (He et al., 2008; Polkki, Julkunen, & Pietila, 2001).

Non-pharmacological intervention is an important aspect for best pain management of children. Fortunately there is no risk or interaction with drugs as pharmacological intervention (Reuben & Buvanendran, 2007). Nurses should have the ability to combine pharmacological and non-pharmacological interventions to manage the pain of children in their practice to get more beneficial results. Sometimes these treatment options overlap each other. Pediatric nurses should take in consideration many points such as appropriateness of specific approach to an individual patient, the relationship between pharmacological and non-pharmacological interventions, and children's previous experience and willingness to undergo the approach (Fergusson, 2009; Vasquenza et al., 2015).

2.6 Studies about knowledge and attitudes deficits

One of the major obstacles in the management of children's pain is healthcare professionals' inadequate knowledge of pain, pain assessment, and pain management. Numerous studies have indicated that nurses' knowledge of pain management is less than optimal. Studies of educational resources for nurses also demonstrated a need for improvement.

Many studies have found nurses' knowledge and attitudes to being accurate, insufficient and poor in assessing and managing children's pain. (Vincent, 2005, Ortiz et al, 2015, Thomas et al, 2015, Ekim & Ocakci, 2013, Tiernan, 2008, Enskar et al, 2007, Salanter, 1999, Chafe, Harnum, & Porter, 2016, Young, 2005, Raffaelli et al, 2016, Mathew & singhi,

2011, Trotter, 2015, Vincent & Szalacha, 2010), They found similar results that there was a lack of knowledge and attitudes of nurses toward pain management in children, also they recommended educational programs and training for nurses. A study conducted by Vincent in 2005 about nurses' knowledge, attitudes, and practice regarding children's pain. It was carried out in Midwestern children's hospital in United States, Quantitative, cross sectional descriptive study with convenience sample of 67 nurses, and 132 children. she found that nurse have lack of knowledge in percentage of respiratory depression occurrence and insufficient relying on self-report of children to assess pain. According to the study, nurses believe that about 20% of 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. Another frequently common misconception is that some nurses think that children can easily become addicted to narcotic analgesics. And the word of morphine is scary. However, The risk of narcotic-induced respiratory depression in adults is about 0.09 %, whereas in children it ranges between 0 and 1% (Anand, Sippell, & Aynsley-Green, 1987; Jay, Thomas, Nandi, & Howard, 2017; Stanley & Schafer, 2012). There are no data to support that children are more susceptible to respiratory depression than are adults (Hendrickson et al., 1987; James et al., 2002; Jacob et al., 2008). With adequate monitoring and adherence to appropriate guidelines for dosages, respiratory depression should be a rare event in children (James et al., 2002). Researcher recommended that nurses should become more aware of analgesic administration adequacy, become more knowledgeable about respiratory depression in children who receiving opioids, also nurses should give more attention for self- report for

pain assessment and take it into their considerations. One strength of this study was use of multiple instruments, and taking in considerations self-report of children in assessment of their pain to compare it with nurses point of view. Weakness point was small sample of nurses who participated (Vincent, 2005). Ortiz et al, (2015) conducted a study about nurses' and nursing students' knowledge and attitudes regarding pediatric pain. This descriptive, cross sectional study was carried out on 111 Mexican pediatric nurses and 300 undergraduate nursing students from 6 different levels. Study revealed that level of knowledge about pain and pain management is very poor in both pediatric nurses and nursing students. Main problems were in pain assessment and management, pharmacological intervention and pain medication. Development of continuous educational and evaluation programs among pediatric nurses was recommended, also the need for curriculum revision. Limitation of this study was students who participated in the study were from 6 different levels of nursing bachelor (Ortiz et al., 2015). In addition study was conducted about triage nurses perspective and knowledge about pediatric pain management in emergency department, this study was performed at 3 Canadian emergency departments, 2 of them only for pediatrics and the another one for general and pediatric. Descriptive cross sectional study with sample of this study 126 triage nurses. Special survey tool was developed for the study. Triage initiated pain protocols have been shown to decrease the time to analgesia and increase the rate of analgesia provision to children with pain. It revealed that more years of pediatric experience associated with decreased acceptable time delays for children with mild, moderate, and severe pain. This study identified a need for increased training and education of triage nurses in pediatric pain assessment and management. Also the study showed a correlation between years of nursing experience and increased comfort with providing non-pharmacologic analgesia, such as distraction and splinting. Limitation of the study were: this study had only covered 3 emergency

departments in Canada, study sample was also small which was 126 nurses. Strength of this study that it was performed in emergency department which is very important, because emergency department is most stressful one at all hospital, when good assessment and proper relief of pain done at emergency, children will less likely to suffer from pain, and also parents will be satisfied (Thomas et al., 2015). Stanley & Pollard, (2013) found years of pediatric experience in pediatric nursing demonstrated positive relationship to level of knowledge and high PNKAS scores among nurses. According to their study that was conducted about attitudes, and self-efficacy of nurses in management of pediatric pain. Which was cross sectional, correlational study and it was performed in north Carolina in 2 regional hospitals with convenience sample of 25 nurses. Two instruments were used: pediatric nurses knowledge and attitudes regarding pain, and self- efficacy in managing children in pain. Purpose of this study was to assess relationship between knowledge and self-efficacy of pain management in pediatric nurses. and no relationship was found between level of knowledge and self – efficacy. Limitation of this study was small sample size which was 25 nurses and just 2 hospitals involved in the study.

Moreover study was conducted about knowledge and attitudes of pediatric nurses toward pain management in Turkey. Quantitative study was carried out in 5 pediatric hospitals by using PNKAS questionnaire, sample was 244 pediatric nurse. The findings of the study showed that pediatric nurses in Turkey had insufficient knowledge toward pain management, it was clear that most of participants had lack of knowledge about pharmacologic interventions, and side effects of opioid especially addiction. and they need more education about pain assessment and management, Revision of nursing curriculum and training programs for pediatric nurses (Ekim & Ocakci, 2013). Another study was conducted about knowledge and attitudes of Irish registered nurses regarding pediatric pain management. Quantitative study was performed in Irish pediatric hospitals. PNKAS

questionnaire was used with simple random sample of 174 nurses with all specialties from one pediatric hospital. Results showed that there was knowledge deficit in pharmacologic aspect especially risk of respiratory depression and addiction of opioid. Also there was lack of knowledge about pain assessment, the majority of nurses believed that children over reported their pain, children's report was ignored by many nurses(Tiernan, 2008). Comparative study was conducted between UK, South Africa, and Sweden about attitudes and knowledge about pain management of nurses working with cancer children. Sample was 106 registered nurses, Salantera instrument on knowledge and attitudes to pain in children was chosen. Results of this study showed that Swedish nurses have higher level of knowledge and positive attitudes to pain management than UK and South Africa nurses. but there is a gap of knowledge and attitudes in all groups, For UK nurses, sociology and psychology of pain should be need more focus. Swedish nurses should improve their level of knowledge about non pharmacological pain management strategies. South Africa nurses need to improve level of knowledge to ensure more positive attitudes toward pain management. There was a clear correlation between high level of knowledge and positive attitudes to pain management. Moreover in this study was showed nurses with special training in pediatric care had higher levels of knowledge. Educational programs were also recommended for all nurses to increase their knowledge and attitudes toward pain management. Great limitation of this study was nurses education, age, responsibilities, and working conditions could differ greatly between the 3 countries thus may affect the results of the study. Weakness of the study was small samples which were in UK 44 nurses, south Africa 21 nurses, Sweden 41 nurses (Enskär et al., 2007). Furthermore, study was carried out about Finnish nurses' attitudes to pain in children. study was at Finland, at children departments of 5 university hospitals. Non experimental survey used in this study, with 256 registered nurses as convenience sample. One questionnaire used, and instrument was

developed with likert type scale especially for this study. Study showed that nurses attitudes did not hinder effective pain management of children. Also nurses demographic variables such as experience, education, and age do not affect significantly attitudes of nurses. But there were gaps in their knowledge with pharmacological and non-pharmacological pain management in children. The amount of education and the area of expertise of nurses were significant influences on their knowledge scores, indicating that there was a clear need for further education. Training courses for nurses to be able to deal with different pain procedures and situations. more involvement of parents in pain management also are recommended. Strengths of this study, large sample which is representative because it was approximately one third of study population, instrument had covered many areas such as nurses attitudes and beliefs, nature of pain. characteristics of children. thus lead to better understanding and analysis of nurses attitudes and perceptions toward pain (Salantera, 1999). Also study was conducted about improving the treatment and assessment of pain in pediatric emergency department. This qualitative study was carried out at Jane way children's health center in Canada and the purpose of the study was to investigate the impact of the previous initiative that used to improve the treatment of pain. The continued barrier was the difficulty of assessing pain accurately. Many physician and nurses raised the need for training courses especially in reducing pain through non-pharmacologic methods. According to this study nurses still believe that self-report of pain is not reliable to assess pain (Chafe, Harnum, & Porter, 2016). Similar result was found by Young et al. (2005) that nurses believe that pain assessment tools are an important part of assessing pain properly and addressing pain problems effectively. However, 29 of 52 nurses believed that pain assessment tools are subjective and inaccurate. A study was conducted in Italy to assess knowledge and attitudes of health care providers toward fever and pain management among children. sample size was 500

healthcare providers, 71 of them were pediatric nurses. Many of the respondents did not know the recommended pediatric doses of paracetamol and ibuprofen, with more pediatric nurses giving wrong answers to both questions. In terms of drug safety, pediatric nurses were less frequently aware that the main paracetamol-related adverse event is hepatotoxicity and that the main ibuprofen-related adverse event is gastric irritation (Raffaelli et al., 2016). In a pilot study with 20 pediatric nurses, Vincent found that when nurses were thinking about assessing children's pain, 35% did not include self-report in their cognitive representations and 20% did not consider the child's behavior. Regarding pain management, 25% of nurses did not report thinking about pharmacologic approaches to relieve children's pain and 40% did not include non-pharmacologic approaches. Nurses did not identify self-report as the primary measure of pain intensity for children who were able to provide a self-report but rather relied on behavior to validate pain (Vincent, 2005). Similar results in mixed methods exploratory study was conducted to describe pediatric nurses' cognitive representations of the assessment and management of children's pain, it showed that behavior was a frequent and important assessment item in the nurses' cognitive representation indicates a major knowledge gap. Nurses also endorsed behavior more frequently than self-report for assessment of children's pain. And they often relied on the child's behavior to judge pain intensity and to administer morphine (Vincent, Wilkie, & Szalacha, 2010). Moreover, Mathew and Singhi (2011) conducted study in India to assess knowledge attitudes and practice for critical care pediatric nurses toward pain. This study included 56 nurses who work in three intensive care units which were pediatric, neonatal, and surgical intensive care units. Study found the absence of any objective scoring systems in use to assess pain in children. This may possibly be due to the lack of awareness of such scoring systems or the lack of time for implementation of such scoring systems. However there was a study conducted in Canada and it covered 15 pediatric

emergency centers, this study was carried out to determine the availability of currently used strategies in Canadian pediatric emergency departments. Results showed that the most frequently available pain assessment tools were verbal numerical scale and it was widely used in 80% of centers, and faces pain rating scale in 40% of these centers to assess pain. These were mostly used by nurses at triage, and while medical assessment. While behavioral pain scales, such as the Face, Legs, Activity, Cry, Consolability (FLACC) were rarely used (Trottier et al., 2015).

2.7 Barriers to adequate pain assessment

According to the literature, pain assessment barriers is one of significant reasons that can also contribute to inadequate pain assessment, in most recently study a comprehensive literature review into barriers hindering adequate pain assessment has been carried out by Oldenmenger et al., (2009). They found that the most frequently barriers are related to patients and health care providers; they found that knowledge deficits, inadequate pain assessment and misconceptions regarding pain were the most reported. Oldenmenger study in addition to many other studies had given attention on the barriers to the achievement of adequate pain assessment in clinical practice. In general these barriers are classified into three categories: professional, patient and system related barriers (Apolone et al., 2009; Yates et al., 2002).

Professional related barriers include lack of knowledge, deficits in skills related to pain assessment and individual attitude or misconception. These problems arise from a lack of fundamental training in the curriculum of health care providers while or in continuing education (Borneman et al., 2010; Sykes, Bennet, & Yuan, 2008). The quality of pain assessment depends on the knowledge, attitudes, and skills of those who provide the care. Nurses play a vital role in this process. Due to their role as mediators between the doctor

and the patient, and serve as the main observer of pain and discomfort in the patient. Unfortunately many nurses may not be prepared to assume this critical role. Many studies indicate that nurses' knowledge deficits, inadequate pain assessment skills and individual attitudes are the most problematic barriers for nurses in implementing adequate pain assessment (Kim et al., 2012; Walco et al., 1994).

Patients related factors also can affect pain assessment, Characteristics of patient such as, age and the temperament or behaviors of a child, is considered one of important barriers that influence adequate pain management. For example; irritability or crying, may trigger nurses to administer an analgesic immediately. But this is may be not performed with child who does not react verbally. patient who unable to communicate such as unconscious, intubated patients, they are unable to express their pain through facial expression and body movement, crying, so this may interrupt accurate pain assessment (Van Hulle Vincent & Denyes, 2004). According to study was conducted in North Ethiopia among 261 nurses in public hospitals of Mekelle City. It showed that more than half of participant did not know that managing pain for patients with Glasgow Coma Scale <8 is important; this could be due to the nurses misperception of believing unconscious children don't feel pain since the patient don't communicate besides being a child (Miftah et al., 2017). Child's medical diagnosis or nature of disease is also one of factors may affect nurses, or the type and duration of an surgical procedure; these may become indicators of pain intensity and need for analgesic administration (Twycross, 2002). Some studies (Colwell, Clark, & Perkins, 1996; Twycross, 2007) found that most of the time nurses routinely use pharmacological interventions in relieving children's pain rather than non-pharmacological interventions. Other studies have examined the types of non-pharmacological approaches used by children and their parents and have found that distraction is a method that is commonly used. such as watching television, playing and reading or talking with their parents (Idvall,

Holm, & Runeson, 2005; Polkki et al., 2003). Hatem, Lira and Mattos, (2006) conducted study through randomization of 84 patients to 30 minutes of music intervention after cardiac surgery, music reduced pain scores and had beneficial effects on heart rate and respiratory rate.

The health care system itself can be a barriers to adequate pain assessment through lack of pain assessment instruments, no designed areas for charting pain, lack of institutional polices for pain assessment, lack of pain management guidelines (Miftah et al., 2017). The existing curriculum in nursing education is another factor that contributes to preparing nurses in providing care for optimal pain relief in their practice. According to the literature, nurses still have knowledge deficits in pain management especially concerning post-operative pain care. The deficient areas of nurses' knowledge and attitudes include pain assessment, pharmacological and non-pharmacological pain management (Ferrell et al., 2015).

2.8 Pain educational intervention studies

It is evident that studies which evaluated the effects of pain education participation mainly reported positive outcomes on nurses' knowledge and attitudes to pain management. The existence of evidence that educating professionals about pain will improve their knowledge is widely acknowledged (Dalton et al., 1999). Furthermore, there is some evidence that there will also be an impact on pain practice, although there is limited confirmation that practice change is sustained. Examples of studies that evaluated the effect of educational intervention in participant's knowledge and attitude and reported positive outcomes on nurses', Study was conducted about effects of pain education program on nurses' pain knowledge, attitudes, and pain assessment practices in China in 2007. Experimental study was carried out in 2 teaching hospitals with sample of 196 nurses, were derived to control

group: 90 nurses, and experimental group 106 nurses. Experimental group had received education program for 5 weeks about pain management, how to implement pain assessment tool, results showed significant improvement of nurses' knowledge and attitudes toward pain assessment and management. Education program showed to be effectively improved nurses' knowledge, attitudes, and assessment of pediatric pain (Zhang et al., 2007). Another study conducted by McMillan et al., (2005) in which authors have reviewed the impact on nurses (n=18) following an intensive 32-hour pain program. Post-course tests, using a variety of validated measurement instruments, demonstrated significant improvements in pain knowledge, attitudes and management, leading the authors to suggest that longer pain programs were successful. Howell et al., (2000) reported a further positive outcome following the participation of 53 Registered Nurses in an eight-hour education course. The purpose of the course was development of positive beliefs and attitudes to pain. Additionally, nurses were given a pain assessment tool and a pain flow sheet that they were encouraged to use post-course. Pre-course, nurses completed a knowledge and attitude scale which was subsequently repeated at three months post-course. Immediately post-course there was a statistical improvement in knowledge and attitude scores. However, two months after the workshop 15 nurses had implemented the pain charts in their practice. In addition there was a study designed to evaluate the effects of an education program on nurses' practice of cancer pain assessment and their acceptance of patients' pain reports (n=645), demonstrated a statistically significant moderate change in knowledge and attitudes towards pain assessment and acceptance of patients' reports of pain (Ger et al., 2014). Similar outcomes were found by Patiraki et al., (2006) who conducted a randomized controlled study exploring the effectiveness of an educational intervention on nurses' attitudes and knowledge about pain management. A sample of 112 nurses was randomized into control and intervention groups and significant

improvements were found in the knowledge of the intervention group in knowledge test items following education intervention. Another study was conducted about The effect of educational intervention on nurses' attitudes toward the importance of family-centered care toward their hospitalized children in Iran. Experimental study was performed on 200 pediatric nurses in 2015. study was focused on the effectiveness of educational intervention concerning family-centered care in changing the attitudes of nurses in the pediatric wards according to the study, The results indicated that there was a significant increase in the mean score of attitude after intervention. nurses believe that Mother participation secures hospitalized child feeling, and mother knowledge can increase the quality of care (Rostami et al., 2015).

2.9 Summary

From the review undertaken in this chapter, children's pain is a complex human experience depending on variety of factors. Nurses spend the most time of all health professionals with patients and are therefore in a unique position to assess and manage pain. Nurses have to be knowledgeable with positive attitude in areas of pain assessment and pain management of children. Also they are responsible for communicating with patients to meet their needs and provide appropriate care based on in depth assessments. During pain assessment and management process. Nurses play a vital role in encouraging patients to express their needs and allowing them to take active role in their care. Pain should be assessed both before and after the administration of analgesics; Moreover, pain scales should be utilized routinely in practice to measure the effects of pain management. Educational programs are a potential method of improving nurses' knowledge of pain management and provide an opportunity to address negative attitudes and beliefs.

Chapter Three:

Research Methodology:

3.1 Introduction

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

3.2 Study population

The population consisted of all nurses who have working experiences in pediatric units at governmental and private hospitals in West Bank. Participants with educational background: Diploma, Bachelor, Master degree, or PhD of science in nursing, who had experience more than 6 months in pediatric wards. Arabic and English language readers and writers are included.

3.3 Setting and sample size

There are 81 hospitals in West Bank and Gaza Strip. 51 of the total hospital are in West Bank including East Jerusalem, while the rest are in Gaza Strip. Of the total hospitals, 27 of them are owned and operated by the MoH. The total number of nurses (including midwives) working in MoH was 4,142, of which 2,715 with 65.5% were employed in West Bank, while nurses approximately 2427 (MoH, 2016). According to a pilot study that was performed prior this study, the estimated number of nurses who work in pediatric units is

around 20 in each hospital, with 37% of population proportion. Sample distributed according population proportion as the following: Firstly, study population was categorized in three parts according to geographic areas: North, south, and middle areas. Secondly, north and middle areas cities were labeled and gathered in box then picked up 3 cities for north, and 3 cities for middle randomly, and the only one city which is Hebron was taken to represent south area. The selected cities were 7. Purposive sampling method was utilized in determining participants in the study. The participants were obtained from a list serve (human resource) of the government and private hospitals in the selected cities of West Bank in Palestine including Ramallah (Palestine medical complex, Istishari hospital), Jerusalem (Al Maqassed hospital), Bethlehem (Beit Jala hospital, Caritas Baby hospital), Hebron (Alia hospital, Red Crescent hospital, Yatta hospital), Nablus (Rafedia hospital, Al Najah hospital), Jenin (Jenin hospital, Al Razi hospital,), Tulkarm (Tulkarm hospital, Zakah hospital).

3.4 Sampling frame

A list of names of the nurses working in the pediatric units at governmental and private hospitals was obtained from the human resources in each hospital.

3.5 Inclusion and exclusion criteria:

A. Inclusion criteria:

1. Nurses who were currently working at pediatric wards and providing care for children.
2. Nurses who had been working at pediatric medical or surgical wards over the past one year and currently rotated to work at other wards.
3. Nurses who had completed a two years diploma in nursing and above.

B. Exclusion criteria:

1. Nurses who had less than 6 months of experience
2. Nurses who were not able to understand written English.

3.6 Study design

A descriptive cross sectional study design was utilized to test the research questions. The intention was to gather quantitative data on the number of pediatric nurses who possess inaccurate knowledge and attitudes with regards to pediatric pain. The use of this design also facilitated the identification of interrelationships between pediatric nurses' pain knowledge and attitudes. Selected demographic and professional variables were examined to explore their relationship to pain knowledge and attitudes.

3.7 Sample size calculation

Sample size calculation was conducted with significant level of 5% ($p < 0.005$) power of 95% and total of 2427 nurses, and it was determined by statistical analysis software. Sample size was distributed according to population proportion as the following: As mentioned in annual health report of PoH, 2016, West Bank nurses ratio is 7.8 per 10000 population, according to that; 695 nurses distributed in north area, 784 nurses in middle area, and 568 nurses in south area. According to human resources lists from selected hospitals, pediatric nurses represent around 37% of total nurses. Of 320 pediatric nurses, it was estimated that 33% for north area, 38% for the middle, and 27% for south area. Of the 320 nurses surveyed, 256 nurses responded with a response rate of 80%.

3.8 Instrument

Data were collected using a questionnaire that contains informed consent (Appendix 1), and a demographic form (Appendix 2). In this study Pediatric Nurses Knowledge and

Attitudes Survey Regarding Pain (PNKAS) was used (Appendix 3). The PNKAS was developed to reflect the standards for pediatric pain management from the American Pain Society, World Health Organization, and the Agency for Health Care Policy and Research. This tool was developed by (Manworren, 2001). from an adaptation of the nurses' knowledge and attitudes survey regarding pain (NKAS), originally first developed by (McCaffery & Ferrell, 1997). The modifications fit into 4 categories: modification of medication dosages, removal of meperidine and aspirin, addition of procedural pain management items, and identification of patients as infant, child, and adolescent. The PNKAS is a self-administered questionnaire that includes 2 parts: demographic data of participants such as age, sex, experience years, educational background, membership in medical organizations. Second part: 17 multiple choice, 25 true and false questions. Content was derived from standards developed by the American Pain Society, the WHO, and the Agency of Health Care Policy and Research. Questions aim to measure knowledge and attitudes of pediatric nurses in pain assessment and management, pharmacologic and non-pharmacologic interventions. Regarding analysis of data: the researcher has had contact with Ms. Manworren to clarify which items measure nurses' knowledge level separately from attitudes. She recommended that it is most helpful to avoid distinguishing items as measuring either knowledge or attitudes. Many items such as one measuring the incidence of addiction really measures both knowledge of addiction and attitude about addiction. Therefore, it is most benefit to be gained from analyzing the data in terms of the percentage of complete scores as well as in analyzing individual items. For example, they have found it very helpful to isolate those items with the least number of correct responses and those items with the best scores to guide educational needs. The Questionnaire with answer keys are attached (Appendix 4). Participants approximately take 20 - 30 minutes to fill the questionnaire. The construct validity was established by comparing scores of nurses

at various levels of expertise: students, new graduates, oncology nurses, and graduate students. 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 by the author as $r > .70$ with items reflecting both knowledge and attitude domains.

When the PNKAS tool was originally developed, no acceptable pass mark for the survey was predetermined. However, in later studies a passing score of 70% was set for the PNKAS survey (McCaffery & Robinson, 2002). It was noted that if a nurse scored less than 70%, their ability to care for a patient experiencing pain was significantly compromised (McCaffery & Robinson 2002). Therefore, a score of 70% or greater was the threshold set for the purpose of analysis and discussion in this study. Nevertheless, an ideal score on this survey would be 100%. Nurses must be highly competent, knowledgeable and possess positive attitudes towards pain management so that patients receive high quality pain management practices to facilitate optimal patient health outcomes. The scores for knowledge and attitudes of participants were categorized in accord with McDonald's (2002) learning outcomes. Which is most commonly used type of classroom assessment of multiple-choice exams. This 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:

Table (3.1): Learning outcomes classification levels

Grade	Composite percent score	Level
A	90-100%	Very high
B	80-89%	High

C	70-79%	Moderate
D	60-69%	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 pain management as follows:

- 80 - 100% = High

- 60 - 79% = Moderate

- < 60 % = Low

Scoring system was performed as the following; Nurses were asked to answer 25 true/false, and 17 multiple choice questions divided into 3 categories related to nurses' knowledge and attitudes towards pain management in children. The questionnaire included nurses' knowledge and attitudes, pain assessment and management in children, pharmacology, and non-pharmacology related questions. The total score and percentage score of each participant were computed. Each correctly answered question was scored a 1, and each incorrectly answered item was scored a 0.

3.9 Validity and Reliability of the instruments

Validation of the instrument proceeded in two distinct phases. The initial phase involved a group of referees and expert arbitrators in pediatric pain management from AL Quds University, who provided some comments on the tool. The second phase involved the implementation of a pilot study (N=20) to validate the survey using exploratory factor analysis. Factor loading for all items exceeded 0.65 (0.68 to 0.95), which means that those items are suitable in measuring every item of the study topic among the sampled population. The reliability was tested using Cronbach's Alpha and Guttman split-half

coefficients to ascertain reliability and consistency of the survey. Cronbach's Alpha and Guttman split-half for the survey instrument was 0.7, indicating moderate degree of reliability and consistency.

3.10 Data collection

All necessary permissions and approval were obtained prior to conducting the study.. Then permission to collect data was given by the directors of governmental and private hospitals. Data collection then started. The objectives of the study were explained to the heads of the pediatric wards, and the head nurses of the selected 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 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 April 2017 – June 2017.

3.11 Ethical considerations

This study posed no known risks to the participants. Approval from the thesis committee was obtained prior to data collection to protect subjects from risks. The study was exempt

from review by the Institutional Review Board (IRB) as no therapy was administered. The study held no anticipated positive or negative effect for the subjects.

Ethical considerations pertinent to the study included informed consent, confidentiality, and invasion of privacy. Requirements for written consent were waived as research presented no more than minimal risk of harm to the participants. The statement, “I, completing this survey on the cover letter, hereby willingly consent to participate in the research project: Pediatric Nurses’ Knowledge and Attitudes Regarding Pediatric Pain,” was included in the informed consent; therefore, subjects’ completion of the survey served as consent.

The study was introduced to potential participants by letter. Each nurse was given the opportunity to decide to participate voluntarily by completing the questionnaire. Privacy and confidentiality of the nurse were maintained throughout the study. There was no identification of the nurse's name, school names, or specific age of the nurse. In order to prevent identifications of nurses there were no numbers assigned to the questionnaire.

3.12 Procedure

The Institutional Review Boards of the university (Appendix 3) approved the study prior to starting the research. Permission for data collection was obtained from the directors of selected hospitals before data collection was started. The study was also discussed with the nursing director of each hospital before commencing the distribution of the questionnaires. A cover letter also was provided as informed consent with information about the study objectives, questionnaires sections, questions, and time that they need.

3.13 Data analysis

Data were analyzed by using the Statistical Package for Social Sciences (SPSS) software version 22. 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 about pain management data were analyzed and presented in terms of frequencies, percentages, means, standard deviations, and minimum and maximum scores *t* test, and one way ANOVA.

Chapter Four:

Results:

4.1 Introduction

The main purpose of this study was to investigate nurses' knowledge and attitudes regarding pain management. Descriptive analyses, including means and frequencies and percentages of categorical variables, were calculated to describe the sample. One ANOVA and t-tests were conducted to investigate the relationships among demographic variables and to answer the research questions.

4.2 Sample distribution

Participants were distributed as the following: Caritas baby hospital 46(18%), Palestinian red crescent society(P RCS) 24(9%), Al Zakah hospital 13(5%), Toulkarm hospital 10(4%), Al Najah hospital 12(5%), Medical complex hospital 19(7%), Yatta hospital 9(4%), Beitjalah hospital 19(7%), Alia hospital 25(10%), Makassed hospital 21(8%), Rafedia hospital 23(9%), Istishari hospital 15(6%), Jenin hospital 12(5%), Al Razi hospital 8(3%).

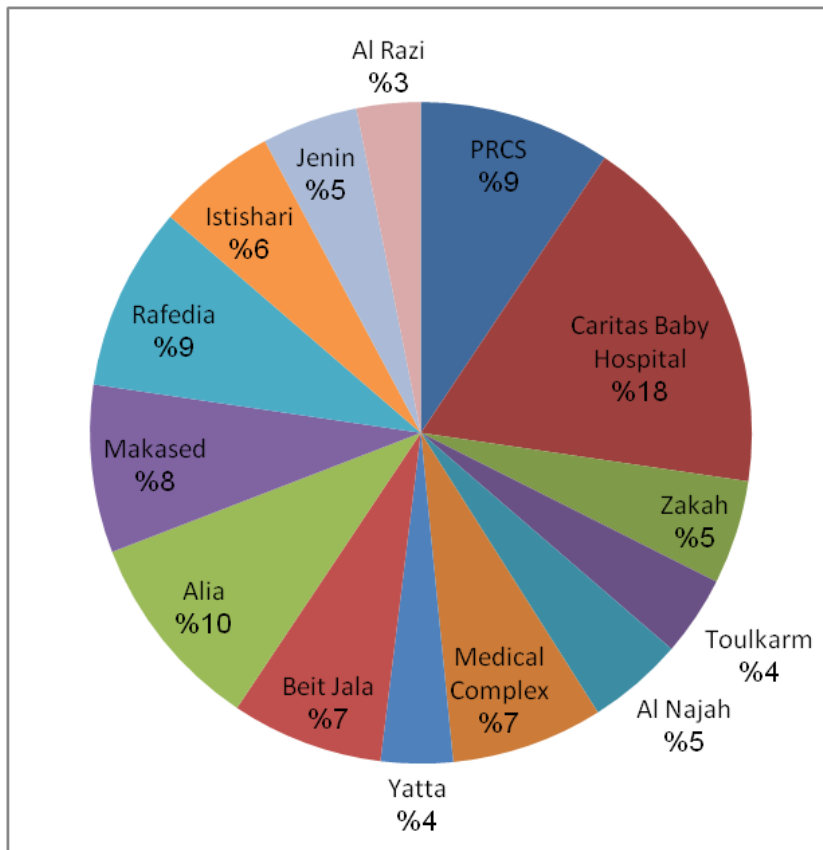


Figure (4.1): Distribution of respondents according to each hospital

4.3 Demographic and professional variables

Of 320 sample size, 256 nurses participated in this study with 80% respond rate. As shown in the following tables, 67.6% were female, and 32.4% were male. The majority of participants' age 52.7% were between age group 20-24 years, and 0.4% was between age group of 35-39 years. Most participants had bachelor's degrees 67.2%, 26.2% had diploma's degrees, and 6.2% had master's degrees, and 0.4% had PhD. Additionally, majority of respondents 48% had 1-5 years of pediatric experience, and 37.1% with 5-10 years of experience in pediatrics. Around 49.4% of nurses reported that there is no pediatric pain management protocols in their hospitals, however 35.9% answered with yes, and 4.7% they were not sure about pediatric pain protocols. About 62.5% of nurses stated

that there is no pain management committee in their hospitals, while 26.2% stated that there is a pain management committee, and 11.3% they don't know.

Table (4.1) : Demographic characteristics of participants

Characteristics		Frequency	Percentage
Gender	Male	83	32.4
	Female	173	67.6
Age	20 – 24	135	52.7
	25- 29	36	14
	30- 34	27	10.5
	35- 39	1	0.4
	40 and above	57	22.4
Education	Diploma	67	26.2
	BSN	172	67.2
	MSN	16	6.2
	PhD	1	0.4

Table (4.2) : Professional data of participants

Characteristics		Frequency	Percentage
Years of pediatric nursing experience	Less than 1 year	0	0
	1 – 5 years	124	48.4
	5-10 years	95	37.1
	10- 15 years	37	14.5
	More than 15years	0	0.0
Does your pediatric facility have a Pain Management Protocol	Yes	92	35.9
	No	152	59.4
	Don't know	12	4.7
Does your pediatric facility have a Pain Management Committee	Yes	67	26.2
	No	160	62.5
	Don't know	29	11.3

Nurses were asked to answer 25 true/false, and 17 multiple choice questions which were categorized in 3 subscales as the following: pharmacologic related questions in Table (4.3), pain assessment and management questions in Table (4.4), and non-pharmacologic related questions in Table (4.5). Frequency and percentage of correct answers are shown in tables below. It was found that total mean score of nurses' knowledge and attitudes regarding pediatric pain management was $M = 50.4\%$, and none of the respondents received a 100% correct response. Lowest score was 25%, and highest score 84.8%. Since mean score was 50.4%, and it's lower than 60%, This means that nurses' knowledge and attitudes level was low.

Table (4.3): Correct answers of pharmacology related questions

No	Pharmacology related questions (23)	Correct answer	
		Frequency	Percentage
27	The recommended route of administration of opioid analgesics to children with brief, severe pain of sudden onset, e.g. trauma or postoperative pain, is:	188	73.4
22	After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response.	173	67.6
13	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics.	164	64.1
12	The usual duration of analgesia of Morphine IV is 4-5 hours.	163	63.7
21	Anxiolytics, sedatives, and barbituates are appropriate medications for the relief of pain during painful procedures	160	62.5
6	Ibuprofen and other non-steroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases.	158	61.7
9	Respiratory depression rarely occurs in children/	148	57.8

	adolescents who have been receiving opioids over a period of months.		
11	The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non-steroidal agent).	147	57.4
40B	Your assessment is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. Check the action you will take at this time.	146	57
15	Adolescents with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction.	145	56.6
30	Analgesics for post-operative pain should initially be given	144	56.3
32	Analgesia for continuous persistent pain should be given	141	55.1
10	Acetaminophen 650 mg PO is approximately equal in analgesic effect to codeine 32 mg PO.	139	54.3
17	Young infants, less than 6 months of age, cannot tolerate opioids for pain relief.	139	54.3
16	Beyond a certain dosage of morphine increases in dosage will not provide increased pain relief	129	50.4
29	Which of the following IV doses of morphine administered would be equivalent to 15 mg of oral morphine.	128	50
28	Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for children?	117	45.7
39B	Your assessment is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he	110	43

	had no clinically significant respiratory depression, sedation, or other untoward side effects. Check the action you will take at this time.		
33	The most likely explanation for why a child/ adolescent with pain would request increased doses of pain medication is	108	42.2
34	Which of the following drugs are useful for treatment of pain in children?	77	30.1
26	The recommended route of administration of opioid analgesics to children with Continuous persistent pain is:	38	14.8
31	A child with chronic cancer pain has been receiving daily opioid analgesics for 2 months. The doses increased during this time period. Yesterday the child was receiving morphine 20 mg/hour intravenously.	13	5.1
38	Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons	4	1.6

Table (4.4): Correct answers of pain assessment and management questions

No	Pain assessment and management questions (14)	Correct answer	
		Frequency	Percentage
1	Observable changes in vital signs must be relied upon to verify a child's/ adolescent's statement that he has severe pain	199	77.7
35	The most accurate judge of the intensity of the child's/ adolescent's pain is	195	76.2
40A	On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain	192	75
39A	On the patient's record you must mark his pain on the	174	68

	scale below. Circle the number that represents your assessment of Robert's pain		
36	Which of the following describes the best approach for cultural considerations in caring for child/ adolescent in pain?	159	62
20	Based on one's religious beliefs a child/ adolescent may think that pain and suffering is necessary.	151	59
8	Children who will require repeated painful procedures (ie. Daily blood draws), should receive maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures.	148	57.8
18	The child/ adolescent with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.	146	57
19	Children less than 8 years cannot reliably report pain intensity and therefore, the nurse should rely on the parents' assessment of the child's pain intensity.	146	57
14	Parents should not be present during painful procedures.	142	55.5
5	Comparable stimuli in different people produce the same intensity of pain.	113	44.1
4	Infants/ children/ adolescents may sleep in spite of severe pain.	124	48.4
2	Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.	87	34
37	What do you think is the percentage of patients who over report the amount of pain they have? Circle the correct answer.	23	9

Table (4.5): Correct answers of non-pharmacology related questions

No	Non-pharmacologic related questions (5)	Correct answer	
		Frequency	Percentage
7	Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.	184	71.9
24	Giving children/ adolescents sterile water by injection (placebo) is often a useful test to determine if the pain is real.	153	59.8
23	The child/ adolescent should be advised to use non-drug techniques alone rather than concurrently with pain medications.	150	58.6
3	If the infant/ child/ adolescent can be distracted from his pain this usually means that he is not experiencing a high level of pain.	122	47.7
25	In order to be effective, heat and cold should be applied directly to the painful area.	111	43.4

The PNKAS tool was used to assess participants' knowledge and attitudes regarding pain.

According to PNKAS results, the majority of participants (83%) had less than 60% of correct answers, while (15%) of nurses their scores were between 60-79%, however only (2%) of nurses passed with a score of 80% or greater in PNKAS scores. Table 4.3 shows nurses distribution according their PNKAS scores.

Table (4.6) :Distribution of nurses according PNKAS scores:

Distribution of scores		Frequency	Percentage
1	Less than 60	213	83
2	60 - 79	39	15
3	80 And Above	4	2
	Total	256	100%

Ten questions were analyzed according to author recommendations to determine the areas that the nurses answered correctly. It was found that the ten questions that were most answered correctly were: 1- Observable changes in vital signs must be relied upon to verify a child's/ adolescent's statement that he has severe pain 77.7%, 2- The most accurate judge of the intensity of the child's/ adolescent's pain is a patents themselves with 76.2%, 3- On the patient's record you must mark his pain on the given scale. Circle the number that represents your assessment of Robert's pain 75%, 4- The recommended route of administration of opioid analgesics to children with brief, severe pain of sudden onset, e.g. trauma or postoperative pain, with 73.4%, 5- Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain 71.9%, 6- On the patient's record you must mark his pain on the given scale. Circle the number that represents your assessment of Robert's pain 68%, 7- After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response 67.6%, 8- Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics 64.1%, 9- The usual duration of analgesia of Morphine IV is 4-5 hours 63.7%, 10- Anxiolytics, sedatives, and barbituates are appropriate medications for the relief of pain during painful procedures with 62.5%. These ten questions that were most answered correctly are presented in Table 4.7.

Table (4.7): Questions most frequently answered correctly

No	Questions most frequently answered correctly	Frequency	Percentage
1	Observable changes in vital signs must be relied upon to verify a child's/ adolescent's statement that he has severe pain	199	77.7
35	The most accurate judge of the intensity of the child's/	195	76.2

	adolescent's pain is		
40A	On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain	192	75
27	The recommended route of administration of opioid analgesics to children with brief, severe pain of sudden onset, e.g. trauma or postoperative pain, is	188	73.4
7	Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.	184	71.9
39A	On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain	174	68
22	After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response	173	67.6
13	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics	164	64.1
12	The usual duration of analgesia of Morphine IV is 4-5 hours	163	63.7
21	Anxiolytics, sedatives, and barbituates are appropriate medications for the relief of pain during painful procedures	160	62.5

Ten questions that answered incorrectly were: 1- the percentage of nurses that answered incorrectly about opioid addiction that may occur after using opioid analgesia in children 98.4%, 2- the likelihood of respiratory depression that may occurs in children is answered in correctly by 94.9% of participants, 3- percentage of patients who over-report the amount of pain they have; 91% of nurses had incorrect answer, 4- The recommended route of administration of opioid analgesics to children with continuous persistent pain 85.2%, 5- Percentage of nurses who failed to identify drugs that are useful for treatment of pain in

children 69.9% 6- Because of an underdeveloped neurological system, nurses assume that children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences 66%, 7- nurses explain incorrectly why a child/ adolescent with pain would request increased doses of pain medication by 57.8%, 8- Your assessment is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. Nurses who ignore patient's self-report of pain and they don't give him, or give him incorrect dose of opioid by 57%, 9- many nurses think that in order to be effective, heat and cold should be applied directly to the painful area with 56.6%, 10- nurses believe that comparable stimuli in different people produce the same intensity of pain 55.9%. The ten questions that were least answered correctly are presented in Table 4.8:

Table (4.8): Questions most frequently answered incorrectly:

No	Questions most frequently answered incorrectly	Frequency	Percentage
38	Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons. How likely is opioid addiction will occur if treating pain with opioids?	252	98.4
31	A child with chronic cancer pain has been receiving daily opioid analgesics for 2 months. The doses increased during this time period. Yesterday the child was receiving morphine 20 mg/hour intravenously	243	94.9
37	What do you think is the percentage of patients who over report the amount of pain they have? Circle the correct answer	233	91
26	The recommended route of administration of opioid analgesics to children with continuous persistent pain is	218	85.2

34	Which of the following drugs are useful for treatment of pain in children?	179	69.9
2	Because of an underdeveloped neurological system, nurses assume that children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences	169	66
33	The most likely explanation for why a child/ adolescent with pain would request increased doses of pain medication is	148	57.8
39B	Your assessment is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. Check the action you will take at this time.	146	57
25	In order to be effective, heat and cold should be applied directly to the painful area.	145	56.6
5	Comparable stimuli in different people produce the same intensity of pain.	143	55.9

4.4 Inferential Hypothesis:

One-way ANOVAs, t- test were conducted to test relationships between 3 subscales of questionnaire and demographic, professional variables (i.e, gender, age, education, and experience). However, no significant relationship was found. Participants' ability to care for patients experiencing pain was compromised in general.

4.5 Pharmacology related questions:

Table (4.9) : The participants' pharmacologic questions according to gender (T .Test)

Variables		The participants' pharmacologic questions			
		Mean	T- value	P-value	Interpretation
Gender	Male	9.1446	1.206	0.229	Accept
	Female	8.7803			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to gender. Despite of the female participants 67.6% were higher than males 32.4%. gender of nurses did not affect their pharmacologic knowledge and attitudes toward pain management.

Table (4.10) The participants' pharmacologic questions according to age (One Way ANOVA)

The participants' pharmacologic questions					
Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.349	4	3.837	0.680	0.606
Within Groups	1416.010	251	5.641		
Total	1431.359	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to age. Despite of majority of age group 52.7% that participated in this survey was between 20 – 24 years, there was no evident relationship between the age of participants and their scores in pharmacologic related questions regarding pain management

Table (4.11) : The participants' pharmacologic questions according to education (One Way ANOVA)

The participants' pharmacologic questions					
Education	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.932	3	6.977	1.247	0.293
Within Groups	1410.428	252	5.597		
Total	1431.359	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to education. It was evident that the most common highest qualification held was the bachelor degree of nursing 67.2% compared to 26.2% holding a diploma, and 6.3% for master degree. According to our study, it showed that educational level of nurses did not demonstrate a relationship with pharmacologic questions.

Table (4.12) : The participants' pharmacologic questions according to years of pediatric nursing experience (One Way ANOVA)

The participants' pharmacologic questions					
Years of pediatric nursing experience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.237	2	0.619	0.109	0.896
Within Groups	1430.122	253	5.653		
Total	1431.359	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to years of pediatric nursing experience. It means that years of experience in pediatric nursing did not have a significant effect on participant's pharmacologic questions. And did not affect their PNKAS scores.

Table (4.13) The participants' pharmacologic questions according to the presence of pain management protocol (One Way ANOVA)

the participants' pharmacologic questions according to					
Does your pediatric facility have a Pain Management Protocol	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.841	2	3.920	0.697	0.499
Within Groups	1423.519	253	5.627		
Total	1431.359	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to the existence of pain management protocol. It's obvious that PNKAS scores of nurses 35.9% who have pain management protocols in their hospitals did not significantly higher than nurses 59.4% who don't have any pain management protocols.

Table (4.14) : The participants' pharmacologic questions according to the existence of pain management committee (One Way ANOVA)

The participants' pharmacologic questions					
Does your pediatric facility have a Pain Management Committee	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.642	2	7.321	1.307	0.272
Within Groups	1416.718	253	5.600		
Total	1431.359	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pharmacologic questions according to the existence of pain management committee. According to our study, 62.5% of participants stated that there is no pain management committee in their institutions compared with 26.2% they stated that

there is a pain management committee. It's evident that the availability of pain management committees in the hospitals did not affect the level of pharmacologic knowledge.

4.6 Pain assessment and management Questions

Table (4.15) : The participants' pain assessment and management questions according to gender (T .Test)

Variables		The pediatric nurses' knowledge and attitude survey scores about Pain assessment and management			
		Mean	T- value	P-value	Interpretation
Gender	Male	4.9634	-1.160-	0 .247	Accept
	Female	5.2601			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of the participants' pain assessment and management questions according to gender. Despite of the female participants 67.6% were higher than males 32.4%. gender of nurses did not affect their knowledge and attitudes toward pain assessment and management.

Table (4.16) : The participants' pain assessment and management questions according to age (One Way ANOVA)

The participants' pain assessment and management questions					
Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.401	4	3.350	0.919	0.454
Within Groups	911.682	250	3.647		
Total	925.082	254			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of participants' pain assessment and management questions according to age. Despite of majority of age group 52.7% that participated in this survey was between 20 – 24 years, there was no evident relationship between the age of participants and their scores regarding pain assessment and management

Table (4.17) : The participants' pain assessment and management questions according to education (One Way ANOVA)

The participants' pain assessment and management questions					
Education	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.263	2	5.131	1.414	0.245
Within Groups	914.820	252	3.630		
Total	925.082	254			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means The participants' pain assessment and management questions according to education. It was evident that the most common highest qualification held was the bachelor degree of nursing 67.2% compared to 26.2% holding a diploma, and 6.3% for master degree. According to our study, it showed that educational level of nurses did not demonstrate a relationship with pain assessment and management questions.

Table (4.18) : The participants' pain assessment and management questions according to years of pediatric nursing experience (One Way ANOVA)

The participants' pain assessment and management questions					
Years of pediatric nursing experience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.260	2	5.130	1.413	0.245

Within Groups	914.823	252	3.630		
Total	925.082	254			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' pain assessment and management questions according to years of pediatric nursing experience. It means that years of experience in pediatric nursing did not have a significant effect on participant's pain assessment and management questions. And did not affect their PNKAS scores.

Table (4.19) :The participants' pain assessment and management questions according to the presence of pain management protocol (One Way ANOVA)

The participants' pain assessment and management questions					
Does your pediatric facility have a Pain Management Protocol	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.673	2	4.337	1.193	0.305
Within Groups	916.409	252	3.637		
Total	925.082	254			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' pain assessment and management questions according to presence of pain management protocol. It's obvious that PNKAS scores of nurses 35.9% who have pain management protocols in their hospitals did not significantly higher than nurses 59.4% who don't have any pain management protocols.

Table (4.20) :The participants' pain assessment and management questions according to the presence of pain management committee (One Way ANOVA)

The participants' pain assessment and management questions					
Does your pediatric facility have a Pain Management Committee	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.435	2	3.217	0.883	0.415
Within Groups	918.648	252	3.645		
Total	925.082	254			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' pain assessment and management questions according to presence of pain management committee. According to our study, 62.5% of participants stated that there is no pain management committee in their institutions compared with 26.2% they stated that there is a pain management committee. It's evident that the availability of pain management committees in the hospitals did not affect the level of assessment and management of pain.

4.7 Non -Pharmacology related questions

Table (4.21) : The participants' non-pharmacologic questions according to gender (T .Test)

Variables		The participants' non-pharmacologic questions			
		Mean	T- value	P-value	Interpretation
Gender	Male	2.1807	1.137	0.257	Accept
	Female	1.9942			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The pediatric nurses' non-pharmacological knowledge and attitude survey scores according to gender. Despite of the female participants 67.6% were higher than males 32.4%. gender of nurses did not affect their knowledge and attitudes toward non-pharmacology related questions about pain management.

Table (4.22) :The participants' non-pharmacologic questions according to age (One Way ANOVA)

The participants' non-pharmacologic questions					
Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.774	4	1.444	0.955	0.433
Within Groups	379.460	251	1.512		
Total	385.234	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' non-pharmacologic questions according to age. Despite of majority of age group 52.7% that participated in this survey was between 20 – 24 years, there was no significant relationship between the age of participants and their scores in non-pharmacologic questions regarding pain management

Table (4.23) :the participant's non-pharmacologic questions according to education (One Way ANOVA)

The participant's non-pharmacologic questions					
Education	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.750	3	1.583	1.049	0.372
Within Groups	380.484	252	1.510		
Total	385.234	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participant's non-pharmacologic questions according to education. It was evident that the most common highest qualification held was the bachelor degree of nursing 67.2% compared to 26.2% holding a diploma, and 6.2% for master degree. According to our study, it showed that educational level of nurses did not demonstrate a relationship with level of non-pharmacologic questions regarding pain management.

Table (4.24) :The participants' non-pharmacologic questions according to years of pediatric nursing experience (One Way ANOVA)

The participants' non-pharmacologic questions					
Years of pediatric nursing experience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.016	2	0.508	0.334	0.716
Within Groups	384.218	253	1.519		
Total	385.234	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' non-Pharmacologic questions according to years of pediatric nursing experience. It means that years of experience in pediatric nursing did not have a significant effect on participant's non-pharmacologic questions. And did not affect their PNKAS scores.

Table (4.25) :The participants' non-pharmacologic questions according to existence of pain management protocol (One Way ANOVA)

The participant's non-pharmacologic questions					
Does your pediatric facility have a Pain Management Protocol	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.540	2	0.270	0.178	0.837
Within Groups	384.694	253	1.521		
Total	385.234	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' non-pharmacological questions according to the presence of pain management protocol. It's obvious that PNKAS scores of nurses 35.9% who have pain management protocols in their hospitals did not significantly higher than nurses 59.4% who don't have any pain management protocols.

Table (4.26) :The participants' non-pharmacologic questions according to the presence of pain management committee (One Way ANOVA)

The participants' non-pharmacologic questions					
Does your pediatric facility have a Pain Management Committee	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.272	2	0.136	0.089	0.914
Within Groups	384.962	253	1.522		
Total	385.234	255			

Table indicates that there were no significant differences at the level ($\alpha \leq 0.05$) between the means of The participants' non-pharmacological questions according to the presence of pain management committee. According to our study, 62.5% of participants stated that there is no pain management committee in their institutions compared with 26.2% they stated that there is a pain management committee. It's evident that the availability of pain management committees in the hospitals did not affect the level of non-pharmacologic questions.

Chapter Five:

Discussion and Recommendations:

5.1 Discussion

Effective pain management for children requires adequate knowledge, appropriate attitudes, and assessment skills (Yildirim, Cicek, &Uyar, 2008). Nurses are responsible for assessing pain, treating pain with pharmacologic and non-pharmacologic interventions (Manworren, 2007). In the present study, pediatric nurses in West Bank completed the PNKAS, and the individual PNKAS scores ranged from 25% to 84.8%, with a mean score of 50.4%. Riemen and Gordon (2007) found PNKAS scores to range from 37% to 100%, with a mean score of 74%. In Manworren's (2001) survey, individual scores ranged from 37% to 98%, with mean score of 66%. In Tiernan's (2008) survey of Irish nurses, the mean score was 62%. Compared with these surveys, it is obvious that the scores from our survey are quite low and may suggest a need for increased education for pediatric nurses. Ultimately, these knowledge deficits may have impact on the administration of effective and optimal care given to patients who are experiencing pain in pediatric setting. The findings from this study reflect those of previously published studies, which reinforce the universal concern of the significant problem of poor knowledge and attitudes held by nurses caring for patients experiencing pain. The lack of pain-related knowledge and attitudes found in the present study existed in several areas in the perspective of pain management. The major areas which showed the most substantial knowledge deficits and negative attitudes revolved around (a) pharmacology based knowledge (b) inadequate pain assessment and management skills (c) poor recognition of non-pharmacologic interventions.

According to results taken from the survey, gender, age, and education level of the nurses didn't affect their knowledge and attitudes about pain management. Also, it was noted that years of pediatric nursing experience did not demonstrate a relationship with the level of pain management knowledge and attitudes. These results have some similarities with the results taken from other research, Manworren (2000) did not report a significant correlation between experience and PNKAS scores. Another study in Finland in 2007 found that nurses demographic variables such as gender, education, and age do not affect their knowledge and attitudes level significantly. However it founds that as experience increases, knowledge and attitudes about pain management improve as well. Stanley & Pollard, (2013) found years of pediatric experience in pediatric nursing to have a positive relationship to level of knowledge and high PNKAS scores among nurses. It is clear that demographic variables in our study such as nurses' age, gender, education, experience, place of work, and field of expertise do not have a significant relationship with nurses' knowledge and attitudes. This may have different explanations; one is that we have an equal work environment among male and female nurses with same responsibilities and obligations, another is the clear job description that may hinder significant variations between staff in most hospitals. In addition, there is no significant cultural or religious diversity that affect nurses attitudes and conceptions. Moreover curriculum in most universities in our country is not widely different, so participant's scores are mostly close.

About 59.4% of nurses reported that there was no pain management standard or protocol in their hospitals. These results suggest that the majority of nurses gain knowledge of pain management in children on the job by haphazardly. The results of this study suggest that pain management should be included in the nursing curriculum in universities, so that nurses can gain more knowledge of the pain area before joining the labor market. This would, in turn, enable them to provide nursing care more effectively.

Most of the nurses answered the questions about pharmacology and addiction incorrectly. For example, in this study 98.4% of nurses had misconception about incidence of opioid addiction, 94.9% of them also had knowledge deficit about incidence of respiratory depression in opioids, they answered incorrectly about the recommended route of administration of opioid analgesics to children with continuous persistent pain, by 85.2% of nurses. The majority of surveys show that nurses had insufficient knowledge about pharmacologic interventions in pain management. Vincent (2005) found that in the assessment of children's pain, nurses knowledge deficits about analgesic drugs. Ellis et al. (2007) stated that nurses have limited knowledge about analgesic drugs. Tiernan (2008) stated that Irish nurses have pharmacologic knowledge deficits. In our study showed that 91% of nurses believe that children over-report their pain, in addition 66% of nurses incorrectly think that due to an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences. This consistent to Vincent study in 2005 which was about nurses' knowledge, attitudes, and practice regarding children's pain. The study was carried out in Midwestern children's hospital in United States, Quantitative, cross sectional descriptive study with convenience sample of 67 nurses, and 132 children. she found that nurse had insufficient relying on self-report of children to assess pain. According to the study, nurses believe that about 20% of children over-report their pain, and nurses believed that children had no memory of pain perception due to the immature development of the nervous system. However James et al. (2002) found that less than 10% of children may over-report when they are in pain. In addition 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. Frequently common misconception is that some nurses think that children can easily become addicted to narcotic analgesics. And the word of morphine is scary.

However, The risk of narcotic-induced respiratory depression in adults is about 0.09 %, whereas in children it ranges between 0 and 1% (Anand et al., 1987; Jay et al., 2017; Stanley & Schafer, 2012). There is no data to support that children are more susceptible to respiratory depression than are adults(Hendrickson et al., 1987). Respiratory depression in children should be rare if there is a close observation, and strict compliance to pharmacologic guidelines (James et al., 2002). Researcher recommended that nurses should become more aware of analgesic administration adequacy, become more knowledgeable about respiratory depression in children who receiving opioids. also nurses should give more attention for self- report for pain assessment and take it into their considerations.

About 76.2% of participants in our study answered correctly the question about the most accurate judge of the intensity of the child's/ adolescent's pain, which is considered a major area of negative attitude related to patient self-report. Similar findings was identified in a pilot study with 20 pediatric nurses, Van Hulle Vincent found that when nurses were thinking about assessing children's pain, 35% did not include self-report in their cognitive representations, and 20% did not consider the child's behavior. In addition mixed methods exploratory study was conducted to describe pediatric nurses' cognitive representations of the assessment and management of children's pain, it showed that nurses endorsed behavior more frequently than self-report for assessment of children's pain. Also nurses often relied on the child's behavior to judge pain intensity and to administer morphine(Vincent et al., 2010). Moreover, Mathew and Singhi conducted study in India to assess knowledge, attitudes, and practice for critical care pediatric nurses toward pain. this study included 56 nurses who work in three intensive care units which were pediatric, neonatal, and surgical intensive care units. study found the absence of any objective scoring systems in use to assess pain in children(Mathew et al., 2011). This may possibly

be due to the lack of awareness of such scoring systems, and importance of self-report assessment which is considered a golden standard for pain assessment, lack of time and increased nurse patient ratio are also another factors that affect implementation of scoring systems. However there was a study conducted in Canada and it covered 15 pediatric emergency centers, this study was carried out to determine the availability of currently used strategies in Canadian pediatric emergency departments. Results showed that the most frequently available pain assessment tools were verbal numerical scale and it was widely used in 80% of centers, and faces pain rating scale in 40% of these centers to assess pain.

Around 71.9% of nurses answered correctly about non pharmacologic interventions, such as the question that said "Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain". Some studies(Colwell et al., 1996; Twycross, 2007) found that most of the time nurses routinely use pharmacological interventions in relieving children's pain rather than non-pharmacological interventions. Other studies have examined the types of non-pharmacological approaches used by children and their parents and have found that distraction is a method that is commonly used. such as watching television, playing and reading or talking with their parents(Idvall et al., 2005; Polkki et al., 2003). Hatem, Lira and Mattos, (2006) conducted study through randomization of 84 patients to 30 minutes of music intervention after cardiac surgery, music reduced pain scores and had beneficial effects on heart rate and respiratory rate. This may due to health care system itself, it can be a barriers to adequate pain management through lack of pain assessment instruments, equipment for treatment, no designed areas for charting pain, lack of institutional polices for pain assessment, and lack of pain management guidelines(Miftah et al., 2017). The existing curriculum in nursing education is another important factor that contributes to

preparing nurses in providing care for optimal pain relief in their practice. The key areas of deficiency described above are likely to be attributable to the insufficient teaching on pain assessment and management in our educational institutions. Pain may be a neglected topic in our nursing schools. It is important to note that good pain management is predicated on attitudes developed through sound knowledge of pain and its treatment. Lack of proper understanding of important concepts of pediatric pain management as described above, leads to under treatment of pain in children, ultimately impacting the quality of care given to the patient. According to the literature, nurses still have knowledge deficits in pain management especially concerning post-operative pain care. The deficient areas of nurses' knowledge and attitudes include pain assessment, pharmacological and non-pharmacological pain management (Ferrell et al., 2015).

5.2 Limitations

Limitations of the study includes the inability to generalize findings to another population. Nursing curriculum differs from school to school; therefore, it would be wrong to assume that nurses attending all nursing programs would demonstrate similar findings. The small sample size also limits the study's generalizability. Nursing curriculum provides a general knowledge of pain management; therefore, knowledge within a specialty field would be an unrealistic expectation.

5.3 Recommendations

Evidence from the study conclusions support that we as nurses are not adequately knowledgeable of how to make our patients feel comfortable, or even how to appropriately manage their pain. The findings of this current study suggest that nurses have serious knowledge deficits and erroneous beliefs that may influence effective management of

patients' pain and the lack of comfort we actually give our patients. The researcher suggests that intensive and comprehensive mandatory educational initiatives should be tailored to meet the specific needs of nurses at all levels of nursing. A thorough review of nursing core curriculum both at under-graduate and post-graduate level should be performed to ensure the content of educational modules provide adequate, relevant and appropriate information and subsequently equipping nurses to effectively manage pain (McNamara et al., 2012). Furthermore, The researcher proposes that further endeavors such as quality-improvement programs should be rolled out within health care organizations which could include many strategies aimed at enhancing the knowledge and improving the practices of pain management. These strategies may possibly include; (a) theoretical education on areas of pain management which are observed to be weak, (b) incorporation of a protocol for the administration of as required or as needed (PRN) opioid analgesics which would guide nurses in making safe and effective decisions with regard to opioid selection and titration (McCaffery, Pasero, & Ferrell, 2007), (c) facilitation of best practices by updating policies, procedures, and guidelines relating to pain management, and (d) undertake regular audits of nursing pain management practices to establish additional strategies aimed at improving practice if the application of pain management practice is not congruent to best practice standards.

Appendices:

Appendix (1): Participant Informed Consent

I am a graduate student in the Master of Pediatric in Nursing Program at Nursing Department, Al-Quds University, in Palestine. I am conducting a study on nurses' knowledge and attitudes toward pain management. This study will identify the previous, as well as, the current level of nursing knowledge and attitudes toward pain management. You are invited to complete an anonymous questionnaire and demographic sheet. The questionnaire will take approximately twenty to thirty minutes to complete. Your participation in this study is voluntary and your responses are anonymous. Please do not include your name or any personal identifying markings on the questionnaires. You may withdraw at any time from the study. There will be no risk to you or any compensation given for taking this survey. Should you choose to participate; **the completion of the questionnaire will serve as informed consent.** At your request, results of the study will be made available to you. You are free to ask questions about the study or your participation in the study.

You may direct any questions to:

Dr. FaridGhrayeb PhD, BS, RN,

Nursing Department, Faculty of Health Professions,

Al Quds University

Phone: 0597-590131

fghrayeb@staff.alquds.edu

Thank you for your participation in this study.

Sincerely,

Ahmad Bajjali RN

Phone: 0597-174275

ahmad.bajjali@students.alquds.edu

Appendix (2) Demographic Data for Nurse-Participants

Part 1:

1) Sex:

Male Female

2) Age:

20 – 24 25- 29 30- 34 35- 39 40 and above

3) Education:

Diploma BSN MSN PhD

4) Years of pediatric nursing experience:

Less than 1 year 1 – 5 years 5-10 years 10- 15 years more than
15years

5) Does your pediatric facility have a Pain Management Protocol?

Yes No don't know

6) Does your pediatric facility have a Pain Management Committee?

Yes No don't know

Appendix (3): Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain

Part 2: True/False – Put √ on correct answer.

#	Item	True	False
1	Observable changes in vital signs must be relied upon to verify a child's/ adolescent's statement that he has severe pain.		
2	Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.		
3	If the infant/ child/ adolescent can be distracted from his pain this usually means that he is not experiencing a high level of pain.		
4	Infants/ children/ adolescents may sleep in spite of severe pain.		
5	Comparable stimuli in different people produce the same intensity of pain.		
6	Ibuprofen and other non-steroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases.		
7	Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.		
8	Children who will require repeated painful procedures (ie. Daily blood draws), should receive maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures.		
9	Respiratory depression rarely occurs in children/ adolescents who have been		

	receiving opioids over a period of months.		
10	Acetaminophen 650 mg PO is approximately equal in analgesic effect to codeine 32 mg PO.		
11	The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non-steroidal agent).		
12	The usual duration of analgesia of Morphine IV is 4-5 hours.		
13	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics.		
14	Parents should not be present during painful procedures.		
15	Adolescents with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction.		
16	Beyond a certain dosage of morphine increases in dosage will NOT provide increased pain relief		
17	Young infants, less than 6 months of age, cannot tolerate opioids for pain relief.		
18	The child/ adolescent with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.		
19	Children less than 8 years cannot reliably report pain intensity and therefore, the nurse should rely on the parents' assessment of the child's pain intensity.		
20	Based on one's religious beliefs a child/ adolescent may think that pain and		

	suffering is necessary.		
21	Anxiolytics, sedatives, and barbituates are appropriate medications for the relief of pain during painful procedures.		
22	After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response.		
23	The child/ adolescent should be advised to use non-drug techniques alone rather than concurrently with pain medications.		
24	Giving children/ adolescents sterile water by injection (placebo) is often a useful test to determine if the pain is real.		
25	In order to be effective, heat and cold should be applied directly to the painful area.		

Type 3: Multiple Choice - Place a check by the correct answer.

26. The recommended route of administration of opioid analgesics to children with

Continuous persistent pain is:

_____ a. intravenous

_____ b. intramuscular

_____ c. subcutaneous

_____ d. oral

_____ e. rectal

_____ f. I don't know

27. The recommended route of administration of opioid analgesics to children with brief, severe pain of sudden onset, e.g. trauma or postoperative pain, is:

_____ a. intravenous

_____ b. intramuscular

_____ c. subcutaneous

_____ d. oral

_____ e. rectal

_____ f. I don't know

28. Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for children?

_____ a. fentanyl

_____ b. codeine

_____ c. morphine

_____ d. meperidine (Demerol)

_____ e. I don't know

29. Which of the following IV doses of morphine administered would be equivalent to 15 mg of oral morphine.

_____ a. Morphine 3 mg IV

_____ b. Morphine 5 mg IV

_____ c. Morphine 10 mg IV

_____ d. Morphine 15 mg IV

30. Analgesics for post-operative pain should initially be given

_____ a. around the clock on a fixed schedule

_____ b. only when the child/ adolescent asks for the medication

_____ c. only when the nurse determines that the child/ adolescent has moderate or greater discomfort

31. A child with chronic cancer pain has been receiving daily opioid analgesics for 2 months. The doses increased during this time period. Yesterday the child was receiving morphine 20 mg/hour intravenously. Today he has been receiving 25 mg/hour intravenously for 3 hours. The likelihood of the child developing clinically significant respiratory depression is

_____ a. less than 1%

_____ b. 1-10%

_____ c. 11-20%

_____ d. 21-40%

_____ e. > 41%

32. Analgesia for continuous persistent pain should be given

_____ a. around the clock on a fixed schedule

_____ b. only when the child asks for the medication

_____ c. only when the nurse determines that the child has moderate or greater discomfort

33. The most likely explanation for why a child/ adolescent with pain would request increased doses of pain medication is

_____ a. The child/ adolescent is experiencing increased pain.

_____ b. The child/ adolescent is experiencing increased anxiety or depression.

_____ c. The child/ adolescent is requesting more staff attention.

_____ d. The child's/ adolescent's requests are related to addiction.

34. Which of the following drugs are useful for treatment of pain in children?

_____ a. Ibuprophen (Motrin)

_____ b. Morphine

_____ c. Amitriptyline (Elavil)

_____ d. All of the above

35. The most accurate judge of the intensity of the child's/ adolescent's pain is

_____ a. the treating physician

_____ b. the child's/ adolescent's primary nurse

_____ c. the child/ adolescent

_____ d. the pharmacist

_____ e. the child's/ adolescent's parent

36. Which of the following describes the best approach for cultural considerations in caring for child/ adolescent in pain?

_____ a. Because of the diverse and mixed cultures in the United States, there are no longer cultural influences on the pain experience.

_____ b. Nurses should use knowledge that has defined clearly the influence of pain on culture (e.g. Asians are generally stoic يتحملون, Hispanics are expressive and exaggerate their pain يببالغون, etc.)

_____ c. Children/ adolescents should be individually assessed to determine cultural influences on pain.

37. What do you think is the percentage of patients who over report the amount of pain they have? Circle the correct answer.

0 10 20 30 40 50 60 70 80 90 100%

38. Narcotic/opioid addiction is defined as psychological dependence accompanied by overwhelming concern with obtaining and using narcotics for psychic effect, not for medical reasons. It may occur with or without the physiological changes of tolerance to analgesia and physical dependence (withdrawal).

Using this definition, how likely is it that opioid addiction will occur as a result if treating pain with opioid analgesics? Circle the number closest to what you consider the correct answer.

< 1% 5% 25% 50% 75% 100%

Case Studies

Two patient case studies are presented. For each patient you are asked to make decisions about pain and medication.

Directions: Please select one answer for each question.

39. Patient A: Andrew is 15 years old and this is his first day following abdominal surgery. As you enter his room, he smiles at you and continues talking and joking with his visitor. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort), he rates his pain as 8.

A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain.

0 1 2 3 4 5 6 7 8 9 10

Mild pain

Moderate pain

Severe pain

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." **Check the action you will take at this time:**

_____ 1) Administer no morphine at this time.

_____ 2) Administer morphine 1 mg IV now.

_____ 3) Administer morphine 2 mg IV now.

_____ 4) Administer morphine 3 mg IV now.

40. Patient B: Robert is 15 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain:

0 1 2 3 4 5 6 7 8 9 10

Mild pain

Moderate pain

Severe pain

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." **Check the action you will take at this time:**

_____ 1) Administer no morphine at this time.

_____ 2) Administer morphine 1 mg IV now.

_____ 3) Administer morphine 2 mg IV now.

_____ 4) Administer morphine 3 mg IV now.

**Appendix (4): Key Answers of Pediatric Nurses' Knowledge and Attitudes Survey
Regarding Pain**

#	Item	True	False
1	Observable changes in vital signs must be relied upon to verify a child's/ adolescent's statement that he has severe pain.		√
2	Because of an underdeveloped neurological system, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.		√
3	If the infant/ child/ adolescent can be distracted from his pain this usually means that he is not experiencing a high level of pain.		√
4	Infants/ children/ adolescents may sleep in spite of severe pain.	√	
5	Comparable stimuli in different people produce the same intensity of pain.		√
6	Ibuprofen and other non-steroidal anti-inflammatory agents are NOT effective analgesics for bone pain caused by metastases.		√
7	Non-drug interventions (e.g. heat, music, imagery, etc.) are very effective for mild-moderate pain control but are rarely helpful for more severe pain.		√
8	Children who will require repeated painful procedures (ie. Daily blood draws), should receive maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures.	√	
9	Respiratory depression rarely occurs in children/ adolescents who have been receiving opioids over a period of months.	√	

10	Acetaminophen 650 mg PO is approximately equal in analgesic effect to codeine 32 mg PO.	√	
11	The World Health Organization (WHO) pain ladder suggests using single analgesic agents rather than combining classes of drugs (e.g. combining an opioid with a non-steroidal agent).		√
12	The usual duration of analgesia of Morphine IV is 4-5 hours.		√
13	Research shows that promethazine (Phenergan) is a reliable potentiator of opioid analgesics.		√
14	Parents should not be present during painful procedures.		√
15	Adolescents with a history of substance abuse should not be given opioids for pain because they are at high risk for repeated addiction.		√
16	Beyond a certain dosage of morphine increases in dosage will NOT provide increased pain relief		√
17	Young infants, less than 6 months of age, cannot tolerate opioids for pain relief.		√
18	The child/ adolescent with pain should be encouraged to endure as much pain as possible before resorting to a pain relief measure.		√
19	Children less than 8 years cannot reliably report pain intensity and therefore, the nurse should rely on the parents' assessment of the child's pain intensity.		√
20	Based on one's religious beliefs a child/ adolescent may think that pain and suffering is necessary.	√	

21	Anxiolytics, sedatives, and barbituates are appropriate medications for the relief of pain during painful procedures.		√
22	After the initial recommended dose of opioid analgesic, subsequent doses should be adjusted in accordance with the individual patient's response.	√	
23	The child/ adolescent should be advised to use non-drug techniques alone rather than concurrently with pain medications.		√
24	Giving children/ adolescents sterile water by injection (placebo) is often a useful test to determine if the pain is real.		√
25	In order to be effective, heat and cold should be applied directly to the painful area.		√

Type 3: Multiple Choice - Place a check by the correct answer.

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_____ d. 21-40%

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___√___ c. Children/ adolescents should be individually assessed to determine cultural influences on pain.

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0 **10** 20 30 40 50 60 70 80 90 100%

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≤1% 5% 25% 50% 75% 100%

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A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain.

0 1 2 3 4 5 6 7 8 9 10

Mild pain

Moderate pain

Severe pain

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." **Check the action you will take at this time:**

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_____ 2) Administer morphine 1 mg IV now.

_____ 3) Administer morphine 2 mg IV now.

___√___ 4) Administer morphine 3 mg IV now.

40. Patient B: Robert is 15 years old and this is his first day following abdominal surgery. As you enter his room, he is lying quietly in bed and grimaces as he turns in bed. Your assessment reveals the following information: BP = 120/80; HR = 80; R = 18; on a scale of 0 to 10 (0 = no pain/discomfort, 10 = worst pain/discomfort) he rates his pain as 8.

A. On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain:

0 1 2 3 4 5 6 7 8 9 10

Mild pain

Moderate pain

Severe pain

B. Your assessment, above, is made two hours after he received morphine 2 mg IV. After he received the morphine, his pain ratings every half hour ranged from 6 to 8 and he had no clinically significant respiratory depression, sedation, or other untoward side effects. He has identified 2 as an acceptable level of pain relief. His physician's order for analgesia is "morphine IV 1-3 mg q1h PRN pain relief." **Check the action you will take at this time:**

_____ 1) Administer no morphine at this time.

_____ 2) Administer morphine 1 mg IV now.

_____ 3) Administer morphine 2 mg IV now.

___√___ 4) Administer morphine 3 mg IV now.

Appendix (5) REC Permission Letter

Al-Quds University
Jerusalem
Deanship of Scientific Research



جامعة القدس
القدس
عمادة البحث العلمي

Research Ethics Committee
Committee's Decision Letter

Date: 21/3/2017
Ref No: 7/REC/2017

Dear Dr. Farid Ghrayeb,

Thank you for submitting your application for research ethics approval. After reviewing your application entitled "**Knowledge and attitudes toward pain management among pediatric nurses in West Bank hospitals.**" The Research Ethics Committee (REC) confirms that your application is in accordance with the research ethics guidelines at Al-Quds University.

We would appreciate receiving a copy of your final research report/ publication. Thank you again and wish you a productive research that serves the best interests of your subjects.


Scie Dr. Dina M. Bitar
Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President
Cc. Members of the committee
Cc. file

Abu-Dies, Jerusalem P.O.Box 20002
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تلفاكس: #970-02-2791293

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المعرفة والسلوكيات لدى ممرضى الأطفال تجاه إدارة الألم في مستشفيات الضفة الغربية

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ملخص

مقدمة: تعتبر إدارة الألم من النواحي المهمة خلال تقديم العناية التمريضية للمرضى الأطفال. أظهرت الدراسات العلمية أن الممرضين ما زالوا يعانون من نقص في المعرفة والسلوكيات تجاه إدارة الألم. الممرضون في طليعة العناية الصحية وامتلاكهم للمعرفة والسلوك الصحيحة تجاه تقييم وإدارة الألم لدى الأطفال مهم للوصول لأفضل عناية ممكنة.

الهدف: من الدراسة هو لتقييم مستوى المعرفة والسلوك لممرضى الأطفال تجاه ادارة الألم في المستشفيات الفلسطينية في الضفة الغربية. إضافة الى تحديد اذا كان هناك علاقة بين البيانات الديمغرافية والمهنية للممرضين ومستوى المعرفة والسلوك لديهم في إدارة الألم عند الأطفال.

الأداة: تم استخدام استبيان " معرفة وسلوكيات ممرضى الاطفال تجاه الالم" ويُعرف اختصاراً بـ (PNKAS) تم استخدامه لهذه الدراسة بهدف تقييم المستوى المعرفي والسلوكي لممرضى الأطفال.

الطريقة: تم استخدام دراسة وصفية غير تدخلية لقياس مستوى المعرفة والسلوكيات لدى ممرضى الاطفال، وشملت الدراسة 14 مستشفى، حيث شارك في ملئ الاستبيان 256 ممرضاً يعملون في أقسام الاطفال في الضفة الغربية.

النتائج: المعدل الكلي لنتائج الاستبيان كان 50.4%، أعلى علامة كانت 84.8%، وأقل علامة كانت 25%. معظم المشتركين 83% حصلوا على علامة أقل من 60% من الاجابات الصحيحة، بينما 15% منهم كانت علاماتهم تتراوح بين الـ 60-79%. فقط 2% من الممرضين حصلوا على علامة 80% أو أكثر. كما لوحظ أن العوامل الديمغرافية والمهنية للممرضين مثل الجنس، العمر، مستوى التعليم، والخبرة لم تكن لها تأثير كبير على مستوى المعرفة والسلوك لدى الممرضين. معظم الممرضين كان لديهم نقص في مستوى المعرفة والسلوك تجاه ادارة الألم لدى الأطفال. 98،4% من الممرضين كان لديهم مفاهيم خاطئة حول الإدمان على العقاقير المخدرة، حوالي 94،9% منهم كان لديهم نقص بالمعرفة والسلوك تجاه حدوث مضاعفات في الجهاز التنفسي عند استخدام العقاقير

المخدرة في إدارة الألم. و 91% من الممرضين يعتقدون أن الأطفال يببالغون في تقييم الألم الخاص بهم. لقد أظهرت نتائج هذه الدراسة عدم وجود مستوى معرفي وسلوكي كافي لدى ممرضي الأطفال الفلسطينيين حول إدارة الألم عند الأطفال.

التوصيات: بناء وتنفيذ العديد من الاستراتيجيات لتعزيز فهم الممرضين وتطبيق المعرفة والممارسة ذات الصلة من خلال البرامج التعليمية ، والتدريب المستمر في المجال السريري. وعلاوة على ذلك ، يجب على كليات التمريض فحص محتوى دورات التمريض من حيث عمق ودقة ومدى أهمية تقييم الألم والمعلومات التي تعكس المعايير الحالية للممارسة. بالإضافة إلى تطوير نهج متكامل لتعليم الطلاب حول إدارة الألم وتزويد الطلاب بالفرصة لأخذ دورات الألم المتعاقبة وتنفيذ التدخل التأملي.