Paediatric nurses' perceptions of using non-pharmacological pain management methods to control hospitalised children's procedural pain in Riyadh-Saudi Arabia

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Hanan Fahad Al-Harbi

School of Nursing and Midwifery

Faculty of Medicine, Dentistry & Health

University of Sheffield

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ABSTRACT

Aims: The purpose of the current study is to examine paediatric nurses' perceptions of the use of non-pharmacological pain management methods in controlling paediatric procedural pain in various Saudi health sectors in Riyadh City.

Background: Pain can be experienced by everyone at some point of their lives. It is the main reason children require health care, and it is one of the main causes of children seeking hospital care services. Pain assessment and management is one of the most important parts of the paediatric nurses' responsibilities towards patients with pain. However, this might be highly influenced by nurses' level of knowledge, attitudes and perceptions about pain.

Design and methods: An explanatory sequential design was applied in this study; qualitative methods were utilised to explain the initial quantitative findings (Creswell et al., 2003). A simple random sampling recruited 181 paediatric nurses from various children's departments for the survey. Twelve managers with experience in paediatric nursing and health care were selected purposively for individual interviews.

Results: older nurses (51-60 years old), nurses holding a diploma and staff nurses working in the governmental hospital are more likely to apply non-pharmacological methods. Staff nurses 1 and paediatric nurses working in ER are less likely to apply those methods.

Paediatric nurses face some barriers that prevent them from applying non-pharmacological methods. Barriers include organizational and relational barriers and issues associated with nurses' autonomy.

Conclusion: Hospital types and some paediatric nurses characteristics such as level of education, age, nursing position and nursing field are significant factors when it comes to pain management in children. Organizational factors, relational factors and nurses' autonomy are important factors that either promote or hinder paediatric nurses' use of non-pharmacological pain management.

Dedication

This thesis is dedicated to

My parents

Fahad and Khadijah

For their love, support, trust and for believing in me

My brothers and sisters

Turki, Bander, Abudllah, Abdulrahma, Mishael, Rania and Sara

For supporting me always and through everything

This work is also dedicated to the memory of my friend and colleague Thelma Van Der Merwe. The person who educated me, believed in me, and supported me always.

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A very special thank you to my lovely father, who supported me the most through all the tough times, loved me unconditionally and encouraged me in every way.

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Glossary

Cutaneous stimulation: stimulating the skin and the underlying tissue to lower pain, inflammation and muscle spasm.

Acute procedural pain: pain that develops in children during or after invasive diagnostic or therapeutic procedures.

Non-pharmacological pain management: administering therapies that do not include drugs to treat the pain.

Staff nurse 1: staff nurse 1 provides direct professional nursing care to patients.

Staff nurse 2: provides only basic care for the patients and cannot administer medication.

Reassurance: 'procedure-related comments that are directed towards the child with the intent of reassuring the child about his/her conditions, or the course of the procedure' (McMurtry et al., 2007, p.97).

Distraction: 'is a nursing attempt to focusing patient's attention on any other stimulant so as to control and reduce pain better' (Inal and Kelleci, 2012, p.211).

Preparatory information: preparing the child for a medical procedure by providing information about who will do the procedure, where the procedure will be done, duration of the procedure, what will happen during the procures and the possible sensation during and after the procedure.

Guided imagery: a distraction method which focuses the child mind on positive images to reduce pain and stress.

Cold compress: cold compression includes cryotherapy and static compression which is commonly used to treat pain and inflammation after surgical procedures or acute injury. (Kullenberg et al., 2006)

Cognitive preparation: preparing patients by informing them about what will be done during their procedures.

Play therapy: an interpersonal process that seeks to use the therapeutic powers of play to enhance children's wellbeing. (Nash &Schaefer, 2011).

List of abbreviations

AAP……..…….. American Academy of Pediatrics

AC……..……Air Conditioning

APS……. American Pain Society

BE……...……. Backward Elimination

BSc……...…. Bachelor Degree

BSN ……..…Bachelor of Science in Nursing

CAMPIS …….…..…….Child-Adult Medical Procedure Interaction Scale

CAPS ……Children's Anxiety and Pain Scale

CASP …….....Critical Appraisal Skills Programme

CBSCV……. Cooperative Behaviour Scale Of Children in Venepuncture

CDC …….……..…Centres for Disease Control and Prevention

CFCS…….. Child Facial Coding System

CHEOPS……..…… Children's Hospital of Eastern Ontario Pain Scale

CHIPPS ……...Children's and Infants' Postoperative Pain Score

CLS …….…….……..Child Life Specialists

CQM……. Clinical Quality Measures

CRIES ……Crying, Requires Oxygen, Increased Vital Signs, Expression, Sleepless

DCU…….…… Day Care Unit

DF…….....Degree of Freedom

e.g/i.e.……...For example

EMLA ……..Eutectic Mixture of Local Anaesthetics

ER…… Emergency Departments

ES…….. Effect Size

etc……. and so on

FLACC ……..….Faces, Legs, Activity, Cry and Consolability Scale

FPS ……...……Faces Pain Scale

FPS-R……Faces Pain Scale - Revised

FS……..…. Forward Selection

GDS ……...…..Groninger Distress Scale

Gov. ……..…..…..Governmental

HIV……...……..… Human Immunodeficiency Virus

IASP…… International Association for the Study of Pain

ICU…….....Intensive Care Unit

IM……...…Intramuscular

IV ……...……...Intravenous

KFSH&RC ……...King Faisal Specialist Hospital and Research Centre

LCD..... Liquid Crystal Display

MMD_D……...……. Multi-modal distraction

MMD-PP ……..Multi-modal distraction procedural preparation

MOH…….....…….Ministry Of Health

N/n…….……. Sample Size

NMC……. Nursing and Midwifery Council

O2…….....……..Oxygen Saturation

OSBD-R ……..…Observational Scale of Behavioural Distress-Revised

PBCL……..... Procedure Behaviour Checklist

PCA……..…… Patient-Controlled Analgesia

PICU ……Paediatric Intensive Care Units

PR ……..……...…….Pulse Rate

RAFH …….……..Riyadh Armed Forces

RCT ……...…...Randomised Controlled Trial

SA……..Saudi Arabia

SD…….Standard deviation

Sig……..….Significant

SPSS……..…….Statistical Package for the Social Science

Staff nurse 1……Provides direct professional nursing care to patients

Staff nurse 2……Provides only basic care for the patients and cannot administer medication

STAI…….... State Trait Anxiety Inventory _ State Scale

TENS ……...Trans-Electrical Nerve Simulation

TV……Television

UAE ……..United Arab Emirates

VAS……..….... The Visual Analogue Pain Scale

VG……..….Video games

VIP.....Very Important Person

VR ……..…….……Virtual Reality

Chapter 1: Introduction

1.1 Introduction

This chapter sets out to present our current understanding of pain and focuses specifically on pain in children, especially pain related to medical procedures. This underlies the purpose of the study which is to investigate approaches (non-pharmacological) to managing the pain associated with clinical procedures in children.

The study is largely related to the management of pain in the Saudi Arabian (SA) healthcare system which is discussed in depth, and there is an analysis of the role that multicultural nursing plays and how this needs to be taken into account when recommending appropriate protocols for child related pain management in SA.

1.2 What is pain?

Most literature uses the International Association for the Study of Pain (IASP) definition of pain which is 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (1979, p.250).

McGuire (1992) reported six dimensions of pain: behavioural, cognitive, sensory, physiologic, affective, and socio-cultural. Various factors can affect the perception of pain, such as a memory of a past painful experience, mood, cause of the pain and the time of the day (Carr and Mann, 2000). Furthermore, people respond to pain according to many physiological conditions as well as other factors such as observational learning, fear, anxiety, the meaning of pain, neuroticism, extroversion, perceived control of events and cultural differences (He, 2006).

Pain is common in paediatric patients (McGrath, 1991) and the majority of people will experience different types of pain throughout their lives. Pain can develop in almost all parts of the human body, both internally (e.g. muscles, bones and joints) and externally (e.g. the

surface of the skin). It can be caused by different factors including chemical, mechanical, thermal and electrical stimuli and there are different kinds of experiences of pain (e.g. burning, aching, gnawing, tearing, throbbing, sharp, dull and stinging) (McGrath, 1991).

1.3 Pain in children

Caty et al. (1995, p.639) and Hawthorn and Redmond (1998) reported that 'paediatric pain is a complex and elusive phenomenon'. The American Society of Anaesthesiologists (2004, p.1577) noted that 'the emotional component of pain is particularly strong in infants and children. Absence of parents, security objects, and familiar surroundings may cause as much suffering as the surgical incision'.

Acute pain is considered to be one of the most common negative stimuli that a child can feel. It can occur as a result of illness, injury or medical procedures and is associated with anxiety, physical symptoms, avoidance and parental distress (American Academy of Pediatrics, 2001).

The importance of understanding how children experience pain and how nurses can assess and manage pain is globally recognized as an issue which is widely underestimated. Gerik (2005, p.295) suggested that 'pain is one of the most misunderstood, under diagnosed and undertreated/untreated medical problems in children'. (Karling et al., 2002; Cummings et al., 1996, Johnston et al., 1992; McCaffery and Ferrell 1997).

Uncontrolled pain can have both short and long term psychological effects on the life of a child (Saxe et al., 2001; Taddio et al., 2002). Indeed, pain can have a range of impacts on the health of patients which can be manifested physically, psychologically and/or socially. Pain can have a great effect on the quality of life of children and lead to a decrease in their physical activity levels and negatively affect their eating habits (Palermo et al., 2006) and sleeping patterns (Yates et al., 1998). Similarly, untreated pain can have a negative impact on

the immune system, as well as the cardiovascular, pulmonary and nervous systems (Vincent et al., 2011). It can increase stress, decrease the rate of healing, and cause depression and anxiety (Lynch, 2001).

1.4 Children's pain related to medical procedures

A medical procedure is defined as 'any medical intervention that may be potentially painful, or cause distress or anxiety' (Department of Pain and Anaesthesia: Comfort Kids Program, Music and Educational Play Therapy and RCH Pharmacy, 2010). Procedures are divided into two types, diagnostic or minor medical procedures (such as immunization or blood taking) and surgical procedures (Association of Paediatric Anaesthetists, 2009).

Acute procedural pain refers to pain that develops in children during or after invasive diagnostic or therapeutic procedures (Admin, 2011) such as intravenous insertions, immunizations or dressing changes. Routine medical procedures such as immunization can commonly be very distressing events for children who experience feelings of pain, distress, and fear prior to and during the procedures (Caprilli and Anastasi, 2007; Deacon and Abramowitz, 2006). Children will often cry and fail to cooperate and the psychological suffering and the negative experience involved may lead to further lack of cooperation and decrease the success rate of such procedures. It is therefore important to develop effective, easy, and safe methods to carry out medical procedures in children which either do not involve pain or, at the very least, minimize it (Wang et al., 2008).

Controlling children's pain related to medical procedures is very important because painful or traumatic medical procedures may have negative effects on a child's behaviour and his/her health-related attitudes (Zeltzer & Brown, 2007). The most common painful medical procedures for children are, 'finger-sticks and venipunctures for laboratory tests, subcutaneous or intramuscular injections, lumbar punctures, bone marrow

aspirations/biopsies, and peripheral or central venous access placements' (Zeltzer & Brown, 2007, p.78).

Hospitalized children frequently have to undergo painful medical procedures such as intravenous cannulation or venipuncture; other medical procedures can also cause pain to children such as the dressing of a burn or laser treatment (Stinson et al., 2008). DeMore and Cohen (2005) reported that routine immunizations are the most painful medical procedures during childhood. The United States Centres for Disease Control and Prevention (CDC) (2004) reported that children need about 28 intramuscular immunization injections before the age of 6 years (DeMore & Cohen, 2005). Even though research indicates that a large number of children experience major distress during immunization, there are clearly advantages of paediatric immunization such as protecting the child from fatal diseases (DeMore & Cohen, 2005). Similarly, MacLaren & Cohen (2007) reported that as a part of medical health care, children might undergo some medical procedures such as immunization and venipunctures. Such events are sources of pain and stress, especially for younger children. In other cases, procedure-related pain can be very severe and may result in escape behaviour and healthcare providers may thus need to restrain the child (MacLaren & Cohen, 2007).

Failure to manage a child's pain during such procedures can have short and long-term negative impacts on the child (DeMore & Cohen, 2005). In the short-term, inadequate pain management can have a negative psychological impact on the child, his/her parents, and the staff. The long-term impact of inadequate pain management during childhood may result in avoidance of medical procedures in adulthood (DeMore & Cohen, 2005). Furthermore, Boivin et al. (2008) reported that failure to manage children's pain during injections can result in needle-phobia and it might negatively affect the relationship between the child and the doctor (Boivin et al., 2008). Failure to control procedural pain during childhood will result in high levels of anxiety before the procedure and less cooperation during the

procedure. Furthermore, children who have had a negative experience of pain during medical procedures might fail to seek health care in adulthood (MacLaren & Cohen, 2007).

In order for paediatric nurses to manage children's pain, it is essential that adequate pain assessment is done beforehand.

1.5 Pain assessment

Chadha (2008) reported that good pain assessment is important for good pain management. In order to treat pain in children effectively an ongoing pain assessment regimen, including the presence and severity of pain and the child's response to treatment, is essential (The American Academy of Paediatrics and American Pain Society, 2001; Chadha, 2008; Jacob and Puntillo, 1999; Twycross et al., 2009; McCaffery and Ferrell, 1994; McCaffery and Thorpe, 1988).

However, pain in infants and children is difficult to assess (Srouji et al., 2010) and poses many challenges - due to:

- The subjective and complex (physiological and psychological) nature of pain;
- Developmental and language limitations that preclude comprehension and self- reporting;
- Dependence on others to infer pain from behavioural and physiological indicators (McCaffery and Pasero, 1999).

Nevertheless, it is important for healthcare providers to have the ability to assess pain, to discover the signs and symptoms of children's pain in different age groups and to determine whether such symptoms are caused by pain or other reasons (Srouji et al., 2010). While paediatric nurses have a major role to play in the assessment of pain (He, 2006), involving the child and his/her family in pain assessment is also very important for effective pain management. McArthur and Cunliffe (1998) found that nurses did not assess children's pain appropriately, according to the developmental level of the children. Srouji et al. (2010)

reported that healthcare providers relied on self-reporting when assessing school-age children.

Pain assessment has been defined as ‘a process of interaction between the nurse and the client to guide goal setting and interventions and to evaluate the effectiveness of the intervention in light of these mutually established goals’ (Dick, 1995, pp.844-845). Messerer et al. (2010) argued that the first pain assessment for a patient should be carried out at admission and that this should be followed by three more assessments each day (in the morning, at noon and in the evening) during the inpatient stay. Furthermore, the evaluation of pain should be carried out at rest, since it is important for children to feel comfortable with the procedure. Moreover, from the age of six years (or earlier) an assessment of the impact of pain on movement should be undertaken. Addressing dynamic pain during movement, deep breathing, and coughing is important for reducing risks of cardiopulmonary and thrombo-embolic complications before and after surgery. In order for nurses to assess paediatric pain effectively, different pain scales can be used, and nurses should use the appropriate scale according to the patients’ age and condition.

1.6 Pain assessment tools

There are three different methods to assess pain in children (Chadha, 2008; Srouji et al., 2010):

- Self-reporting using questions, verbal scales, numeric scales and pictorial scales;
- Behavioural measures, such as motor responses, facial expressions, crying and sleep patterns. The observer depends on the presence or absence of these actions when he or she assesses the patient’s pain;
- Physiological measures, such as changes in a patient’s pulse rate and blood pressure.
- In order to quantify pain, a number of different pain scales are available. Some examples are noted below:

A) Children's and infants' postoperative pain score (CHIPPS): This scale can be used with children up to the age of four years, who cannot use words to describe their pain.

B) Faces Pain Scale - Revised (FPS-R) (Figure 1.1) by Hicks et al. (2001): This scale can be used for children aged four to six years and can help to assess the intensity of acute pain in child patients.

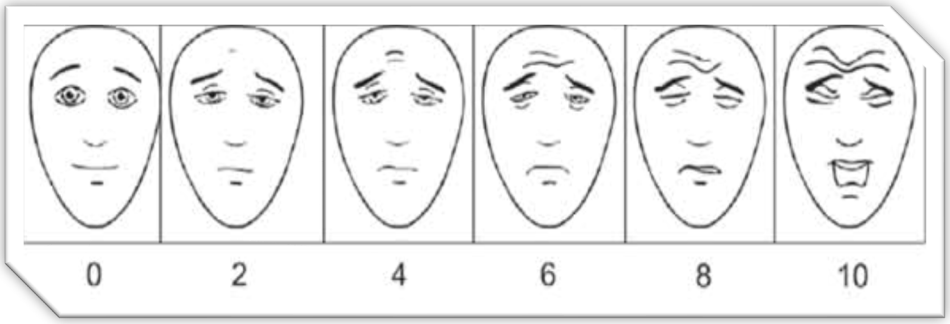

Figure 1.1: Faces Pain Scale – Revised (The Faces Pain Scale Revised; Hicks et al., 2001; International Association for the Study of Pain)

C) The visual analogue pain scale (VAS): This scale can be used with children aged 12 and older (Figure 1.2). The VAS contains a single horizontal line, 100 mm in length, with endpoints labelled 'no pain' and 'very severe pain'.

No pain _____Very severe pain

Figure 1.2: The VAS

1.7 Pain management

In past decades, most studies on pain control in paediatric patients reported that many pharmacological methods to control pain, especially in short painful medical procedures, are insufficient (Wang et al., 2008). Rogers and Ostrow (2004) reported that applying Eutectic Mixture of Local Anaesthetics (EMLA) cream is safe and effective in controlling pain during venous puncture and it has been suggested that it should be used routinely in such procedures. However, to achieve the optimum benefit of EMLA cream it needs to be applied at least 60

minutes before the procedure, so there are practical as well as financial limits to the use of EMLA cream in some paediatric departments. Attempts to develop non-pharmacological methods to control pain have also been made, such as therapeutic touch, encouragement, distraction, cognitive behavioural therapy and guided imagery with some reports of success (Ball et al., 2003; Russell and Smart, 2007; Kemper and Kelly, 2004; Lambert, 1996; Lange et al., 2006; Levy et al., 2010).

A combination of pharmacological and non-pharmacological methods have been argued to work best to control children's pain related to medical procedures; the right combination of methods depends on what is available to the healthcare providers, the waiting time before the medical procedure, the type of procedure, the child's age, his/her fear level and his/her previous experiences of procedures (Zeltzer & Brown, 2007). Sinha et al. (2006) also reported that non-pharmacological methods have a role to play in decreasing pain and anxiety in children undergoing invasive medical procedures.

1.8 Non-pharmacological pain management methods

'Non-pharmacological methods are widely accepted as strategies that may be used independently with mild pain or as a complement to pain medication for moderate or severe pain to ensure adequate relief' (He et al., 2010, pp.2399).

Different methods of non-pharmacological pain management, such as distraction, massage, guided imagery, Trans-Electrical Nerve Simulation (TENS) and music are widely used to control pain in children of different ages (Salanterä et al., 1999; Broome et al., 1996). Furthermore, humour and therapeutic massage have been recommended to control pain in children (Salanterä et al., 1999), and a number of other non-pharmacological methods of relieving pain or making pain more tolerable in hospitalized children have also been described (Caty et al., 1995; Pederson, 1996).

MacLaren and Cohen (2007) categorise non-pharmacological pain management methods into two techniques: physical and behavioural. Srouji et al. (2010) state that non-pharmacological methods can be divided into three types: behavioural, cognitive and both behavioural and cognitive. Other researchers have divided non-pharmacological methods into various categories (Vessey and Carlson, 1996). For example, non-pharmacological pain management can be categorized as follows:

1.8.1 Cognitive or behavioural strategies

Examples of cognitive or behavioural strategies includes; distraction, imagery, relaxation, and breathing exercises. In cognitive behavioural strategies, distraction refers to directing attention away from pain by focusing the attention on something else (Title and Rakel, 2001). There are various types of distraction, such as music, humour or movement but it is essential that the person experiencing the pain should actively participate in the distraction method being used (McCaffery, 1990). Furthermore, distraction techniques including cartoon movies, music and party blowers have attracted the attention of researchers and the impact of such techniques have been assessed in different ways, including self-reports, observation and parental reports. Most research outcomes have supported the effectiveness of distraction in reducing children's pain and distress (MacLaren and Cohen, 2007).

Preparing a child for a medical procedure involves behavioural intervention. This includes providing information to the child about what will happen during the procedure. Preparing a child for hospitalization and surgery involves more attention than preparing a child for shorter, basic care, such as an immunization (MacLaren and Cohen, 2007).

Cognitive interventions (e.g., listening to music, counting and non-procedure-related talk) can be used with older children to distract their attention from procedural pain (Uman et al., 2010). The following are some examples of cognitive interventions:

a) Imagery: Asking the child to imagine an enjoyable item or experience, such as playing on the beach (Kline et al., 2010).

b) Preparation/education/information: Explaining to the child the feeling that he/she may experience during the procedure, as well as delivering instructions to the child about what he/she must do during the procedure (Harrison, 1991).

c) Coping statements: Asking the child to repeat a set of positive thoughts, such as 'I can do this' or 'this will be over soon'.

d) Parental training: Teaching the child's parents one of the above techniques to reduce their own stress which will, in turn, help to decrease the child's distress (Lindsey et al., 1997).

e) Video games and television: These can be used to distract the child's attention from a painful procedure (Wint et al., 2002).

Behavioural interventions can be used to move a child's attention away from a painful procedure (Srouji et al., 2010). They include:

a) Breathing exercises: Teaching the child to concentrate on deep breathing; for young children, party blowers or blowing bubbles can be used (French et al., 1994).

b) Modelling positive coping behaviours: A child watching another child or adult undergoing a procedure and then rehearsing their behaviours (Srouji et al., 2010).

c) Desensitization: This is a step-by-step technique to cope with painful stimuli. It includes slowly introducing the procedure and the tasks involved, dealing with the easier tasks first before moving to the next tasks (Lindsey et al., 1997).

d) Positive reinforcement: Rewarding the child with positive statements or gifts (such as games, stickers or toys) after a painful procedure (Srouji, et al., 2010).

e) Parent coaching: Instructing parents to encourage their children to use these techniques (Srouji et al., 2010). Similarly, Young (2005) states that there are some simple, non-pharmacological methods that can be taught to children (and to parents, for coaching their

children) as ‘tricks’ to use. If coping techniques are used by adults, then children are more likely to use them. Parents are the best coaches because they know their children well, they know the interests that their children have, and they usually like to stay with their children during the procedure. The use of coping techniques also helps to reduce the anxiety levels of parents by allowing them to participate during procedures and by providing helpful information that parents can use for future painful procedures (Young, 2005).

1.8.2 Physical or cutaneous strategies

Examples of physical or cutaneous strategies include; vibration, position changing, massage, rubbing the area of pain, heat/cold, and Transcutaneous Electrical Nerve Stimulation (TENS) (McCaffery, 1990; Mobily et al., 1994; Savedra et al., 1990).

Cutaneous stimulation was defined as stimulating the skin and the underlying tissue to lower pain, inflammation and muscle spasm. Cutaneous stimulation can be performed by different methods such as massage with hand heat, and cold application on the site prior to injection, simple rhythmic rubbing and application of pressure or electric vibrators (Abd El-Gawad and Elsayed, 2015). Applying heat and cold pressure on peripheral nerves will increase the pain threshold and elicit a spinal cord reflex and this will ‘close the gate’ to pain (Michlovitz, 1990). Massage includes manipulating the soft tissue to decrease the muscle tension and spasms which promote pain relief (Mobily et al., 1994). TENS produce low-voltage of electrical stimulation of peripheral nerves. This can help in block the pain sensation (Mobily et al., 1994).

1.8.3 Environmental or emotional strategies

Examples of environmental or emotional strategies include; reassurance, touch, and the interior decoration of the room (Pölkki et al., 2002). Reassurance is defined as ‘procedure-related comments that are directed towards the child with the intent of reassuring the child about his/her conditions, or the course of the procedure’ (McMurtry et al., 2007, p.97).

Reassuring children during procedures can be done by parents or medical staff. For example; 'Don't worry. I'll hold your hand'; 'You can do this.'; 'You're okay' (McMurtry et al., 2007).

As a summary, the non-pharmacological interventions that can help reduce procedural distress and pain in children, as suggested by Young (2005), are: distraction, deep breathing, blowing, suggestion, superhero imagery, guided imagery, thought-stopping and positive self-statements, rewards, spot pressure or counter irritation and cognitive behaviour therapy.
Healthcare providers can keep various distraction tools in the treatment room, keeping in mind that different distraction items can be used depending on the child's age and interests. Non-procedural conversations, such as discussions of school or sports, do not require any preparation before the procedure. Thus, the conversational approach is always available to healthcare providers, while cognitive behavioural therapies require more time and training (Young, 2005).

1.9 Pain management in the Saudi-Arabian context / Influence on pain management

From my experience as a nurse in paediatric intensive care units (PICU) and from my observations, I have noticed that various medical procedures, such as IV insertion, dressing changes, and blood tests, are very common in children's departments. Moreover, it is known from the children, the children's families, and the literature review that these procedures are sources of pain (MacLaren and Cohen, 2007; Stinson et al., 2008; Young, 2005; Zeltzer and Brown, 2007).

There are limitations to paediatric pain management in Saudi Arabia that need to be explored and understood, specifically applying non-pharmacological pain management to control procedural pain. The choice of studying paediatric nurses' perceptions of applying non-pharmacological pain management methods to control children's pain related to medical

procedures is grounded in my previous experience as a PICU nurse, which also highlighted the prominence of religious and traditional healing in the Saudi culture. Furthermore, the use of narcotics to treat pain is considered strongly unacceptable in the Saudi culture, because of narcotics' sedative effects (Lovering, 2006).

Many Saudi hospitals are influenced by the American system. Some hospitals in Saudi Arabia work closely with the Joint Commission International (JCI), an organization, for the accreditation of healthcare organizations. This is an American, independent, non-profit organization that evaluates and accredits more than 21,000 healthcare organizations and programmes in the United States (US). It also currently accredits healthcare organizations in the Middle East, Asia, South America and Europe (http://www.jointcommission.org). In order for a hospital to be accredited by this organization, specific guidelines and recommendations, which include pain management, must be followed.

In the following section, a general overview of the health care system in Saudi Arabia is presented with reference to pain management in children. Then different types of culturally specific, non-pharmacological methods used by Saudis will be presented.

1.10 The healthcare system in Saudi Arabia

Saudi Arabia is one of the largest countries in the Middle East, comprising 2.24 million km^2 (Aldossary et al., 2008). The last census in 2010 showed that the population was approximately 27 million (compared to a 2004 population of 22.6 million). The annual population growth between the years 2004 and 2010 was 3.2 percent. The number of Saudi citizens was 18,707,576 in 2010, and the number of non-Saudi residents was 8,429,401 (MOH, 2010). In Riyadh (the capital) the number of Saudi citizens in 2010 was 4,296,745 and the number of non-Saudi residents was 2,480,401 (MOH, 2010). Overall, in the Saudi population, 67.1 percent were under the age of 30 and 37.2 percent were under the age of 15. The birth rate in Saudi Arabia is 23.7 births per 1000 people annually. The escalating birth

rate and the relatively young population in Saudi Arabia will inevitably lead to a rising demand for improved health services and facilities especially for children (Yusuf, 2014).

The current Saudi health care system is two-tiered. The first tier provides primary healthcare through clinics, preventive healthcare services, emergency services and mobile clinics in less accessible rural regions. The second tier includes both general hospitals and hospitals that provide specialized treatment services that are located in urban regions (Yusuf, 2014). The Ministry Of Health (MOH) delivers primary healthcare services in many primary health care centres around the Kingdom with a referral system to general or specialist hospitals when required (Aldossary and Barriball, 2008). In emergency situations, patients go immediately to any Emergency Room (ER department) and they will receive care.

Primary health care and hospital services are operated by both governmental and private organizations (Aldossary and Barriball, 2008). The MOH is the main provider and financer of governmental health care services in the Kingdom of SA. Public health care services in SA are also operated, financed, supervised, controlled, and managed by the MOH. The government operates 115 hospitals with a total capacity of 10,822 beds. Moreover, other governmental agencies operate hospitals including; referral hospitals, such as the King Faisal Specialist Hospital and Research Centre (KFSH&RC); military hospitals which are also known as Riyadh Armed Forces (RAFH), Security Forces' Medical Services, and National Guard Health Affairs; Aramco hospital; Ministry of Higher Education teaching hospitals; school health units of the Ministry of Education; the Red Crescent Society; the Royal Commission for Jubail and Yanbu health services. In addition, the private health sector participates in the delivery of health services, especially in large towns and cities (Almalki et al., 2011) (see Figure 1.3). The private health sector operates 125 hospitals with a total capacity of 11,833 beds and 2,218 dispensaries (Yusuf, 2014).

The MOH is financed through Government expenditure and is currently facing major challenges in funding health care services, which are provided free of charge to users. This has put the government under significant cost pressures, especially in relation to the rapid growth of the Saudi population, increasing prices of new technology and rising awareness about health and disease in the society. In order to meet the population's increasing demands on health services and to provide quality services, the government established the Council for Cooperative Health Insurance in 1999. This Council has three major roles; to introduce, adjust and supervise health insurance policies for the health care market in SA. Application of the cooperative health insurance plan took place in three stages. The first stage included implementation of cooperative health insurance for non-Saudis and Saudi citizens in the private sectors, in which their employers must pay for their health services. Implementation of cooperative health insurance for Saudi citizens and non-Saudis working in the government sector was planned for the second stage. The government will pay the health insurance fees for this group of employees. The last stage will include implementing cooperative health insurance for all other groups such as pilgrims (Almalki, et al., 2011). To date, only the first stage has been implemented and in 2015 the MOH budget was 62.342.539 Saudi Riyal. Within this budget, 151 new primary health care centres, specialized hospitals and health centres were established around the Kingdom (MOH, 2015).

The second highest concentration of private hospitals in SA is in Riyadh city (23.3%) (Health Statistics Annual Book, 2012). Private hospitals in Riyadh city are owned by individuals or a group of wealthy people. The prices for health care services can vary by hospital and according to the service being accessed and the area where the hospital or the dispensary is located. Usually the dispensaries' prices are more affordable and the price of health services is much lower than in the large hospitals.

Al-Doghaither et al. (2003) report several factors that can influence patients' choice of hospitals in Riyadh city. The nature of the medical services provided (such as the quality of medical care and the level of equipment in the ER) is the most important factor affecting patients' choice of hospitals in Riyadh city. Furthermore, communication and staff behaviour are also important factors. Several respondents (Al-Doghaither et al., 2003) reported that health staff in private hospitals are more skilled, cooperative and have more pleasant attitudes regarding patients' needs. Furthermore, there are high demands in some health services in the governmental hospitals and patients sometimes experience long waiting times. Some of those patients use private health services.

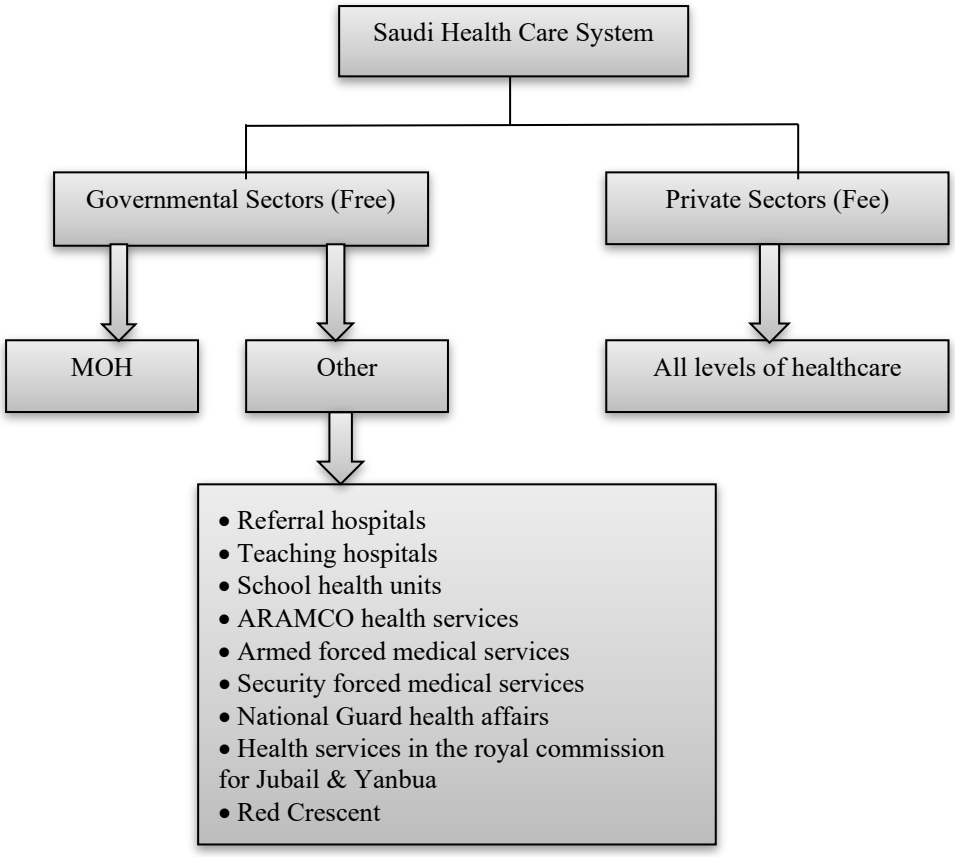

Figure 1.3 Current structure of the health care sectors in Saudi Arabia (Ministry of Health, 2010).

1.11 Nursing education in Saudi Arabia

The first official nursing training was established in 1958 in Riyadh city, the capital of Saudi Arabia, by what was then the Health Institute, a collaboration between the Ministry of Health and the World Health Organization. Soon after, other Health Institutes opened in Jeddah and Houfouf cities. In 1976, the College of Nursing at King Saud University in Riyadh established a Bachelor of Science in Nursing (BSN) programme. In 1987, they established a Master of Science in Nursing. Then, other BSN programmes were established in Jeddah and Dammam. All the universities' programmes were limited to female students at that time. In 2008, all educational organizations providing nurse education at that time were transferred from the MOH to the Ministry of Higher Education (MOHE) and the BSN became the main route into nursing, requiring nursing students to study four years of theory followed by a one year internship. The aim of this transfer was to improve the quality of nursing education (Almalki, et al. 2011and Tumulty 2001).

However, other governmental organizations also provide nursing educational programmes in order to meet their own requirements. For example, the National Guard Health Affairs (NGHA), the Medical Services of Army Forces and the Prince Sultan Cardiac Centre (KFSH&RC) have been providing a two years diploma in nursing since 2002. These programmes target male and female high school students. After the students successfully complete the two years, they must undertake six months of consolidated clinical practice before they can work as registered nurses (Almalki et al., 2011).

Speciality training is achieved by working in a specific hospital department and gaining the necessary experience; nurses therefore develop specialist knowledge and skills by attending courses, conferences and workshops within their hospitals and sometimes outside the hospital.

1.12 Nurses' working practice

In Saudi hospitals, nurses are appointed to posts in specific clinical areas and work exclusively within their allocated ward (or other clinical practice area), unless they are required to relieve colleagues elsewhere when they are short-staffed. Primary nursing is common, where one nurse is assigned to a specific number of patients to deliver all the nursing care needed. Primary nurses can be promoted to charge nurses when they develop their communication, leadership and management skills and knowledge. Charge nurses have specific responsibilities such as supervising and assisting primary nurses, assigning nurses to patients, responding to emergencies requiring resuscitation and admitting patients. Thus, charge nurses must attend and pass a life support course to be able to respond to emergencies requiring resuscitation. A primary nurse can become a head nurse when they have nursing and leadership experience. A primary nurse usually applies for a head nurse position when it is available and a team from different hospital departments will meet the nurse and evaluate his/her skills and knowledge to assess her/his eligibility for the position. Head nurses have specific responsibilities such as; regularly reviewing and approving nursing policies and procedures, evaluating staff nurses' performance, ensuring that staff nursing care meets regulatory standards, communicating and collaborating with staff nurses and upper management and external agencies in the coordination of patients' care and training nursing management staff.

Nurses' career structure starts from staff nurse 2 or staff nurse 1 according to their level of education (diploma or BSc degree in nursing), then charge nurse and then head nurse.

1.13 The nursing workforce in Saudi Arabia

In the Kingdom of Saudi Arabia nursing as a career is not desirable for many Saudi citizens. There are many reasons for this including the working hours, the type of work and perceptions of insufficient financial payment for nurses. For these and other reasons, such as

gender norms and the rapid population growth in the Middle East, health organizations in Saudi Arabia and the Middle East have increasingly had to rely on expatriate nurses (Almutairi and McCarthy, 2012). Currently, it has been estimated that the proportion of expatriate nurses from diverse cultures and backgrounds working in Saudi Arabia is 67.7% (Almutairi and McCarthy, 2012). However, this is the norm in all gulf countries. For example, in the United Arab Emirates (UAE) only 3% of nurses are natives of UAE (Almutairi and McCarthy, 2012).

The multicultural local and expatriate health care professionals working in Saudi Arabia face the challenge of becoming familiar with local cultural attitudes and beliefs regarding pain and its management. These multicultural and expatriate health care professionals bring their own belief systems, knowledge and experience into the clinical work environment and it can sometimes be months before they learn and adapt to the Saudi Arabian culture (Lovering, 2006). Inevitably, nurses bring their own knowledge and skills in pain management, which were obtained in their countries of education and/or origin, to their new working environment (Van der Merwe, 2005).

1.14 Cultural health beliefs

In Saudi culture ‘predestination and the occurrence of diseases can be attributed to the will of Allah’ (Al-Shahri, 2002, p.134). However, this does not prevent people from seeking medical therapy such as immunization for children (Al-Shahri, 2002). Medical treatment in Saudi Arabia includes traditional healing methods, such as herbal medicine, cauterizing, chiropractic therapy, dietary treatments, cupping, and fracture reduction (Al-Shahri, 2002). It can be noted that ‘the traditional healers are usually illiterate people who inherit the trade from their predecessors’ (Al-Shahri, 2002, p.134). Moreover, ‘a traditional healer sometimes orders the discontinuation of all hospital medications before accepting a patient for treatment’ (Al-Shahri, 2002, p.134).

Spiritual healing is widely used by Saudi people for all types of diseases, especially the ones that are presented in the Noble Qur'an and (or) Sunnah. Spiritual healing includes healing in different situations such as mal-effects of the evil eye, possession by Jinn and poisonous stings. The main spiritual modality of treatment is the recitation of verses of the Noble Qur'an and specific sayings of the prophet Mohammad. Zamzam water (obtained from the Holy Mosque in Makkah), honey and black cumin (Nigella seeds) are considered healing agents. The use of amulets is extremely rare in Saudi culture, as this practice was discouraged by the prophet Mohammad 'peace be upon him' (Al-Shahri, 2002, p.135). The next section discusses the importance of understanding pain management for paediatric nurses.

1.15 Rationale of the study

My own interest in nurses' management of paediatric pain first emerged when I was an undergraduate nurse. At that time, I encountered a young child who was complaining of pain in his stomach. When I informed my preceptor (the primary nurse) who did not speak Arabic, she immediately asked; 'Did you massage his stomach?' I had not anticipated this question as I was unfamiliar with the potential for massage to relieve pain. This prompted me to begin to learn about alternatives to pharmacological pain management. Later, when working as a PICU staff nurse I became aware that many of my colleagues were concerned about the side effects associated with the use of narcotic medications and were reticent in administering these. At the same time, I noted that the majority of families were using traditional and spiritual treatments such as reading the holy Quran to the child and even asked the staff nurses to play recordings of the holy Quran for the child in their absence. When I moved from PICU to the Quality Management Department, I was responsible for checking nurses' documentation in all departments and gradually became aware that nurses were either not using, or not documenting the use of non-pharmacological pain management methods. This raised the important question: what did paediatric nurses know about non-pharmacological

methods and what factors affected whether or not they chose to use them? This question is particularly pertinent as children comprise a large proportion of the Saudi population. Currently 37.2 % of the Saudi population are under the age of fifteen (MOH, 2010). Furthermore, in Saudi culture, consanguineous marriage is very common, thus, genetic disorders, congenital malformations and chronic diseases are not uncommon (Khalil and Daradka, 2015). The population of Saudi children can, therefore, be expected to go through several immunizations, diagnostic tests, and treatments. Many children will undergo medical procedures during their childhood, such as intravenous insertion (IV) and venepuncture. These procedures are considered painful and stressful. Untreated pain can affect the child in various ways; it can lower the quality of life, negatively affect their sleeping patterns, decrease activity and prevent the child from seeking medical help in the future (Saxe et al., 2001; Taddio et al., 2002; Palermo et al., 2006; Yates et al., 1998; Vincent et al., 2011; Lynch, 2001). Thus, it is very important to take children's pain into consideration to prevent the negative impacts of uncontrolled pain on hospitalized children.

My aim, therefore, in undertaking this study was to better understand paediatric nurses' awareness of alternatives to pharmacological pain management and to explore factors that either promoted or inhibited their use of non-pharmacological methods for children undergoing medical procedures in hospitals in Riyadh.

1.16 Conclusion

This chapter presents a general introduction to pain and pain in children as well as children's pain related to medical procedures. It notes the importance of assessing pain correctly using the appropriate assessment tools to determine the child's level of pain which helps the paediatric nurses to manage pain properly. Pain management, focusing on non-pharmacological methods, is discussed. A general overview of the health care system in Saudi Arabia, highlighting the increasing paediatric population and their demands on health

care services, is presented. Cultural health beliefs in Saudi Arabia and the popularity of applying traditional and religious healing among the Saudi population are discussed. At the end of the chapter, the rationale for the study is presented.

The next chapter reviews the literature concerning the effectiveness of non-pharmacological pain management in controlling children's pain related to medical procedures as the focus of this study is on paediatric nurses' application of non-pharmacological pain management to control hospitalized children's pain related to medical procedures.

Chapter 2: Literature Review

2.1 Introduction

The aim of this chapter is to present and discuss evidence of the effectiveness of applying various non-pharmacological methods for managing pain in children during medical procedures.

In the first section of this chapter, the search strategy is presented. This indicates the search terms, databases used and the inclusion and exclusion criteria. The second section presents the studies and considers evidence for the effectiveness of non-pharmacological pain management methods in controlling paediatric pain during medical procedures. The last section presents potential gaps in the literature, aims, and significance of the study and the research questions that inform the development of this thesis.

2.2 Search strategy

The strategy used to search for the evidence of effectiveness included an exploration of electronic databases and other sources using inclusion and exclusion criteria and search terms.

2.2.1 Search terms

The search utilized keywords and synonyms, such as: pain, procedural pain, pain management, non-pharmacological, non-pharmacologic, cognitive therapies, distraction, imagery, preparatory information, paediatric, children, child, nursing care, nursing, nursing knowledge, nursing attitude and perceptions.

The search included the following synonyms:

• Non-pharmacological, non-drug

• Child, children, paediatric, paediatrics, pediatric

• Pain management, pain control, procedural pain, acute pain, child pain

2.2.2 List of terms

Some examples of combination terms used for the literature review include;

- Non-pharmacologic **And** paediatric **Or** child **And** pain management
- Non-pharmacologic **And** Children **And** procedural pain
- Non-pharmacological **And** Children **And** acute pain
- Nonpharmacological **And** children **Or** paediatric
- Children **And** procedural pain
- Pain management **Or** pain control **And** children
- Pain **And** nursing care
- Distraction **And** child **Or** children **And** immunization
- Preparatory information **And** child **And** Nurse
- Guided imaginary **And** child **And** Nursing
- Positioning **And** paediatric **Or** pediatric **And** acute pain

2.2.3 Electronic databases

The terms identified and their synonyms were used to expand the search of the literature. A comprehensive approach was used to cover a wide range of nursing and medical databases. Information was thus utilized from various databases:

- Medline via Ovid
- CINAHL via EBSCO
- PsycoINFO
- Cochrane Library
- Google and Google Scholar

2.2.4 Other search methods

The search also included manual searching (references included in some of the articles used), published dissertations, expert opinions, and professional reports (including some hospital and university reports and guidelines which were found on the internet).

2.2.5 Inclusion criteria

Hospitalized children (from age 3 to 14 years) undergoing medical procedures are eligible to be included in the study. This age group were selected to include preschool and school age children. Preschool age in Saudi Arabia is between 3-5 years old. Primary School is between 6-11 years old. Secondary School is between 12-14 years old.

2.2.6 Exclusion criteria

The following criteria were excluded from the searching process:

- Neonatal and infant patients
- Children outside the hospital setting
- Adult patients
- Surgical procedures
- Chronic pain
- Children with cancer

Following this strategy 20 articles were identified as noted in the figure 2.1.

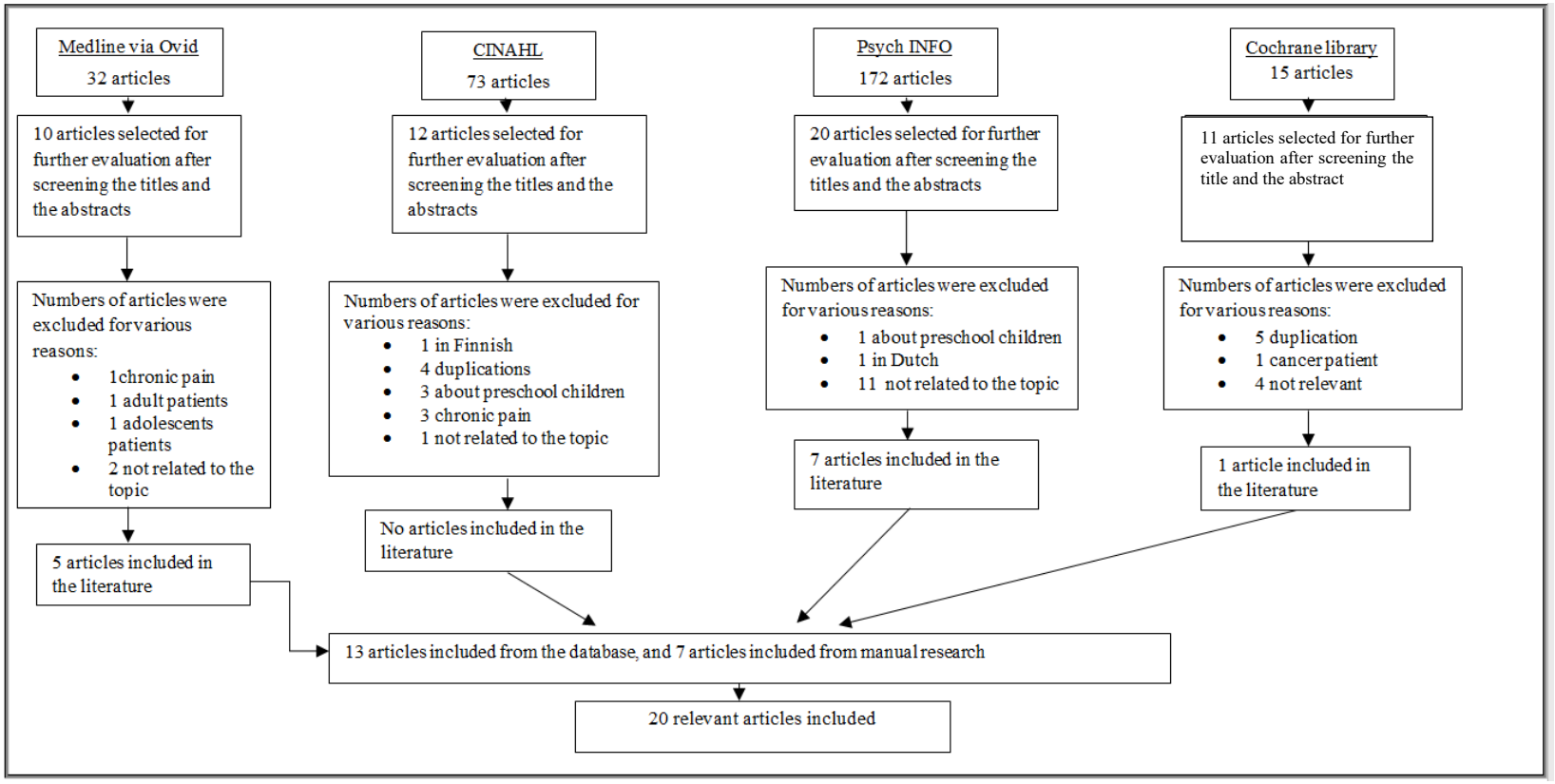

Figure 2.1: Summarizes the process of identifying the relevant studies from the literature review.

2.2.7 Critical appraisal of the literature review

Critical appraisal is a process of examining the literature review in a systematic way to determine the value, truthfulness and relevance of it in a practical context (Burls, 2009). The Critical Appraisal Skills Programme (CASP) (http://www.casp-uk.net) was used to examine the quality of the literature as these tools are widely used by the scientific community and their efficacy is well accepted. CASP has various checklists that can be used for different research approaches.

Critical appraisal can be carried out using a three-step process; firstly, the methodological quality of each research articles is assessed. Second, looking at the study results and judging if the findings are clinically relevant, for example, did the experimental group have significant outcomes compared to the control group? Finally, it is important to take into consideration how the results apply to my research questions (Burls, 2009).

2.2.7.1 Undertaking the critical appraisal

Usually, any research paper is organized into four sections; overview, methods, findings and discussion. A researcher can assess research papers by asking questions addressed to each of the sections in order to highlight the significant information that they contain. This process provides the basis for the evaluation of the quality of each study.

The questions, broadly, are:

- Is it of interest?
- Why was it done?
- What has it found?
- What are the implications?
- What else is of interest? (Crombie, 1996).

In the current study a total of twenty papers were included in the first section of the literature review, where the effectiveness of non-pharmacological pain management methods was considered. Each checklist comprises between 10 and 12 questions. The exact nature of the appraisal is dependent upon the study design such as RCT, cohort study, systematic review, qualitative study, case-control study and diagnostic study. Most of the studies included in the review reported on RCTs (Gonzalez et al., 1993; French et al., 1994; Goymour et al., 2000; Lindsey et al.,1997; Gold et al., 2006; Tüfekci et al., 2009; Miller et al., 2010; Cassidy et al., 2002; Wang et al., 2008; Sinha et al., 2006; Kipping et al., 2012; Boivin et al., 2008; Pederson, 1995; Kolk et al., 1999; Harrison, 1991; Inal and Kelleci, 2012; Sparks et al., 2007; Cavender et al., 2004) and the CASP RCT appraisal tool was therefore used for each of these; the other studies (Schiff et al., 2001; Movahedi et al., 2006) were appraised using different checklists.

A randomized controlled trial (RCT) is considered the best design to use in studies assessing the effectiveness of a treatment or intervention (McGrath et al., 2008). The participants in these types of study are randomly allocated into an intervention or control group. At the end of the study, each group is followed, and the effectiveness of the intervention can be measured as the two groups are compared.

Gonzalez et al. (1993) conducted a RCT study to investigate the effects of maternal distraction and reassurance on children's reactions to injections. A total of 42 child/mother dyads were included in the study. Researchers did not include the power calculation. Children from the age 3 to 7 years who needed injections were included in the study. The researchers clearly determined the population under study and the intervention given. Inclusion and exclusion criteria were reported in the study. Children were randomly assigned into groups applying a block randomization procedure according to their age, gender and ethnicity. The study was done in a children's primary care clinic in a large public hospital. It was reported

that the nurse and the research assistants who interacted with the children and their parents were not aware of the hypotheses under the investigation. Data coders were also blinded to the group assignment. Aside from the experimental intervention, the groups were treated equally. The process of data collection was reported in detail. Researchers used more than one pain assessment scales to assess children's pain (Table 2.2). The researchers compared the groups and reported the significant and the non-significant results. In Gonzalez et al.'s (1993) study, the *P* value was presented. Despite the absence of a power calculation, this study was deemed to be of sufficient quality to be included in the review. Study findings showed evidence for the efficacy of maternal distraction as a non-pharmacological pain management method to control children's distress during invasive medical procedures.

French et al. (1994) conducted a RCT study to assess the effectiveness of active distraction methods on pain in preschool children who receive immunization. The study was randomized and un-blinded controlled. It was reported that the experimental and the control group were enrolled on alternate days to prevent contamination of the control group. The sample size was 149 children from the age of 4-7 years. The power calculation was 80%, the sample size needed was not reported. The recruitment site was in public health department immunization clinics. Inclusion and exclusion criteria as well as the process of the study were reported. The visual analogue scale was used to assess the children's pain levels. Results were reported in detail, including significant and non-significant outcomes including the results of *P* values. The results of the study showed that distraction methods reduced children's pain during immunization. Appraisal of this study showed a sufficient confidence in the research for me to include it in the review.

Goymour et al.'s (2000) study was a RCT to evaluate the role of play therapy in a paediatric emergency room. The population under study was clearly identified. The researchers used a convenience sample of 100 children from the age of 4 to 15 years who were visiting the ER

and needed cannulation or venepuncture. The power calculation was not reported in the study. Children were recruited from Sydney Children's Hospital. The researchers reported inclusion and exclusion criteria. The sample was divided into an intervention and a control group, though how the groups were assigned was not reported. It was not reported if the researchers were blinded to the group assignment. Aside from distracting the intervention group by play therapy and providing preparatory information, those in the control group were treated equally. The process of the study was reported in detail. A standardized author-designed questionnaire was used to collect data from the children, their parents' and the attending medical staff members. Significant and non-significant differences between the two groups were reported including the *P* values. The study concluded that play therapy was effective in decreasing children's anxiety levels during venepuncture. This paper was included in the review because, after reviewing the study critically and applying the CASP tool, I had adequate confidence in the research.

Lindsey et al. (1997) conducted a RCT study to evaluate nurse coaching and distracting children by allowing them to watch cartoons to reduce child, parent and nurse distress during immunizations. The sample size was 92 children from age 4 to 6 years. Their parents and guardians and the two nurses who performed the immunization were included in the study. The power calculation was not clear in the study. Participants were recruited from a health care centre in a rural county in United States. The nurses performing immunizations were not blind to the study conditions. Inclusion and exclusion criteria were reported. The process of conducting the study was reported in detail. The researchers assigned the children into groups alternately. The measures applied to assess the effectiveness of applied non-pharmacological methods were reported. At the end of the study, they compared the groups and reported the significant differences between them. ANOVA analysis with an alpha set at less than or equal to .05 was applied. The researchers reported in detail the process applied to test the research

hypothesis. The results showed better coping from children in the experiment group during the immunization. Furthermore, children in the experiment group were less distressed and this result provides evidence of the effectiveness of distraction during immunization, which has relevance for the current research. This study was therefore included in the study because after the critical appraisal, I had a sufficient confidence in the research.

Gold et al.'s (2006) study was a RCT conducted to evaluate the efficacy of applying virtual reality as a distraction method to control children's pain during intravenous insertion. The sample size was 20 children and their parents. The children were stratified according to their age (7-9 or 10-12 years) and gender (girl or boy), and then they were randomized into two groups. The researchers reported that the study sample was reflective of the hospital's patient population with regards to medical status and ethnicity but the power calculation of the sample size was not clear. It was not reported if the assignment of the children was blinded to the researcher or the research assistant. Participants were recruited from a radiology department in a children's hospital in Los Angeles. The inclusion and exclusion criteria were included, and the process of the study was reported in detail. The pain scales used by the researchers to assess the participant's pain were reported in the study. The researchers reported the significant and non-significant results clearly and *P* values were presented. Although the sample size was not clear in the study, the research process and the detailed information provided by the researchers convinced me to include this study in the literature review.

Tüfekci et al. (2009) conducted a RCT study to assess the effect of distraction to control school-age children's pain during venepuncture. The participants were recruited from the Biomedical Laboratory of Ataturk University, Yakutiye Research Hospital Erzurum in Turkey. The power calculation of the study sample size was not clear. The researchers presented the hypothesis of the research, tested it and presented detailed information about

how they tested it. The sample size was 206 children from the age of 7 to 11 years. 105 of those children, who came on one day of the week, were included in the intervention group and the other 101 children, who came on another day of the week, were included in the control group. The day of the week was selected randomly, but it was not reported how this was done. The researchers presented the inclusion and exclusion criteria. The intervention used was distraction by looking through a Kaleidoscope during venepuncture. Children of the same age and gender were selected to constitute each group. Various scales were used to measure the patients' level of pain. The researchers reported the statistically significant and the non-significant results. All the *P* values of the results were reported in detail. Following critical appraisal, this paper was considered to be of sufficient quality for inclusion, and showed the effectiveness of using distraction to lower children's pain during venepuncture.

Miller et al. (2010) conducted a prospective RCT study to investigate the influence of multi-modal distraction in decreasing children's pain during dressing changes. The recruitment site was the paediatric burns outpatient centre in a royal children's hospital in Australia. Inclusion and exclusion criteria were reported. A total of 94 children met the research criteria but six caregivers did not give permission for participation and the researcher missed eight because the researcher was absent from the clinic. The children's ages ranged from 3 to 10 years. The power analysis undertaken by the researcher showed that the sample size needed was 20 children in each of the four groups. This sample size allowed between-group comparisons to be calculated based on a moderate effect size (0.8). Block randomization was undertaken using consecutively numbered, opaque, sealed envelopes. Scales of pain assessment applied were reported in detail. At the end of the study, the researchers reported all the results including the significant and the non-significant. The study concluded that multi-modal distraction was effective in decreasing children's pain during the dressing of burns. The

critical appraisal of this study showed sufficient confidence in the study and was therefore included in the review.

Cassidy et al. (2002) conducted a RCT study to evaluate the effectiveness of distraction compared to watching a blank TV screen in reducing children's pain during intramuscular immunization. The study was conducted in two urban paediatric practices in Canada. The sample size was 62 five years old children. The sample size was based on an expected effect size (d=0.50). The sample size required on this basis was not reported. Inclusion and exclusion criteria were reported in the study. The children were randomly assigned to two groups by applying a standard randomization table for every cluster of ten subjects. Three parents withdrew from the study. The researcher tried to minimize the bias and increase the validity of the intervention by standing behind the AV equipment to operate the video camera used during the study. All the children were treated equally, they were asked to watch TV but were not informed about whether or not the TV would be switched on. Various scales were used to assess the children's pain and the researchers reported the results in detail, including non-significant results. All the P values were presented. After the critical appraisal, I had sufficient confidence in this study to include it in the review.

Wang et al. (2008) conducted a RCT study to assess the efficacy of applying audio-visual distraction and routine psychological intervention in school age children undergoing venepuncture procedures. The researchers recruited participants from the paediatric unit of Qingdao Municipal Hospital in China. The sample size was 300 children from the age of 8 to 9 years. The children were divided into three groups using Research Randomizer. The researchers reported the inclusion and exclusion criteria. All the children included in the study were treated equally as they were evaluated and treated following the standard protocol. The researchers used an assumption of alpha level of 0.05 and a power of 90%. The researchers required 198 children, but, to avoid any baseline imbalances between the two

groups, they enlarged the sample size to 300 children. Of the 300 children, 29 refused to participate in the study and 22 were not offered enrolment as the nurse researcher was either not on duty or very busy with other duties. The pain measurements used were presented in the study. The researchers reported the significant and the non-significant results. In the control group, the venepuncture time was significantly higher compared to the other two groups. Children in the control group suffered more pain during the procedure compared to those receiving audio-visual distraction or the intervention group. The results of this study support the effectiveness of applying audio-visual distraction to control children's pain during painful medical procedures. The critical appraisal of this study indicated that this was a well conducted and reported study, which could be included in the review.

Boivin et al.'s (2008) study was a prospective study, an open-label trial where both the researchers and the participants knew the treatment type. The aim of the study was to evaluate a multifactorial strategy including pharmacological and non-pharmacological pain management methods to decrease children's pain during vaccination. Participants were recruited from a teaching clinical practice site in France. The inclusion and exclusion criteria were reported. They used pseudo-randomization where the first six children were included in the control group and the next six children were included in the intervention group. The researcher planned a sample size of 100 children per group to provide 80% power and 5% significant level. The total sample was 239 children. 132 children of them were in the control group and 107 children were in the intervention group. Half of the children were aged between five and seven years and the second half were from ten to twelve years old. The researcher used more than one scale, including VAS and the facial pain scale revised and a behavioural scale, to assess pain. . Children in the intervention group had significantly less pain compared to the control group. The results of this study highlighted the importance of providing education, distraction and family presence in controlling children's pain during

vaccination. After the critical appraisal of this study, I had sufficient confidence in the research to include this article in the literature review.

Sinha et al. (2006) conducted a RCT study to evaluate the effectiveness of a distraction method in decreasing children's pain during laceration repair. A total of 240 children from the age of 6-18 years were recruited from an emergency department in United States. An assumption of alpha level of 0.05 and a power of 90% was applied to calculate the sample size. The necessary sample size was not clear. Inclusion criteria were reported clearly by the researchers. The children were randomly assigned into either an intervention or control group. Aside from the experiment, children in both groups were treated equally. Researchers reported the results in detail. The researchers clearly reported the pain management scales they used to evaluate children's pain and anxiety. The results showed that distraction was effective in decreasing situational anxiety in older children and controlling parental perceptions of distress in younger children. This study was included in the review as it met the entire key criteria highlighted by the critical appraisal tool. .

The study aim in Pederson's (1995) study was to investigate the effects of imagery in decreasing children's pain and anxiety during cardiac catheterization. An experimental design was used. The researchers contacted 29 parents, and 24 of them agreed to participate in the study. The power calculation was not clear. The study questions and hypothesis were presented clearly. Participants were recruited from the cardiac catheterization unit in a 567 bed Midwestern hospital in United States. Children were randomly assigned to one of three groups (imagery, presence and control) but it was not reported how this was done. The inclusion criteria were reported clearly. The children were from of nine to seventeen years old. The researcher used more than one scale to measure the children's anxiety and pain. The researcher reported the significant results including the *P* values. The non-significant results were also presented. Imagery was not effective in controlling children's pain during the

procedure but it was effective in reducing their distress behaviours. Children in the presence group had the lowest pain level compared to the other groups. The study was chosen to be included in the literature review because researchers reported all the steps of the research in detail, and added to the evidence base with respect to the application of as a non-pharmacological method during children's medical procedures.

Kipping et al.'s (2012) study aim was to investigate the effects of virtual reality on pain during wound dressing. The inclusion criteria for the RCT were reported clearly. The sample size was forty one and the children were aged between 11- 17 years. It was reported that the sample size calculations indicated a minimum of sixteen participants were needed in each group for between-group analysis. The researcher used a power of 0.8, (Type I error rate 0.05). A random sequence was generated by computer and the allocation of children was concealed from the researchers. Participants were recruited from two tertiary hospital sites; a paediatric burn centre and an adult burn unit in Australia. The participants were assigned to two groups (Virtual Reality [VR] group and standard distraction group). Aside from the experiment, children in both groups were treated equally. One participant withdrew from the study. Various pain assessment scales were used to assess the children's level of pain (Table 2.7). There were no significant differences between the children in the two groups at baseline with respect to characteristics such as age or gender. The results showed that children in the standard distraction group reported higher pain compared to the children in the VR group but this result was not significant. Nurses observed less pain behaviours in the VR group and this was a statistically significant result. This study was chosen to be included in the review because the researchers clearly reported the aim, process of the study, detailed information about the participants, sample size and the sample size power calculation.

Kolk et al. (1999) conducted a double blind, RCT study to investigate the influence of an integrated intervention on children's distress before and during venepuncture. They included

thirty-one children with their parents in the study. The power calculation was not clear. The children's ages ranged from 3 to 8 years. The inclusion and exclusion criteria were reported by the researchers. The participants were recruited from the outpatient department of the Slotervaart Hospital in Amsterdam. The participants were randomly divided into two groups (preparation and no preparation). The raters who assessed the children's distress were blind to the groups. The exclusion criteria were reported clearly. Aside from the experiment, all the children were treated equally. Children in each group were similar in age, gender, injection history, and the tension of their parents during the procedure. Various scales for measuring pain were used by the researchers and were reported in the study. The results of this study showed that prepared children experienced significantly less distress compared to non-prepared children during venepuncture procedures. All the significant results including P values were reported in detail. The study was considered sufficiently robust to be included in the study. The researchers presented in detail the process of conducting and analysing the study and the results.

Harrison's (1991) RCT study investigated the effectiveness of preparatory information on controlling children's pain during venous blood sampling. The sample size was 100 children from 6 to12 years old. The sample size power calculation was not reported in the study. There was one inclusion criterion, and it was reported in the study. The participants were recruited from four laboratories in a Kuwaiti governmental hospital. The children were randomly assigned to two groups. It was not reported how the randomization was done. Methods of pain measurement were reported. The researcher reported the significant and the non-significant results. Children in the prepared group reported significantly less pain and they were less distressed during the procedure. The study was chosen to be included because the researchers presented the study in detail, providing sufficient evidence of the robustness of the study's design and conduct. .

Schiff et al. (2001) conducted a single-group repeated measure study to assess a multicomponent pain control intervention (parental involvement, distraction, preparation, relaxation, reinforcement and EMLA cream) in controlling children's pain during venepuncture procedure. Forty-seven children were initially recruited but one child was excluded because of developmental delay and three children did not complete the data collection due to poor clinic attendance or declines in health that necessitated further invasive procedures. The final sample size was 43 children from 4-12 years old. The sample size calculation was not clear. Children included in the study were recruited from an immunology clinic in an urban children's hospital in United States. Inclusion and exclusion criteria were presented. The researchers applied a single-group repeated measures design. The pain scales applied by the researchers were reported in detail. Lack of a control group was a limitation in the study. The researchers used within-subject changes in children pain, distress, and parents' anxiety. It was reported that the small sample size was a reason for not having a control group. Aside from the intervention, the children were treated equally. The researchers reported significant results including the *P* value. Non-significant results were also presented. Although no control group was present, the study was judged to be sufficiently robust to indicate that there was a significant decrease in children's distress and pain. Parents' level of anxiety was significantly reduced by applying those non-pharmacological methods.

Inal and Kelleci (2012) conducted a prospective randomized clinical trial study to investigate the effects of a distraction method to decrease children's pain and anxiety during blood-draw. Inclusion and exclusion criteria were reported clearly in the study. Participants were recruited from a paediatric clinic in the Faculty of Medicine in Istanbul University. The sample size power calculation was presented. The standard deviation level of pain for the test group was 1.5 points, and the standard deviation level of pain for the control group was 2 points. Therefore, the researchers decided that every group must consist of 50 participants. With

20% design effect coefficient, the initial calculation became 60 participants per group. The test group had 61 participants and the control group had 62 participants. A total of 125 children were approached for inclusion but two were excluded because they did not meet the inclusion criteria. The research was completed with 123 children. The age of the children was from 6-12 years, and they were randomly assigned into experimental and control groups. The randomization into two almost equal groups was undertaken using a computer-generated table of random numbers. The pain measurements used were presented in the study. The researchers reported the significant and non-significant results. Children in the intervention group had significantly less pain compared to the control group. This study was included in the review as it was judged to be sufficiently robust following critical appraisal.

Movahedi et al.'s (2006) study was a RCT and the aim was to evaluate the effect of local-refrigeration before venepuncture to control school-age children's pain. The sample size was 80 children from the age of 6-12 years. The researchers used a significant level of 0.5 and power of 0.8. The necessary minimum sample size was not clear. The participants were recruited from the emergency department in Ahwaz Jondishapour University of Medical Science in Iran. The inclusion and exclusion criteria were reported in the study. The children were assigned to two groups (test and control). The researchers did not report how the randomization was done. Various pain assessment scales were used and were reported in the study. Significant and non-significant results were reported. The results of the study showed no significant differences between test and control groups for physiological responses before and after venepuncture. However, behavioural responses during and after venepuncture as well as subjective responses after venepuncture were significantly lower in the test group compared to the control group. After critically appraising this study, I had sufficient confidence in the process and the results of the research. Thus, I decided to include it in the review.

In Sparks et al.'s (2007) RCT study, the aim was to compare parental holding and upright positioning with traditional supine positioning for controlling children's pain during IV insertion. The inclusion criteria were reported. 135 children from 9 months to 4 years old were recruited for the study, but 17 of them were excluded for various reasons that were reported in detail in the article. The final sample size was 118 children who were randomly allocated to two groups (experimental and control). The sample size of the study was determined by applied power analysis. The researchers reported that the probability of Type I error was set as .05 and the power was set at .90. The Standard deviation and the effect size were determined from a similar study. Thus, the sample size of 120 participants (60 per group) was expected to be necessary. The participants were recruited from the trauma ER of a paediatric hospital in United States. It was not reported how the randomization was done. The researchers informed the nurse about the position to be used just before the procedure and blinded observers undertook videotaping of the IV insertion. Aside from the experiment, children in both groups were treated equally. All the scales used by the researchers to assess the children's pain were presented in detail. Findings indicated that parental holding and upright positioning were effective in decreasing children's pain during IV insertion . Following critical appraisal this study was also judged to be sufficiently robust for inclusion in the review...

Cavender et al.'s (2004) RCT study investigated the effectiveness of parental positioning and distraction on children pain, distress and fear during venepuncture procedures. Inclusion and exclusion criteria were reported in detail. The participants were recruited from the emergency department in a private paediatric medical centre in United States. The sample size was 43 and children were from the age of 4-11 years; they were divided randomly into either an experimental or a control group using a table of random numbers. *P* values of less than 0.05 were considered to be significant and all *p* values were reported for results. Researchers

reported all the pain measurement scales they used. The researchers reported the results in detail including the significant and non-significant results. Fear, rated by the child life specialist, showed that the children in the experimental group (parental positioning and distraction) had significantly less fear. Self-reported fear and pain were highly correlated but there were no significant differences between the two groups. There was a limitation to this study, which was the small sample size. Even so, the study gave insight into the effectiveness of applying positioning and distraction non-pharmacological methods to control children's pain during painful medical procedure, and I therefore decided to include the study in the literature review.

On the basis of the critical appraisal, none of the articles were rejected and all are included in the thematic review that follows.

Some of the studies included in the literature review do not include the power of the sample size. Whitley and Ball (2002) state that even with the importance of this matter, it is surprising how frequently researchers fail to perform the sample size calculation before undertaking the study.

2.3 Thematic review of the literature

As the aim of the literature review is to consider evidence for the effectiveness of non-pharmacological approaches to pain management, thematic analysis of the findings sections of each paper was undertaken. There are a variety of methods that can be considered to be non-pharmacological and these methods are themselves considered to be the important themes within which evidence of effectiveness was considered; thus the themes are distraction, guided imagery, parental presence, preparatory information, parental holding, positioning, cold compress, play therapy and finally the use of multiple non-pharmacological methods.

A broad definition of each of these categories of non-pharmacological pain management are presented in Table 2.1 below:

Table 2.1: Non-pharmacological pain management methods with definitions/descriptions

Pain management method	Definition/Description
Distraction	'Distraction is a nursing attempt to focusing patient's attention on any other stimulant so as to control and reduce pain' (Inal and Kelleci, 2012, p.211).
Preparatory information	Preparatory information means preparing the child for the procedure by providing information about who will do the procedure, where the procedure will be done, the duration of the procedure, what will happen during the procedures and the possible sensation during and after the procedure (MacLaren and Cohen, 2007).
Guided imagery	Guided imagery is a distraction method which focuses the child's mind on positive images to reduce pain and stress (Nilsson et al., 2015).
Cold compress	Cold compression includes cryotherapy and static compression which is commonly used to treat pain and inflammation after surgical procedures or acute injury. (Kullenberg et al., 2006)
Play/ Play therapy	Play includes expressive arts as therapeutic actions, allowing children who suffer pain to safely express their fears and pain. (Pender et al., 2015). Play therapy: an interpersonal process that seeks to use the therapeutic powers of play to enhance children's wellbeing. (Nash &Schaefer, 2011).
Parental positioning	Parental positioning means helping the child sit up and holding him/her in a comfortable position, by a parent (Sparks et al., 2007).

Overall the studies show the effectiveness of non-pharmacological methods in decreasing children's pain and distress, decreasing children's and parents' anxiety, decreasing children's fear, reducing the time needed to undertake procedures, increasing children's, parents' and nurses' satisfaction with pain management, and improving children's cooperation during procedures.

However, there are some variations between the non-pharmacological methods that emerged from the review. Findings relating to each of the categories of non-pharmacological pain management are therefore discussed below.

2.3.1 Distraction

The literature review shows that many different distraction techniques have attracted the attention of researchers (such as cartoon movies and music) and the impact of such techniques has been assessed in various ways (such as self-reporting, observational and parent-reporting). Most of the study outcomes support the effectiveness of distraction in reducing child pain and distress (MacLaren & Cohen, 2007). In the following sections, study outcomes about distracting children during various types of medical procedures will be presented.

Gold et al. (2006) stated that children undergoing intravenous (IV) procedures often suffered adverse and stressful experiences. They studied the effectiveness of virtual reality (VR) in distracting paediatric patients from pain during IV insertion. The children included in the study were from seven to twelve years old. The results showed that children in the control group had a significant (fourfold) increase in pain after the IV insertion compared to children in the VR group. Furthermore, children, parents, and paediatric nurses found VR effective in distracting children from pain during IV placement.

Another way of distracting children during venepuncture is to allow them to look through kaleidoscopes, and this was effective in decreasing seven to eleven year old children's pain. A kaleidoscope is a toy through which several colours and shapes can be seen with one eye while turning a cylinder (Tüfekci et al., 2009). Wang et al. (2008) investigated the effectiveness of various non-pharmacological methods on children undergoing venepuncture. The children were aged from eight to nine years, and were randomly assigned to three groups; intervention, control and audio-visual distraction. The children in the audio-visual distraction had the chance to choose from ten cartoon videos and the procedures were done during that time. Children in the intervention group did not receive distraction but they had

conventional psychological interventions such as guided imagery, touch, and explanation during the procedure. The results showed that venepuncture time in the control group was significantly longer compared to the other two groups. Furthermore, audio-visual distraction and psychological intervention were effective in controlling children's pain, improved their cooperation during the procedure, and improved the success rate of the procedures.

French et al. (1994) assessed the effect of an active distraction method on four to seven year old children's pain during immunization. The children were asked to blow out air during the immunization. The results showed that those children who blew out air experienced significantly less pain. Lindsey et al. (1997) examined a practical and low cost method to manage the distress suffered by children, parents, and nurses during child immunization procedures. The children were aged from four to six years and were divided into three groups; standard medical care, nurse coach, nurse coach plus child intervention and training for parents. For the standard medical care, the children and the parents did not receive training. For the nurse coach intervention group, the children and their parents did not receive training or a warning that a movie would be shown during the immunization. In the last group, which was the nurse coach plus parental training and child intervention group, the parents and children had training which involved delivering a short rationale to parents regarding the intervention. Children in the nurse coach and in the nurse coach and child intervention plus training group had the chance to choose a movie to watch during the procedure. Children in the two intervention groups showed better coping during the procedure and they were less distressed. Furthermore, parents and nurses showed less distress promoting behaviour and better coping promoting behaviour.

Cassidy et al. (2002) assessed the effectiveness of applying audio-visual distraction (watching cartoons) compared to watching a blank TV screen in order to reduce pain related to intramuscular immunization. The children were five years old and they were randomly

assigned to distraction and control groups. The first group watched TV and the second group watched a blank TV (control) during the procedure. The results showed that watching cartoons did help in distracting children during the procedure which was not reduced while watching the blank TV, and helped in lowering behavioural pain levels in the whole sample.

Inal and Kelleci (2012) reported that distracting six to twelve years old children by having them look through distraction cards during blood removal did not make a significant difference to pre-procedural anxiety. However, children in the experimental group had significantly lower levels of pain and anxiety during the blood drawing procedure compared to children in the control group.

Kipping et al. (2012) reported the effectiveness of applying VR to manage adolescent's (11-17 years) pain during burn wound care. There was a statistically significant decrease in the patients' pain levels during dressing removal as well as statistically lower levels of rescue doses of Entonox (pain relieving gas) which contains 50% Oxygen and 50% Nitrous Oxide and is administered to patients having VR, compared to patients receiving standard distraction. Furthermore, there were lower treatment times and pain scores in the patients receiving VR but this was not statistically significant.

Applying multi-modal distraction is an effective technique in reducing patient levels of pain during dressing change (application and removal) as shown in a study by Miller et al. (2010) which aimed to assess whether multi-modal distraction procedural preparation (MMD-PP) or distraction (MMD_D) had a better effect in reducing children's pain than standard distraction or video distraction techniques, to understand the effect of MMD_PP and MMD_D on the clinical efficacy by measuring the duration of the therapy and to assess the efficiency of distraction methods over three procedures of dressing changes. They reported that children in the MMD_D and MMD-PP groups showed significantly less reported pain and required less

time to conduct the dressing changes, compared to those using video games (VD) or standard care (SD).

Sinha et al. (2006) studied the effectiveness of distraction methods in reducing six to eight years old children's pain related to laceration repair in an emergency department. The children were divided into intervention and control groups. Children in the intervention group were distracted during the procedures. The results showed distraction was effective in lowering the situational anxiety in the older participants and decreasing the parental opinion of pain levels in younger children.

2.3.2 Preparatory information

Preparing the child for a medical procedure involves behavioural intervention. This includes providing some information to the child about what will happen during the procedure. Preparing the child for hospitalization and surgery requires more attention than preparing a child for shorter, basic care such as immunization (MacLaren and Cohen, 2007).

Kolk et al. (2000) studied the effects of preparing three to eight year old children undergoing venepuncture for a blood test. A local anaesthesia EMLA cream was applied at least one hour before the procedure. Before that, the parent started to prepare the child by reading a story about the effect of the cream and the sensation that they might experience and sometimes, while applying the cream, the parent read a story about the procedure including the steps to be used and the possible sensation to be experienced during the procedure. The results showed that prepared children experienced less distress before and during the procedure compared to the non-prepared children.

In a study by Harrison, 1991, the effectiveness of preparatory information for children undergoing blood sampling was investigated. The children's ages were from six to twelve years and they were divided into two groups; a prepared and a non-prepared group. The

children in the prepared group read a preparation story and they were asked if they had any questions. The results showed that prepared children had significantly less pain and were less distressed by the blood sampling procedure.

2.3.3 Guided imagery and presence

Pederson (1995) investigated the effects of guided imagery on children undergoing cardiac catheterization. The children's ages were from nine to seventeen years and they were divided into three groups; control, presence and imagery. Children in the control group had their cardiac catheterization under routine care with no intervention. Children in the presence group had a member of the research team who provided presence by sitting close to the child's head and using eye contact and touch as well as having a conversation during the procedure. Children in the imagery group had a member of the research team present during the procedure and several suggestions of relaxation methods were provided for the child. The relaxation methods included breathing, blowing out stress with every exhalation, and allowing muscles to feel soft and relaxed. The results showed that the anxiety levels of the children in the imagery group was higher before the procedure but there was no significant difference and the imagery did not control the pain during the procedure. Nevertheless, children in this group showed the least distress behaviours and children in the presence group had the lowest levels of pain.

2.3.4 Cold compress

Using a cold compress at the site of venepuncture prior to the procedure was reported to be effective in controlling six to twelve years old children's pain. Movahedi et al. (2006) investigated the effectiveness of applying an ice bag three minutes before the venepuncture procedure. They found there was no significant difference between the experimental and the control groups related to physiological responses but there was in relation to behavioural responses which showed a statistically significant difference between the two groups.

2.3.5 Play therapy

Play therapy is arguably one of the most important preparation methods for children prior to any invasive or painful procedure. It aims to facilitate the child's coping strategies when experiencing stress during hospitalization (Goymour et al., 2000). The role of play therapy is to make the child's hospitalization experience positive. It has been proven to lower four to fifteen year old children's anxiety and fear levels by providing child and family support, providing an element of balance to the child experiencing an overload of pain, fear, and separation and to facilitate the recovery process of hospitalized children. Furthermore, play therapy is a way of helping hospitalized children to deal with being unwell and being in an unfamiliar environment (Goymour et al., 2000). Some researchers have studied the effects of non-pharmacological strategies on child pain during various types of medical procedures and these are presented in the following section, along with the parental role in facilitating child pain management.

2.3.6 Parental holding, distracting and positioning the child during medical procedures

The involvement of parents in their hospitalized children's care has changed dramatically in recent years (Neill, 1996). Historically, parents were expected to leave the care of their children to the healthcare providers; nowadays, healthcare providers encourage parents to participate in their children's care (Kristensson-Hallstrom et al., 1999). Brownlea (1987, p.605) defines participation as 'getting involved or being allowed to become involved in a decision-making process or the delivery of a service or the evaluation of a service, or even simply to become one of a number of people consulted on an issue or a matter'. Applying simple non-pharmacological methods which can be taught to children as 'tricks' to use (and to parents, for coaching their children) can be effective (Young, 2005). Young added that if coping techniques are used by adults then the children are more likely to use them. Parents

are the best coaches because they know their children well and know what interests them and also because they usually like to stay with their children during the procedure. Furthermore, this helps to reduce the anxiety levels of parents by allowing them to participate during the procedure and by providing helpful advice and information that they can use for future painful procedures.

The simple act of holding a child undergoing IV insertion by a parent or a family member is effective in decreasing child distress. The child can be held in different ways such as in the parent's lap or on the examination table and the parent can hold the child's arm or trunk (Sparks et al., 2007). Parents' involvement in this way and their ability to hold their children during IV insertion is associated with reports of increased parental satisfaction with the procedure (Sparks et al., 2007).

Parental positioning and distracting children undergoing venepuncture and IV insertion has been found to be an effective way of managing nine to eleven years old children's pain. A study by (Cavender et al., 2004) indicates that paediatric patients who were positioned and distracted by their parents during venepuncture and IV insertion had significantly less fear, as assessed by parents and child life specialists (CLS).

2.3.7 Combinations of non-pharmacological methods

Boivin et al. (2008) studied the effectiveness of various non-pharmacological methods on children undergoing vaccinations. The children were divided into two groups; a control group who had their vaccination as routine practice and an intervention group who had their vaccinations using several strategies including preparation and education for the parents, education for children delivered by parents and distracting children during procedures by blowing soap bubbles. Children in the intervention group showed significantly lower pain compared to children in the control group.

Schiff et al. (2001) evaluated the effects of multicomponent approaches and cognitive behavioural approaches to control the pain of venepuncture with children with human immunodeficiency virus (HIV). Various non-pharmacological pain management methods were included in the study including; preparatory information, reinforcement, distraction, relaxation, parental involvement and EMLA cream. The results showed significant reduction in the children's pain levels and distress with the second post-intervention procedure and this was maintained the third time. The level of parental anxiety was also significantly less by the second post-intervention procedure.

Gonzalez and Routh (1993) studied the effect of parental vocal behaviour on child distress during surgical procedures. They divided children into three groups; maternal reassuring comments conditions, control conditions and maternal non-procedural talk (distraction) conditions. The mothers in the non-procedural talk (distraction) and in the reassuring group received oral instructions on how they could distract and reassure their children verbally during the immunization. The findings showed a significant difference between the groups related to their behavioural distress. Child behavioural distress in the reassurance group was higher compared to the distraction group. Furthermore, there was greater behavioural distress in the control group of children compared to the distraction group.

A summary of all the studies included in the literature review is provided in the following tables (Tables 2.2 - 2.9).

Table 2.2: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Gonzalez and Routh (1993)	Intramuscular Injections	To clarify the role of non-procedural talk (distraction) and parental reassurance on children's reaction to an injection.	1-maternal reassurance. 2-maternal non-procedurals talk (distraction). 3-minimal-treatment control group	RCT Experimental Block-randomization	47 child-mother dyads	3-7 years old	1-The Modified Frankl Behaviour Rating Scale to measure children's behavioural distress. 2-The Oucher Pain Rating Scale to elicit children's self-reports of pain. 3-Observational Scale of Behavioural Distress-Revised (OSBD-R)to rate children's behavioural distress 4-Child-Adult Medical Procedure Interaction Scale (CAMPIS) to measure the occurrence of specific types of vocal behaviours during medical procedures.	1-More behavioural distress in children in the reassurance group compared to children in the distraction group. 2-More behavioural distress in children in the control group compared to the children in the distraction group ($p<.02$) 3- More crying by children in the reassurance group compared to children in the distraction group ($p<.001$) 4-More crying by children in the control group compared to children in the distraction group ($p<.003$).
French et al. (1994)	Immunization (Pertussis, Diphtheria and Tetanus)	To investigate the effectiveness of an active distraction technique on pain in preschool children receiving diphtheria, pertussis, and tetanus immunization.	Distraction by blown out air	RCT Randomized, unblended controlled study	149 child	4-7 years old	VAS	Significantly lower pain behaviours ($P<.04$) in children who were told to blow air.
Goymour et al. (2000)	Venipuncture and Cannulation	To evaluate the play therapy on children undergoing Venipuncture and Cannulation.	Play therapy	RCT	100 child	4-15 years old	Parent, child and attended staff answered questionnaire including: How prepared the child was? Child level of distress before, during and after the procedure.	Significantly more children in the play therapy group were rated as better prepared for the procedures compared to the children in the control group.

Table 2.3: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Lindsey et al. (1997)	immunizations	To develop a practical and cost-effective means of increasing child coping and lowering child, parent, and nurse distress during child immunizations.	1-Standard medical care control group 2-Nurse coach intervention group 3-Nurse coach plus trained parent and child intervention group	RCT	92 child	4-6 years old	1-Observational (children, parents and staff). 2-Faces scale (after the immunization, the children rated their levels of pain).	1-In the two intervention groups, children coped better and were less distressed. 2-Nurses and parents in the intervention groups exhibited more coping-promoting behaviour and less distress-promoting behaviour, and parents and nurses were less distressed than in the control condition. 3- Children in the standard medical care condition required more restraint than children in the intervention conditions.
Gold et al. (2006)	IV Placement	To assess the suitability and efficacy of distraction by virtual reality (VR) in children during intravenous incretion (IV).	Children were randomized into two groups: VR distraction using Street Luge and standard care and VR Standard care (control group) included a topical anaesthesia spray before the IV insertion	RCT Interventional study.	20 child	7-12 years old Children were divided according to their age: 7-9 and 10-12 years and according to their gender (boy or girl)	Self-report questionnaires were completed by the children, their parents and the nurses. Faces Pain Scale	1-No reporting of results by age group. 2-Children in the control group experienced a significant fourfold increase in pain after the IV. 3-No significant difference was found within the VR condition regarding effective pain management. 4-A nurse reported higher parental satisfaction concerning pain management in the VR group. 5-Children in the VR group were satisfied with the pain management compared to children in the control group.

Table 2.4: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Tüfekci et al. (2009)	Venipunctures	To examine the effect of distraction by using kaleidoscopes (a toy through which various shapes and colours can be seen with one eye while rotating a cylinder) to reduce pain during venepuncture procedure.	Distraction by looking at Kaleidoscopes	Descriptive study included intervention and control groups.	206 Child (105) intervention (101) control	7-11 years old	Interviews with children using VAS and the Wong-Baker FACES pain rating scale (WB-FPRS)	1-Lower pain levels, according to the two scales, in the intervention group. However, the differences between the mean scores of the two groups were statistically significant ($p< 0.01$) 2-In both groups, female patients felt lower pain than male patients, and the pain perception levels were statistically higher in the control group.
Miller et al. (2010)	Dressing changes (burns)	1-To assess whether multi-modal distraction procedural preparation (MMD-PP) or distraction (MMD_D) has a better effect of reducing children's pain than standard distraction or video distraction. 2- To understand the effect of MMD_PP and MMD_D on clinical efficacy by measuring the duration of the therapy. 3- To assess the efficiency of distraction methods over three procedures of dressing changes.	Multi-modal distraction	RCT Prospective randomize control trial. Block randomization	80 child	3-10 years old	1-Validated children's reports using the Wong-Baker Faces scale (FACES) 2-Caregiver report using VAS 3-Nurses' observations using the Faces, Legs, Activity, Cry and Consolability Scale (FLACC) 4-Physiological measures: Pulse rate (PR) and oxygen saturation (O2)	MMD-D and MMD_PP significantly lowered the paediatric pain ($p\leq0.05$) and decreased the time needed for dressing ($p \leq0.05$) compared to SG and VG.

Table 2.5: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Cassidy et al. (2002)	Intramuscular Immunization (Polio, Diphtheria and Pertussis)	To address inadequacies in the distraction literature and to determine: 1-Whether television (TV) entertainment reduced the pain of five-year-old children undergoing immunization 2-The clinical significance of the pain reduction using TV entertainment 3-Whether there were differential effects of distraction on self-reports or on objective, behavioural measures of pain 4-Whether TV entertainment produced distraction.	Distraction	RCT	62 child	5 years old	1-To measure parents' and children's anxiety, a VAS was used, ranging from 1 ('no anxiety') to 10 ('worst anxiety') 2-Children self-reported pain using Faces Pain Scale (FPS). 3-Pain behaviour was scored from videotapes using Children's Hospital of Eastern Ontario Pain Scale CHEOPS and a reviewer who was blind to the intervention condition 4-Child Facial Coding System (CFCS)	1-No significant group differences for any of the pain or distraction measures during the needle phase 2-No significant group differences on the pre-needle phase on the CFCS 3-No significant group differences during the post-needle phase on either the CFCS or the CHEOPS 4-No significant group differences in child anticipatory anxiety scores or in parent anxiety scores 5-No sex differences in self-reported pain or CHEOPS pain scores during the pre-needle, needle, or post-needle phases 6- No sex differences on the CFCS during needle or post-needle phases. Watching cartoon was not effective in distracting children during needle injection or controlling their pain. Watching TV screen was related to decreasing behavioural pain scores overall the sample.
Wang et al. (2008)	Venipuncture	To assess the efficiency of using non-pharmacological therapies on school-age children during venepuncture procedures.	Audio-visual distraction and routine psychological intervention	RCT	300 child	8-9 years old	1-The observational visual analogue scale (VAS), to assess pain 2- The cooperative behaviour scale of children in venepuncture (CBSCV)	Regarding the venepuncture pain, there was significant difference between the control group and the intervention groups regarding audio-visual distraction ($P = 0.031 < 0.05$).

Table 2.6: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Boivin et al. (2008)	Vaccination	To evaluate a multifactorial strategy of pain management in children 4 to 12 years old, including pharmacological and non-pharmacological methods during vaccination, in comparison to usual care.	A combination of pharmacological and non-pharmacological approaches The non-pharmacological methods included: 1-Education of the parents 2-Education and preparation of the children 3-Distraction with soap bubbles	Prospective, open study, with Pseudo randomization.	239 Child	4 to 12 years old	Self-reporting scale using: 1-VAS 2-Facial pain scale Hetero-evaluation: 1-Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) 2-Parents using VAS 3-Doctors using VAS	Significant decrease in pain when using multifactorial strategy (P<0.0001), confirmed by another self-reporting scale (a revised facial pain scale: P=0.005) and by using hetero-evaluations by GPs and parents (Children's Hospital of Eastern Ontario Pain Scale: P=0.0007; GP's VAS: (P<0.0001); parent's VAS: (P<0.0001)).
Sinha et al. (2006)	laceration repairs	To assess the effectiveness of distraction in reducing pain in children undergoing laceration repairs in the emergency department.	Distraction: According to their age and interest, this included music, video games, or cartoon videos Children also read a book or blew bubbles	RCT (stratified block)	240 Child	6 to18 years old Groups: children younger than 10 years children older than 10 years	1- Seven-point Facial Pain Scale 2- State Trait Anxiety Inventory for Children 3-VAS	1-Reduction of situational anxiety in older children. 2-Reduction of parental perceptions of pain distress in younger children.

Table 2.7: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Pederson, C. (1995)	Cardiac catheterization	To examine the effectiveness of imagery on paediatric pain and anxiety during cardiac catheterization.	1-Imagery 2-Control 3-Presence	RCT Experimental design Participants were randomly assigned into three groups—control, presence, or imagery—with eight children in each group	24 child (8 in each group)	9-17 years old	1-The State-Trait Anxiety Inventory for Children (to measure children's pre-catheterization anxiety). To measure the children pain, the following scales were used: 1- Observational Scale of Behavioural Distress (OSBD). 2- Visual Analogue Scale (VAS). 3-Salivary Cortisol Radioimmunoassay (Cortisol).	The researcher did not report any results according to children's ages. The anxiety level was higher in the imagery group before the procedure; however, this was not significantly related to similarities among the children (e.g., in terms of age, sex, etc.) in each group. Imagery was not enough to reduce children's pain during cardiac catheterization, but it did decrease the patients' distress behaviours.
Kipping et al. (2012)	Burn wound care	To assess the effect of VR on adolescent during burn wound care.	Virtual reality (VR)	Prospective RCT	41 child	11-17 years old	Visual analogue scale (VAS) Faces, legs, activity, cry, consolability (FLACC) scale Self-report	Significantly lower pain level during dressing removal. Significantly lower doses of Entonox to patients on the VR group. Trend of less pain and procedure time in VR group (not significant).

Table 2.8: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Kolk et al. (2000)	Venipuncture	To assess the effects of venepuncture procedures on the distress reaction in young paediatrics before and during the venepuncture.	1-Anaesthetic cream 2-Preparatory information (provision of sensory) 3-Parental involvement	RCT Double blinded	31 child	3-8 years old	1-Groninger Distress Scale (GDS) was used to measure distress 2-A short questionnaire was used to assess the covariates' sex, age, cultural background, parental tension, and injection history. 3-Two questions checked whether the parents had prepared children in the prescribed way and refrained from other preparation methods (manipulation check) 4-The lab assistant was asked to indicate the difficulty of the puncture on a five-point Likert scale: very easy, easy, normal, difficult, and very difficult.	Prepared children showed significantly less distress than non-prepared children before and during the venepuncture.
Harrison, A. (1991)	Venous blood sampling	To assess the effectiveness of reading a short preparation story to children while waiting for a blood test.	A simple description of the blood test and the reason for it, as well as an explanation of how children will feel less pain if they cooperate with the technician	RCT Prepared and non-prepared groups	100 child	6-12 years old	1-Behavioural observation 2-Interview with children	Prepared children reported significantly less pain and coped better during the procedure.
Schiff et al. (2001)	Venipuncture	To evaluate a multicomponent intervention, including cognitive behavioural therapy for children with human immunodeficiency virus (HIV) infection undergoing routing venepuncture.	Preparation, relaxation, reinforcement, distraction, parental involvement and EMLA (eutectic mixture of local anaesthetics) cream	Single-group, repeated measures design	43 child	4-12 years old	1-Procedure Behaviour Checklist (PBCL) 2-Children's self-reporting using FACES 3-State Trait Anxiety Inventory _ State Scale (STAI) to measure parents' anxiety	There was a significant reduction in child pain and distress. There was a significant reduction in parental anxiety.

Table 2.9: Characteristics of the Included Studies

Author (s), Year	Type of procedure	Aim(s)	Intervention(s)	Design	Sample Size	Age	Methods of pain measurement	Findings
Inal and Kelleci (2012)	Blood draw	Investigate the effects of using distracting cards to control children's pain and anxiety during blood draw.	Distraction (distraction cards)	Prospective RCT	123 child	6-12 years old	Children's Anxiety and Pain Scale (CAPS)	No significant difference in the pre-procedural anxiety level. Significantly less pain and anxiety in distraction group.
Movahedi et al. (2006)	Venipuncture	Determine the effect of local refrigeration (ice bag) before Venipuncture on school- age children's pain.	Local refrigeration (ice bag)	Quasi-experimental	80 child	6-12 years old	Oucher scale	No significant differences between the two groups as regards physiological responses. Behavioural and subjective responses were significantly lower compared to the control group.
Sparks et al. (2007)	IV insertion	To compare the effectiveness of parent holding the child in upright positioning to traditional supine positioning in lowering paediatric distress during IV insertion.	Parental holding and distraction	RCT	118 child	9 months-4 years	Procedural Behavior Rating Scale-Revised (PBRS-R) Questionnaire to measure parental satisfaction A scale of 1= least satisfied to 5= most satisfied to measure the nurses satisfaction	Significantly less distress in upright position children. Parents were more satisfied in the upright position group. Significant differences in the nurses satisfaction between the two groups (more nurses satisfaction on the control group).
Cavender et al. (2004)	Venipuncture	Investigate the effectiveness of parental positioning and distraction on children's pain, fear and distress during Venipuncture.	Parents' positioning and distraction	Experimental-comparison group	43 child	4-11 years old	FACES Scale Self-reported pain Glasses Fear Scale (to assess child' level of fear)	Fear and self-reported pain were highly correlated but it was not significantly different between the two groups. Significantly less fear in the experimental group No significant differences in distress between the groups.

2.3.8 Summary of the effectiveness literature

There are a number of methods in addition to medication that can be used to decrease children's pain related to medical procedures. Paediatric nurses must choose the right method that is suitable for the child's age and condition. Each method has advantages and can work best for specific age groups. Paediatric nurses need to have the knowledge and the skills to apply non-pharmacological methods.

The findings of the literature review presented in (Tables 2.2 to 2.9) show that researchers examined the effectiveness of applying different types of non-pharmacological methods such as distraction, play therapy, preparatory information and parental presence for children's acute pain caused by various medical procedures. Those researchers proved that non-pharmacological methods can control children's pain, improve their coping during procedures, decrease their fear and anxiety, decrease the level of parental anxiety, increase the nurses' satisfaction level and increase the children's satisfaction with the pain management they receive.

After researching the effectiveness of non-pharmacological pain management methods in controlling children pain during medical procedures, I am interested to know more about the application of those methods in hospitals in Saudi Arabia. Are paediatric nurses working in Saudi Arabian hospitals applying non-pharmacological pain management? If so, what types?

2.4 Nurses' knowledge and attitudes about paediatric pain management

Elements of the systematic literature review presented in Tables 2.2 - 2.9 suggest that nurses' knowledge and attitudes play an important role in paediatric pain management including the implementation of non-pharmacological methods. A further search therefore needed to be undertaken in order to explore these issues in greater detail. As this follow-on review did not

assess effectiveness, it did not require the comprehensiveness of a systematic review. The procedure followed therefore was to enter those articles from the systematic review that identified the importance of nurses' attitudes into Google and Google Scholar in order to use the 'similar articles' facility. The key messages emerging from the additional studies identified in this was the importance of nurses' level of knowledge and their positive attitudes in relation to applying non-pharmacological pain management methods to control patients' pain. Researchers in some studies state that nurses' lack of knowledge and inappropriate attitudes are the main two barriers that prevent nurses from using those methods (Rieman et al., 2007; Vincent, 2005; Hamilton and Edgar, 1992; Jacob and Puntillo, 1999; Wilson, 2006).

Pain management is a major area of children's care that is influenced by the caregiver's level of knowledge as well as their attitudes regarding children's perceptions and responses to pain. The volume of available information for paediatric nurses regarding pain assessment and management has increased significantly over the past 20 years (Rieman et al., 2007). Clinical practice guidelines have been established by many organizations including The American Pain Society (APS, 1999) and The American Academy of Pediatrics (AAP, 2001). Many reported that, even with all the available information, guidelines and standards, paediatric nurses still do not use them consistently when delivering care to children in pain (Manworren, 2000).

Nurses' levels of knowledge and attitudes about pain influence their ability to control patients' pain (Rieman et al., 2007). Several researchers have documented a lack of nurses' knowledge regarding the effectiveness of non-pharmacological interventions (Vincent, 2005), for example: nurses think that children over report their pain (Vincent, 2005); nurses have inconsistent beliefs regarding pain, and the assessment and management of pain, such as they believe in the importance of assessing pain as the first step to manage pain, but in their

documentation there is no evidence of pain assessment for all children (Jacob and Puntillo, 1999); nurses do not prepare children and parents for painful procedures (Jacob and Puntillo, 1999); there is poor knowledge of pain management (Wilson, 2006); and a lack of knowledge about the differences between acute and chronic pain (Hamilton and Edgar, 1992).

Pölkki et al. (2002) conducted a study about nurses' attitudes to, and knowledge of, non-pharmacologcia1 methods of relieving children's postoperative pain. The results showed that only 57% of the nurses applied non-pharmacological pain management methods routinely, even though the majority of the nurses informed the children about pharmacological methods of pain relief. Participants showed that they were applying positioning, massage, thermal regulation, emotional support, helping the child with daily activities, creating a comfortable environment, although applying cognitive behavioural, as well as physical, methods such as distraction, relaxation and massage were applied less often and were less known about by the nurses.

In order for paediatric patients to receive the best available pain management, nurses need to have the ability to integrate pharmacological and non-pharmacological pain management methods. Nurses' lack of knowledge and inappropriate attitudes have been reported to be two important barriers to applying non-pharmacological pain management methods. Studies assessing these factors have been done in various countries such as the United States, Finland and Australia. Broome et al. (1996) reported that 50% of the nurses included in their study used non-pharmacological methods such as distraction, relaxation, massage, positioning and imagery 'sometimes' or 'often' with paediatric patients. Whereas in Finland, Kankkunen et al. (2003) reported that parents used non-pharmacological pain management for their children at home. The most commonly applied methods were comforting the child, holding the child on their lap and spending a longer time with the child. In Australia, Helmrich et al. (2001) conducted a qualitative study to evaluate nurses' attitudes and application of non-

pharmacological pain management methods. Eighty-nine percent of the participating nurses reported that they applied non-pharmacological pain management methods with their patients. Another study conducted in Finland by Pölkki et al. (2002) to assess nurses' attitudes towards, and knowledge of, non-pharmacological pain management methods to control children's post operation pain, found that about 57% of the nurses reported their use of non-pharmacological pain management methods to control pain routinely; though most of the nurses informed the children about pharmacological methods.

In 2003, Pölkki et al. conducted a study of factors influencing nurses' use of non-pharmacological pain management methods in paediatric patients. It was reported that nurses had positive attitudes to learning non-pharmacological pain management methods and this finding was considered an essential basis for developing pain management in paediatric patients. Continuous education for nurses was recommended. Salanterä et al. (1999) supported this finding by reporting that nurses had positive attitudes towards pain management but with a need for more education regarding both pharmacological and non-pharmacological pain management in children.

Nurses' attitudes and knowledge have been found to be barriers to applying non-pharmacological pain management methods (Bicek, 2004). Another study was done by Helmrich et al. (2001) to assess nurses' attitudes and application of non-pharmacological pain management methods. Eighty-nine percent of the participants reported using non-pharmacological pain management with their hospitalized patients. The nurses reported some benefits of using non-pharmacological methods such as; having the chance to build a therapeutic relationship with the patient, controlling pain during the wait for a drug to work and distracting the patient during a painful procedure. Some of the barriers that prevented nurses from applying these methods were that applying these methods is time consuming,

there was a lack of knowledge and resources, and the use of these methods was not considered standard practice.

2.5 Measuring paediatric nurses' practices in applying non-pharmacological pain management to control children's acute pain

Pölkki et al. (2002) developed an instrument based on previous studies related to children's pain and methods for controlling pain (Patterson & Ware, 1988; Broome, 1996; Savedra et al., 1990; Pederson & Harbaugh, 1995; Vessey and Carlson, 1996; Woodgate & Kristjanson, 1996). In order to improve the instrument's content and construct validity, Pölkki et al. (2002) tested the questionnaire on 35 Finnish paediatric nurses working in surgical units in two hospitals. Two specialized paediatric nurses and one paediatric anaesthesiologist participated in revising the instrument. In 2005, the questionnaire was again evaluated by an expert panel to assess its content validity (He et al., 2005). A pilot study was conducted with eight paediatric nurses working in a surgical unit to improve the reliability of the instrument. A Cronbach's alpha test was used to test the reliability of the instrument, resulting in an alpha value of 0.92 for preparatory cognitive information. For sensory information and the method of delivering the information, the alpha values were 0.90 and 0.84, respectively, indicating good internal consistency of the questionnaire.

The questionnaire was also used by He et al. (2011) in Singapore. A panel of experts including an anaesthetist, a pain consultant, two pain resource nurses and a senior paediatric nurse clinician, reviewed the English version of the instrument to revalidate the content. A pilot test was done on 35 paediatric nurses from paediatric intensive care units (PICUs) in two hospitals. In order to assess the internal consistency of the questionnaire, the Cronbach's alpha was calculated. The alpha values for preparatory information and non-pharmacological methods were 0.89 and 0.87, respectively, indicating good internal consistency for the questionnaire.

In 2002, Pölkki et al. created a questionnaire to investigate paediatric nurses' application of non-pharmacological methods in managing postoperative pain for hospitalized children aged 8-12 years. Pölkki (2002) and He et al. (2006) used the same questionnaires. Pölkki et al.'s (2002) instrument was used by other researchers in China (He et al., 2005; 2006) and Singapore (He et al., 2011). Pölkki et al.'s (2002) questionnaire was divided into two sections; the first asked about the nurse's background such as gender, age and level of education, the second asked about various types of non-pharmacological pain management methods and was divided into five sections as follows: (1) cognitive-behavioural methods (containing preparatory information, distraction imagery, relaxation, positive reinforcement and breathing techniques); (2) physical methods (containing massage, thermal regulation, Transcutaneous Electrical Nerve Stimulation (TENS) and positioning); (3) emotional support (containing touch comforting/reassurance and presence); (4) helping the child with daily activities; and (5) creating a comfortable environment.

Another instrument was created by Salanterä et al. (1999) to measure paediatric nurses' knowledge regarding pharmacological and non-pharmacological pain management for hospitalized children. In Salanterä et al.'s (1999) questionnaire, the focus was on pharmacological knowledge, with four sections of the questionnaire focusing on this area, including general knowledge about pharmacological pain management, knowledge about anti-inflammatory pain medication, knowledge about opioids and knowledge about regional anaesthetics. The non-pharmacological section included eight true or false questions.

I decided to adapt Pölkki et al.'s (2002) questionnaire because it was designed to obtain responses from paediatric nurses to specific questions related to non-pharmacological pain management, although some modification was made to the questionnaire before using it. Full details are presented in the methodology chapter.

2.6 Gaps in the literature

The literature review has demonstrated that there is evidence of the effectiveness of non-pharmacological pain management methods in paediatric care. Furthermore, there are indications that nurses' attitudes, knowledge and experience are important factors in determining where and when non-pharmacological pain management is utilized. However, to date there have been no studies exploring these issues within the Saudi context. Given the importance of child health and the significance of effective pain management during childhood, as discussed in chapter one, this is an important omission. In order to address this gap in knowledge, the research questions noted below were formulated;

2.7 Research questions

1. How do paediatric nurses in Saudi Arabia perceive the importance of non-pharmacological pain management?
2. What types of non-pharmacological methods do paediatric nurses in Saudi Arabia use to control children's procedural pain?
3. What barriers do paediatric nurses in Saudi Arabia encounter with regard to the use of non-pharmacological methods in their daily nursing practice?
4. What advantages do paediatric nurses in Saudi Arabia perceive with regard to the use of non-pharmacological methods in their daily nursing practice?
5. Is there a relationship between the population sample's demographic data (specifically, the nurses' age, gender, nationality, religion, level of education, years of experience, country of origin and hospital type) and their use of non-pharmacological methods in Saudi Arabia?

2.8 Significance of the study

The results of this study highlight the concept of non-pharmacological pain management in children in hospital settings in Riyadh. It provides a level of understanding that may facilitate future education and training. Furthermore, it identifies the facilitators of, and barriers to, the

use of non-pharmacological pain management in hospitalized children. The results facilitate the structuring of competencies regarding non-pharmacological pain management in children. The next chapter gives a detailed account of the research methodologies used.

Chapter 3: Methodology and methods

3.1 Introduction

This chapter presents the methodological characteristics of the research. The research design is presented, along with a justification for using a mixed methods approach. Strengths and weaknesses of the quantitative and the qualitative methods are discussed. The data collection phases, including a description of the settings, the sampling strategies and the sample size for both quantitative and qualitative data collection are provided. A description of the quantitative data instrument is given, followed by a discussion of the techniques used and the ethical issues that were considered. The chapter also illustrates how the questions for the qualitative data collection were generated. The use of semi-structured interviews for data collection will be introduced and the techniques for quantitative and qualitative analysis will be presented. Finally, the integration of both quantitative and qualitative results is discussed.

The chapter includes two sections; the first gives general information about epistemological issues, positivism and interpretivisim, quantitative, qualitative and mixed method approaches. The sampling and data collection for each approach is discussed. The second section includes the research design, sampling, sample size, data collection and analysis used for the current study.

3.2 Epistemological issues

For decades, quantitative and qualitative researchers debated research paradigms. Every category of researcher thought they were superior to the other (Mackenzie and Knipe, 2006; Mertens, 1998; 2005). Though, during the long paradigm debate, no side tried to provide evidence of how its research outcomes superseded the other in terms of usefulness (Everest, 2014; McGregor and Murnane, 2010). The term ‘paradigm’ is defined as group of basic

beliefs that deal with principles (Guba and Lincoln, 1994; 2000). This definition is close to Rubin and Rubin's (2005) definition in which they define a paradigm as a group of basic beliefs that deal with principles regarding the nature of the social world. There are two main epistemological positions, which can be broadly categorized as positivism and interpretivist. Epistemology poses questions such as: 'What kind of relationships exists between the knower and what is known? How do we know what we know? What counts as knowledge?' (Tuli, 2010).

3.3 Positivism and interpretivist

Authors use the word positivism in various ways. Some writers use it as a descriptive category to describe a philosophical position that might be discerned in research. However, there are still disagreements regarding what it involves. Other writers consider it a pejorative word used to describe crude and frequently superficial data collection. 'Positivism is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond' (Bryman, 2012, p.28).

Positivism entails elements of both inductive and detective approaches. A major distinction is drawn between theory and research. The aim of research is to test theories as well as to provide material for the development of laws. Nonetheless each of these connections between research and theory include the possibility of collecting observations in a way that is not affected by pre-existing theories. A positivist approach is modelled on the approaches of the natural sciences. In this approach, researchers seek knowledge depending on experiment and systematic observation, with the aim of discovering social laws comparable to the natural laws which are uncovered by natural sciences methods (Marshall, 1994; Angus, 1986). The goal of positivist analysis is to hypothesize and to evaluate causal inferences regarding social phenomena that will be generalizable beyond the particular data analyzed (Lin, 1998). Positivism is not limited to specific methods and both quantitative and qualitative methods

can further the objectives of positivism when they share a united logic of causal inference (King, Keohane and Verba, 1994).

Interpretivism can be defined as 'the belief that the social world is actively constructed by human beings' and 'we are continually involved in making sense of or explaining our social environments' (Milburn et al., 1995, p.349). This approach has received various treatments in many social sciences fields. The aim of interpretivism is to recognize how people interpret a specific phenomenon or event. The interpretive analysis of a particular meaning cannot be achieved by empirical tests of validity in all cases because it is by nature linked to a specific cultural system. The building of patterns and causal laws that are generalizable in all cases necessarily divorces the explanation from what has happened in any specific case. Because interpretive analysis cannot be systematically assessed and theorized, it needs to be self-validating (Roth and Mehta, 2002).

3.4 Quantitative research

Aliaga and Gunderson (2002) state that quantitative research seeks to understand phenomena by gathering numerical data which can be analyzed statistically. Thus, quantitative researchers collect numerical data to explain the phenomenon under investigation in the study and to answer specific questions, such as 'how many?' or 'what percentage?' Quantitative research is defined by the words 'empiricism' (Leach, 1990) and 'positivism' (Duffy, 1985). It was developed from the scientific methods used in the physical sciences (Cormack, 1991). Quantitative research is an objective, formal, systematic process, in which numerical data form the findings. It describes, tests and examines cause and effect relationships (Burns and Grove, 2003), using a deductive process to attain knowledge (Duffy, 1985).

Using quantitative methodology, the researcher tests his/her theory deductively using current knowledge by developing hypothesized relationships and proposed outcomes. In contrast,

qualitative researchers are directed by certain ideas, perceptions, or intuitions concerning the subject to be examined (Cormack, 1991). There are several types of quantitative research: descriptive, correlational, quasi-experimental and experimental (Burns and Grove, 2003; Cormack, 1991; Marczyk at al., 2005).

In descriptive research, the researcher explores and describes phenomena in a real life situation, to provide an account of features of specific individuals, groups or situations (Kerlinger and Lee, 1999). Correlational research includes a systematic examination of relationships among or between two or more variables.

The aim of quasi-experimental research is to examine causal relationships or identify the influence of one variable on another variable. This includes applying a treatment and investigating the results by applying particular methods of measurement (Cook and Campbell, 1979). Experimental research is a systematic, objective, very controlled examination aiming to predict and control phenomena in order to understand the relationships between the dependant and independent variables (Kerlinger and Lee, 1999).

The advantage of these methods is that experiments and quasi-experiments produce adequate information regarding relationships between the variables under study, which makes it possible to predict and control future outcomes. This can be achieved if a researcher has the ability to manipulate the independent variable in order to investigate its effects on the dependent variables. However, this advantage can also be argued to be a disadvantage, particularly where organizational studies are concerned, because organizations depend on a general view of people and their environment, which quantitative methods do not allow (Briones and Cecchini, 1991).

3.5 Qualitative research

There are three possible approaches to any research: quantitative, qualitative and mixed-methods (Creswell, 2003). The first method originated in the natural sciences (e.g., physics, biology etc.) and focuses on examining things that we might observe and measure in a certain way. Such observations and measurements can be made objectively and can be repeated by other researchers. This approach is referred to as 'quantitative research'. Much later, researchers working in the social sciences, such as sociology, psychology, and so on, became interested in investigating human behaviour and the social world inhabited by human beings (Morgan, 1998). However, it was difficult for them to explain human behaviour in purely quantifiable terms. Whereas measurements can provide us with information about the number and frequency of people behaving in a specific way, they cannot sufficiently answer the question why they behave in that way. Research that attempts to improve our understanding of why things are the way they are in our lives and the reasons behind people's behaviour is called 'qualitative research' (Marshall and Rossman, 1999).

Some research highlights the focus and purpose of qualitative research. Merriam (2009, p.13) states 'researchers are interested in understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world'. Cormack (1991) reports that the purpose of a qualitative study is to describe certain aspects of a phenomena, with the purpose of explaining the subject under study. Qualitative research encompasses several approaches such as phenomenology, grounded theory and ethnography (Burns and Grove, 2003).

Following long debates between qualitative and quantitative approaches, scholars acknowledge that there is no single accepted method of scientific inquiry (Krantz, 1995), and the deficiency in recognizing the multi-interpretability of reality causes many issues in

healthcare research. This is the basis of translation in methods and research paradigms. The researchers who contribute to this approach are called ‘post-positivists’ (Everest, 2014).

3.6 Data collection in qualitative research

Choosing the appropriate data collection method depends on the research question being asked and it may be influenced by the study context, timing or structure. Participant observation is one possible data collection method, however, this is a very resource intensive approach that is best suited to the generation of data from clearly defined clinical contexts involving a small sub-sample of nurses. The most frequently used data collection methods in qualitative research are individual interviews or focus group discussions. Choosing which is optimal depends on the nature of the data sought the topic and the nature of the group under study.

While focus group studies provide fewer details of individual responses they can be superior when data on member interaction (group interaction) is considered a key component to the outcome because they include discussion and listening and provide more chances for the participants to refine what they want to say. Focus groups offer the key advantage of a social context among which the phenomenon is located and helps to display the way in which the context can shape individual views, indicating how data can be generated through conversation with others (Holloway and Wheeler, 2010).

a. Focus-group: this type of data collection is less structured compared to in-depth interviews because it is difficult to impose a structure in which data will be coherently collected from group interactions.

b. Interview: there are three types of interviews

• Unstructured (non-standardized) interviews

By definition, these utilize a wide agenda to map issues that need to be explored within the sample. Nevertheless the arrangement, wording and technique in which the interviews are followed-up will differ significantly between studies.

• Semi-structured (semi-standardized) interviews

The researcher asks all the interviewees the same questions, in the same way, every time but also does some probing to gather further information. However, the probing is limited compared to unstructured, in-depth interviews.

• Structured (standardized) interviews

The researcher asks pre-planned questions. Every informant in a study should be asked the same questions in the same order (Holloway and Wheeler, 2010).

3.6.1 Structuring qualitative data collection

In any qualitative data collection, there must be some structure, even if the researcher's intention is to follow the direction of the study participants without imposing structure on either the focus group or the individual interview. How the structuring of the data collection is planned will differ according to the specific aims of the study. Specifically, it will depend on how far the researcher can identify ahead of time the issues to be explored, the level of interest in specific issues (which may be difficult to predict) and how respondents react both to the issues to be analyzed and the interviewers themselves (Ritchie and Lewis, 2003).

3.6.2 Field notes

The role of field notes must be taken into consideration. Field notes were established a long time ago as a method of data collection in ethnographic studies, mainly utilizing observation. Although data from in-depth interviews with individuals or focus groups are collected by audio-recording, field notes provide a chance to record what the researcher observes and hears outside the direct context of the interview as well as their views regarding the dynamic of the encounter, thoughts for inclusion in future fieldwork and issues that may be applicable

at the analytical phase (Ritchie and Lewis, 2003). The field notes generated in the current study record my impressions of the clinical environments such as ward layouts and decoration, nurses' uniforms etc. When head nurses in the two hospitals took me on a tour around their departments I was able to make notes about each context and to note issues raised with me, such as the shortage of Saudi nurses, the presence or absence of a paediatric pain management department and nurses' understanding of pain management strategies. These issues were subsequently explored in the qualitative data collection.

3.7 Mixed-methods research

Quantitative and qualitative methods provide different perspectives and each has its limitations. However, the limitations of one method can be overcome by the strengths of the other. Furthermore, a combination of quantitative and qualitative methods can provide a more comprehensive understanding of the phenomenon under study than would be obtained from using either method alone (Creswell and Clark, 2011; Simons and Lathlean, 2010; Collins and O'Cathain, 2009).

Numerous definitions of mixed methods research have been developed over the years. These definitions combine several components of the research process, including the methods, the design and the philosophy. 'Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration' (Johnson et al., 2007, p.123).

The process of mixed methods research includes the following:

• Collecting and analyzing quantitative and qualitative data (depending on the research question).

• Mixing both approaches (quantitative and qualitative) together either concurrently by merging or combining them, or sequentially by starting with one approach and then building upon it with a second approach or by embedding one inside the other.

• Prioritizing one approach (according to what the study emphasizes). Applying these procedures in one study or in various stages of a programme of research.

• Framing these procedures within philosophical worldviews and theoretical lenses.

Merging the two procedures into a particular research design guides the plan for conducting the research (Creswell and Clark, 2011). Applying various methods leads to different perspectives being revealed, in contrast to what a single method is able to achieve on its own, resulting in greater understanding of a difficult phenomenon (Parahoo, 2006). The health field is usually faced with issues that are multi-disciplinary and multi-dimensional, which are best studied using the variety of methods available to researchers (Barbour, 1999). This particularly applies in nursing, which is a multi-faceted and multi-layered discipline (Maggs-Rapport, 2000) in which both natural and social sciences need to be applied.

Integrating quantitative and qualitative methods together in the same study can provide more precise information than applying one method alone; the researcher can overcome any bias or weakness of one method by applying multiple methods (Brewer and Hunter, 1989). Similarly, Morgan (1998) adds that this strategy utilizes the power of one method to improve the performance of the other. Thus, combining methods is expected to improve the validity of the results (Parahoo, 2006).

There are three important elements that must be considered in mixed methods (Creswell, 2003) and they are as follows.

3.7.1 Mixed methods research-weighting

Once a decision has been made to use a mixed methods approach, the significance, or weighting, of quantitative and qualitative methods in answering the research questions needs to be considered. In addition, the timing and/or sequence of data collection should also be considered. I will now deal with both of these issues in the context of this study.

Creswell and Clark (2011) identified three weighting possibilities for mixed methods research:

• Quantitative and qualitative methods have equal priority, which means that both are equally important in addressing the study problem.

• The quantitative aspect might have priority with regard to addressing the study problem, and the qualitative aspect plays a secondary role.

• The qualitative aspect might have priority with regard to addressing the study problem, and the quantitative aspect plays a secondary role.

For the purpose of this research, the quantitative aspect is given priority and the qualitative aspect is given a secondary role. The reason behind this is that the information collected about how paediatric nurses working in Saudi hospitals perceive the use of non-pharmacological pain management with hospitalized children is largely quantitative, while analyzing the significance in terms of nurses' experience involves largely qualitative data analysis.

3.7.2 Determining the timing of the quantitative and qualitative aspects

Consideration needs to be given to the time-based relationship between the quantitative and qualitative aspects of a study. Timing is usually discussed in relation to data collection; however, more importantly, it defines the order in which the researcher uses the findings from both sets of data within the research. That is, timing is related to the entirety of both the

quantitative and the qualitative aspects — not only the data collection. Timing in mixed methods studies is classified in three ways:

• *Concurrent timing*: quantitative and qualitative data are collected simultaneously.

• *Sequential timing:* one research method is applied first, followed by the other method, in two phases.

• *Multiphase combination timing:* the researcher implements many phases, which may include concurrent and/or sequential timing over a programme of study (Creswell and Clark, 2011).

3.7.3 Determining how and where to mix the quantitative and qualitative aspects

Mixing refers to combining and integrating results from qualitative and quantitative data. This can be done during the following stages of the study:

• *During interpretation:* the researcher mixes the quantitative and qualitative results during the final stage of the research process.

• *During data analysis:* after analysing the quantitative and the qualitative data, by linking both findings.

• *During data collection:* this type of mixing occurs during the study process when the researcher collects a second group of data. The collection of the second set of data is based on the results of the first set of data.

• *During the design:* mixing occurs during the design stage of the study process. There are three strategies for this approach, as follows:

Embedded mixing: the quantitative and qualitative methods are embedded within a design associated with one of the two methods.

Theoretical framework-based mixing: the quantitative and qualitative methods are mixed in a substantive or transformative framework to guide the overall design.

Programme objective framework-based mixing: the quantitative and qualitative methods are mixed within the general programme objective, which guides the connection of several projects or studies in a project (Creswell and Clark, 2011).

3.8 Sampling in quantitative and qualitative research

One of the most important decisions in any study is what type of data should be collected and who the population is. If the population under study is very large, which can happen frequently, the researcher needs to find a strategy to be able to collect information from a smaller sub-section of the population (Parahoo, 2006; Marshall, 1996).

Quantitative and qualitative research approaches require samples that represent a larger population of either people or objects. In quantitative research, the researcher often draws a random sample from the study population (Duffy, 1985). Statistical sampling relies on the study sample to develop general laws, which can be generalized to the larger population. Indeed, the benefit of findings gained from random sampling is that the results have a greater likelihood of being generalizable. The weakness of this approach is that random sampling is time consuming; as a result, researchers often use easily achieved, opportunistic samples (Duffy, 1985). However, such an approach decreases the potential for generalizability, especially if the sample size is very small.

In contrast, since qualitative research requires both the study and type of data analysis to be detailed, qualitative research usually relates to a selective and small sample size (Cormack, 1991). In qualitative research, the researcher often has a close relationship with the participants. Duffy (1985) argued that the advantage of such interactive communication is that the researcher obtains first-hand experience, thus providing valuable and meaningful data. As the researcher and the participants spend more time together, the data are more likely to be valid and honest (Bryman, 2012). However, researchers in such situations might face

difficulties in separating their own experiences from those of the participants leading to subjectivity (Cormack, 1991).

There are two types of sampling techniques, probability and non-probability sampling.

I.Probability sampling techniques include:

a) Simple random sampling

Each unit has an equal chance to be selected for the study. This kind of sampling is appropriate for a (more or less) homogeneous population (Parahoo, 2006).

b) Systematic sampling

The subject is chosen from a sampling frame as regular intervals. The researcher will start by randomly choosing a number, then this number will guide the researcher to continue selecting the subjects (Parahoo, 2006).

c) Stratified sampling

Stratified random sampling includes splitting the units included in the sample frame in layers based on what variables the researcher thinks are vital for the study, then choosing a sample from each layer by applying a simple random sampling process (Parahoo, 2006).

d) Cluster sampling

A cluster is defined by the Oxford dictionary as ‘a group of similar things’. In some situations, the units of the research population present in the form of clusters. When the study population present in clusters it is occasionally more cost-efficient and practical to start sampling the cluster than to sample the units from the chosen clusters (Parahoo, 2006).

II. Non-probability sampling techniques include:

a) Convenience sampling

In convenience sampling, the researcher can choose the participants who might be useful for the research and are easy to access (Holloway and Wheeler, 2010).

b) Accidental sampling

In this type of sampling, only the available population will have the chance to be selected for the study. This kind of sampling does not have a sampling frame (Parahoo, 2006).

c) Purposive (purposeful) sampling

The researcher will deliberately decide who will be included in the study based on their ability to provide the necessary data. The researcher depends on her/his judgement as to who can provide the data needed to help the researcher understand the phenomena under study (Parahoo, 2006).

d) Volunteer sampling

Participants volunteer to take part in the study and are thus self-selected (Parahoo, 2006).

e) Snowball sampling

A participant refers one or more people they know to the study, and then those participants refer people, until the researcher achieves an adequate sample size (Parahoo, 2006).

f) Quota sampling

This type of sampling includes components from stratified and purposive sampling but without random selection. This sampling includes two stages; first the researcher should decide the quota allocation and the second stage is selecting the sample (Parahoo, 2006).

3.9 Data analysis

Data collection is an important part of any research, but raw data cannot answer research questions and it cannot support or reject hypotheses. In order to make sense of the collected data, researchers need to analyze them. Data analysis will help the researcher to make sense of the data before he/she can present them to the readers (Parahoo, 2006).

3.9.1 Data analysis in quantitative research

Quantitative data can be analyzed in two ways, either inferential or descriptive statistical analysis. The inferential analysis includes *parametric* and *non-parametric* analysis methods.

The parametric method is about estimating the parameters of the population, for example, the mean. These methods rely on making distributional assumptions regarding the population. The non-parametric method can be used when the researcher is testing a hypothesis or estimation if the population distributions are not strictly specified (Cormack, 2000).

Descriptive statistical analysis is a way of data analysis that helps the researcher to summarize and describe the data in a meaningful way. There are many ways to present data such as tables, bar charts/histograms, pie charts, line graphs and scatter diagrams. These analyses can be carried out through statistical computer packages like Statistical Package for the Social Sciences (SPSS) (Norusis, 1993).

Quantitative data can be analyzed using a different range of software packages. Some of these packages are designed to do statistical analysis and others provide limited statistical tests. Programs like databases, spreadsheets and graphics packages can be used for statistical analysis (Cormack, 2000).

3.9.2 Data analysis in qualitative research

Analysis means looking for patterns in the research data and for ideas that might help the researcher to explain the reasons behind the presence of those patterns in the first place (Bernard and Ryan, 2010). Thorne (2000) states that 'unquestionably, data analysis is the most complex and mysterious of all of the phases of a qualitative project' (p.68). The researcher needs to immerse him/herself in the data. This process requires the researcher to fully commit him/herself to a structured process of analysis to understand the real meaning of it. It needs a substantial amount of dedication to read, intuit, analyse, synthesize and report the findings. Qualitative data analysis often starts when the data collections starts. As this kind of research is carried out either by observation or by interview, it is important to maintain and frequently review the records to find further questions that need to be asked or

to offer explanations of the outcomes. Typically, the questions or explanations are embedded in interviews and even in observations. Qualitative researchers should 'listen' very carefully to what they hear, observe and experience to determine the meanings. The repeated nature of asking and verifying the meaning is a significant part of collecting and analyzing data. Usually this stage of data analysis consumes a lot of time (Speziale and Carpenter, 2003).

The real process of data analysis generally takes the form of clustering the data. In several qualitative approaches, clustering ideas refers to finding 'themes'. DeSantis and Ugarriza (2000) report that themes emerge from the data. They define a theme as 'an abstract entity that brings meaning identity to a recurrent experience and its variant manifestations' (p.400). After the researcher explains all the themes related to the study, she/he needs to report them in a meaningful way to the intended readers.

3.10 Conclusion

This section has presented various methodologies and discussed quantitative, qualitative and mixed methods approaches to research. In addition it has looked at various research designs in quantitative, qualitative and mixed methods research. Quantitative and qualitative data collection and analysis strategies were discussed in detail. The next section of this chapter will present in detail the methodologies and the methods used for the current study.

3.11 Methodology of the current study

3.11.1 Introduction

In the following section, the methodological approach used in the current study will be presented. The following aspects will be highlighted: study aims and questions, setting, inclusion criteria for the participants, research design, justification of the selected methodology, quantitative and qualitative sampling, sample size, data collection and analysis.

3.11.2 Study aims

The purpose of the current study is to examine paediatric nurses' perceptions of the use of non-pharmacological pain management methods in controlling paediatric procedural pain in two Saudi health sectors in Riyadh City.

3.12 Study objectives

- To explore paediatric nurses' perceptions and use of different non-pharmacological pain management methods;
- To understand the facilitators and the barriers that can either promote or prevent paediatric nurses use of non-pharmacological pain management methods;
- To investigate if the paediatric nurses backgrounds and personal characteristics are influencing their use of non-pharmacological pain management methods.

3.13 Research design for the current study

3.13.1 Explanatory sequential design

Within this study I have decided to use an explanatory sequential design (Figure 3.1). An explanatory design is a mixed methods design which starts with quantitative data collection and analysis and then pursues specific findings through a second (qualitative) phase of data collection and analysis (Creswell and Clark, 2011; Creswell et al., 2003). The purpose of the explanatory design is to use qualitative methods to explain the initial quantitative findings (Creswell et al., 2003). This design is useful when the researcher needs to examine relationships and trends or to clarify the mechanism or causes behind identified trends using quantitative data (Creswell and Clark, 2011). Explanatory studies focus on 'why?' questions.

Strengths of the explanatory design:

• Explanatory research is attractive to quantitative researchers because it starts with a strong quantitative understanding.

• The data collection is accomplished in two phases, which means that a single researcher can conduct the study (i.e., there is no need for a team of researchers).

• The final results can be presented with a quantitative section followed by a qualitative section, facilitating reader comprehension.

• An explanatory design lends itself to the development of methods, since the second round of data collection can be conducted based on findings from the first (quantitative) data collection round (Creswell and Clark, 2011).

Challenges in using the explanatory design:

• The explanatory design is time consuming. Significant time is required to apply the two phases of data collection and analysis. Usually, qualitative data collection requires a longer period of time, even when only a few participants are involved.

• It might be difficult to obtain ethical approval to conduct an explanatory study, since the researcher is not able to identify the participants for the second phase of data collection until the initial results have been obtained.

• The researcher must determine which quantitative findings need further examination. This cannot be done until the completion of the quantitative data collection.

• The researcher must think carefully about who will be included in the second phase of data collection and what the criteria will be (Creswell and Clark, 2011).

3.13.2 Justification for applying mixed-method research for the current study

A sequential design (Figure 3.1) was followed in the current study to collect and analyze the data. The quantitative data were collected in the first phase, and their findings contributed to the qualitative data, which were collected in the second phase. The data were collected in this

way in order to draw more in-depth information from the first phase of data collection and analysis (Creswell and Clark, 2007, p.121).

For phase one of this sequential design, two pre-existing, validated questionnaires were considered as questionnaires can generate information that can be generalized to the population of nurses within the chosen settings. The choice of questionnaire is explained in 3.17.2.1 below. A pilot study, utilizing the questionnaire was undertaken prior to phase one in order to check the questionnaire's validity within the Saudi context. The pilot study is

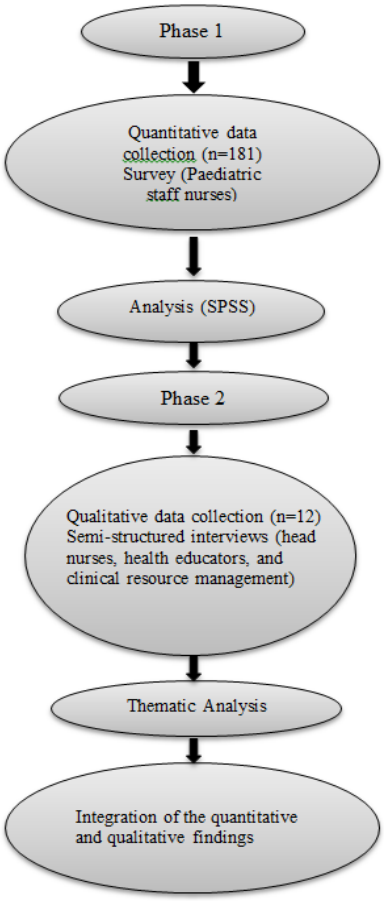

Figure 3.1 Sequential Design

described fully in 3.15.

In order to provide an opportunity to explore the findings from the first, quantitative, phase in greater depth the decision was taken to undertake interviews with key informants in the

second phase of the sequential design (3.21). The sequential design utilized in the study is noted below in Figure 3.1.

3.14 Settings

The Saudi health care system is divided into the governmental sector, which includes the Ministry of Health (MOH) and other agencies, and the private sector. All military and educational hospitals operate under MOH agencies. Therefore, all those hospitals were considered to be MOH hospitals during the selection of a setting for the current study (Almalki, 2011).

In 2012, the total number of hospitals in Riyadh City (Saudi MOH, 2012) was 46, housing 7,473 beds. There were 6,725 physicians in Riyadh City, with 9.19 physicians for every 10,000 persons. The number of nurses was 16,447, with 22.5 nurses for every 10,000 persons. The following table presents the total number of health staff working in Riyadh City.

Table 3.1Total number of health staff working in Riyadh City

Position	Saudi Male	Non-Saudi Male	Saudi Female	Non-Saudi Female	Total
Physicians	1,341	3,534	559	1,281	6,715
Nurses	3,284	555	3,737	8,871	16,447
Pharmacists	172	14	294	22	502
Applied medical health	6,662	376	1,508	709	9,255

The hospitals targeted for the current study are located in Riyadh City, which is where the majority of hospitals and advance health care services are located.

A list of the hospitals located in Riyadh was taken from the MOH website. The process of selecting the hospitals began with a categorization of hospitals into different types: governmental, military, private and educational.

Only hospitals with inpatient paediatric departments and paediatric nurses providing health care for paediatric patients were included, as this study was concerned with paediatric nurses'

perceptions of using non-pharmacological pain management methods to control procedural pain.

There are two educational hospitals in Riyadh; neither was included in the study because they did not meet the inclusion criteria of having dedicated paediatric departments. Four private hospitals were contacted, but none was willing to participate in the study. For this reason, the private hospitals were not included. There are three military hospitals in Riyadh, from which I randomly selected one for inclusion in the study. I gave each hospital a number, wrote the numbers on three separate pieces of papers, and drew one paper at random. The hospital on that paper was included in the study.

The governmental hospital included in the study was selected purposively because it is a medical city which has a children's hospital. Furthermore, the staff nurses working in the children's hospital are paediatric nurses, who do not rotate to work with adult patients. Thus, the two hospitals included in the study are a governmental hospital and a military hospital. Further details of the selected hospitals are provided below.

A. Military hospital

The hospital is located in Riyadh City, the capital of the Kingdom of Saudi Arabia. It is the medical services department of the Ministry of Defence and Aviation. The hospital was opened in December 1978 with 385 beds, and it now has approximately 1200 beds. The hospital offers a wide range of services such as medical care, training and development, postgraduate and medical education, health awareness, symposia and conferences. Furthermore, facilities are being built on a regular basis to accommodate the increasing demand for health services and to improve the quality of care. This hospital is under the Ministry of Defence and it is self-run. Only military personnel and their families are treated

in this hospital, but any patient can go to ER in case of emergencies. In both hospitals, health services are free of charge.

B. The Governmental hospital

This hospital is a tertiary care medical centre in Riyadh City. It is known as the ultimate referral hospital for the MOH, and it carries national responsibility for improving the health care delivered to children and adolescents. On the hospital website, they identify their staff as highly qualified (having the appropriate qualifications such as; abilities, education and skills to perform paediatric nursing care), dedicated, international health professionals. This medical city includes; main hospital, children's hospital, rehabilitation hospital, heart centre, cancer centre, diabetes centre and national neurosciences institute.

The children's hospital includes several subspecialties: surgery, a paediatric intensive care unit, a neonatal intensive care unit and medicine. This hospital is under the Ministry of Health but it is self-run. Usually patients are referred from primary health care centres but in emergency cases, patients go directly to the ER department.

3.15 Pilot study

A pilot study, in which the questionnaire was distributed, was conducted in order to improve the reliability of the instrument, to assess the clarity of the questions and to measure the time needed to complete the questionnaire. The governmental hospital was chosen for the pilot study because it has a paediatric hospital and a greater number of paediatric nurses than the military hospital. The questionnaires were distributed following simple random sampling method to sixteen nurses, and ten completed questionnaires were returned. The questionnaires were distributed and collected by me. Several reminders were sent to these nurses, with no further response.

The participants were asked to measure the time needed to complete the questionnaire, which was accomplished by asking the participants to record the time at which they started to

answer the questionnaire and the time at which they completed it, to assess the clarity of the questions and to make any comments or suggestions regarding the questions. The participants' responses concerning the time needed to complete the questionnaires ranged from 20 minutes to one hour. Subsequently, I added to the cover sheet of the questionnaire that it might take from 20 to 40 minutes (the mean) to complete the survey. In addition, the nurses reported that the questions were clear and easy to understand, though some reported that some of the research questions did not fit certain patients' age ranges. Not all the participants answered the open-ended questions.

In addition to the pilot study, a Cronbach's alpha test was conducted to assess the internal consistency of the questionnaire. The result was 0.9, which indicates good internal consistency (George and Mallery, 2003).

I decided to change the collection process. Instead of asking the participants to return the completed questionnaires to a provided box, I collected the completed questionnaires personally. The two phases of data collection followed in the current study are presented as follows.

3.16 Phase one

The inclusion criteria for phase one of the study were that all registered paediatric nurses with a minimum of three months experience of working in one of the hospitals' paediatric departments, were eligible for inclusion.

3.17 Sampling

3.17.1 Sample size for quantitative data collection

Because, frequently, it is not possible to explore the entirety of a population under study, a sample can be drawn from the target population. There are several reasons for sampling, such as saving time and money. Moreover, it is not necessary to include all possible cases in order

to be familiar with a phenomenon under study. However, it is very important for me as a researcher to ensure that the sample represents the full population, which is critical to being able to generalize the findings.

Cohen's formula (1992) was used to determine the sample size for the current study (Chuan, 2006). According to Chuan (2006), the 'Cohen Statistical Power Analysis is one of the most popular approaches in the behavioural sciences in calculating the required sampling size. In order to determine an adequate sample size, the values of significance level, effect size, power and estimated variance have to be pre-determined' (Chuan, 2006, p.80). Power and sample size estimations are important for researchers to be able to determine the number of participants needed to answer a study question (or a null hypothesis). Power calculations provide researchers with information regarding the number of participants needed to avoid type I or type II errors (Jones et al., 2003).

According to Cohen, 'statistical power analysis exploits the relationships among the four variables involved in statistical inference: sample size (N), significance criterion (α), population effect size (ES), and statistical power' (Cohen, 1992, p.156). In comparison or intervention research, the sample size determines the power of the research to detect a statistically significant difference between groups. The significance of the research is related to the probability of making a type I (α) error, which refers to finding a significant difference/effect between two groups in the sample when one does not exist in the study or target population. A type II (β) error refers to the probability of finding no effect or difference between two groups in the sample population when one does, in fact, exist in the study population. If the significance level is set at 5% and a significant result is achieved, then the results indicate, with 95% confidence that a real difference exists: in other words, 'the confidence interval of 95% derives from the probability of obtaining the observed result due to chance alone' (Gerrish and Lacey, 2006). According to Cohen's (1992) formula, and using

a medium effect size at power 0.80 for $\alpha = 0.05$, with two different hospitals, the projected sample size is 64 participants per hospital.

3.17.1.1 Simple random sampling

Probability sampling can be applied when an accurate and up-to-date sampling frame is accessible to the researcher (Gerrish and Lacey, 2010). The strength of this kind of sampling is that the researcher can generate a representative sample, which should ensure that the sample has characteristics similar to those of the research population and that the research population is similar to the target population (Gerrish and Lacey, 2010). This type of sampling was appropriate for the current study as both hospitals were able to provide me with a sampling frame for the paediatric nursing staff. The number of paediatric nurses in each hospital was large and they were working across a number of different departments. This gave each paediatric nurse an equal chance of inclusion in the study.

The first plan for the study sample was simple random selection. A software program called Research Randomizer (http://www.randomizer.org) was used in order to randomly select participants. For the questionnaire distribution, some of the participants did not satisfy one of the study inclusion criteria (a minimum of three months experience of working in one of the hospitals' paediatric departments). In this case I talked to the department head nurse to get an alternative name of a paediatric nurse who had been working for at least three months in a paediatric department of the hospital. This process did not support either the random sampling or the anonymity of the participants. As an external researcher I would not have had any other way of knowing the new nurses who had just started to work in the hospital. I had to communicate with the head nurse of the department to solve this issue.

The target population comprised the registered paediatric nurses working only in paediatric departments in Saudi Arabia (Riyadh City), and the study population comprised registered

paediatric nurses working in the two chosen hospitals, from which the sample was randomly selected.

Gerrish and Lacy (2010, pp.143-144) said, 'a sampling frame is a comprehensive, itemized list of all people, patients, hospitals or events which comprise the study population, from which a sample will be taken'. A sampling frame (i.e., a list of the paediatric nurses) was obtained from both hospitals; next, the probability sampling method was used, which meant each participant had an equal chance to be included in the study (Gerrish and Lacey, 2010). The advantage of probability sampling is that it generates a representative sample. The second step was to generate a simple random sample (Gerrish and Lacey, 2010). The lists of paediatric nurses were numbered systematically; then, random numbers were chosen using a statistical software program called Research Randomizer (http://www.randomizer.org) in order to randomly select the participants. Randomization took place independently in each of the two hospitals.

In the governmental hospital, the dean of the nursing department for the children's hospital provided an up-to-date list of all of the paediatric nurses. I numbered all the names to be able to choose random numbers to be included in the study. The sampling frame from the governmental hospital included the employees' numbers, names, working departments, positions, nationalities, and genders.

In the military hospital, each head nurse provided the primary researcher with a separate list of the paediatric staff nurses. All of the lists were numbered systematically, except the PICU list. The sampling frame provided from the military hospital included the employees' names and working departments, except for the military hospital PICU list, which included the employees' names, working departments, and positions. The list included the staff working in the haematology/oncology departments, who were excluded before the sampling process

began. I systematically numbered the entire list provided by the military hospital in order to choose the sample.

In accordance with the sampling criteria for the current study, after communication with each paediatric head nurse in each hospital and before distributing the questionnaires, all new staff nurses with less than three months' experience in their current jobs were excluded from the study. These nurses' names were removed from the sampling frame and I randomly chose a new staff nurse for each exclusion. This process was done by verbal communication with the head nurse, asking them to suggest paediatric nurses with more than three months experience in the department. The head nurses suggested several names which I wrote on pieces of paper and drew one name for each excluded nurse.

According to the nursing list provided by the governmental hospital, the total number of paediatric nurses in the various paediatric health care departments was 660. Of these, 585 were female (88.6%), 39 were male (5.9%) and 37 (5.6%) did not specify their gender. In the military hospital, the genders of the paediatric nurses were not indicated, unlike the governmental hospital, where the nursing sampling frame included the staff names, positions, genders, departments and nationalities, the sampling frame did not include this information. The total numbers of distributed and returned questionnaires in each department, according to hospital, are included in (Appendix 7).

3.17.2 Data collection (Phase one- Quantitative data collection)

3.17.2.1 Self-administered questionnaire (Pölkki et al., 2002)

In the questionnaire, all the questions related to applying non-pharmacological pain management methods are based on a 5-point Likert scale, comprising 'never', 'very seldom', 'sometimes', 'nearly always' and 'always'. For this study, I added certain questions concerning the advantages of non-pharmacological methods, the barriers to using non-

pharmacological methods, and whether the nurses had any education regarding non-pharmacological methods. There was also a minor modification regarding the level of education, which was made to suit the Saudi Arabian work environment. The resultant questionnaire consisted of two parts: the first part contained questions regarding the nurse's background data, and the second part contained two sections: the preparation of a child for a procedure and the post procedural pain management and parental guidance for a child.

The questionnaire included five sections; the first section included general information about the respondent's background data such as (age, nationality, religion, having children or not, level of education, years of experience and current field of nursing). The second section included nurses' sources of knowledge. The third section included questions such as: type of hospital; nursing organization in the unit; how pain management is organized in the unit; availability of pain assessment tools; nurses' use of such tools. Section four included several questions about different non-pharmacological pain management methods such as preparatory information, distraction, guided imagery, thermal regulation, massage, positioning, TENS etc. The fifth section included questions about parental guidance measured on a 5 point Likert scale (not at all, very seldom, sometimes, nearly always and always). This final section also included two open ended questions about other types of non-pharmacological methods that the paediatric nurses might use and the advantages perceived when using those methods as well as questions about barriers that paediatric nurses encounter with regards to the use of non-pharmacological methods.

In keeping with these strategies, I chose to adapt Pölkki et al.'s (2002) questionnaire for the following reasons: first, there is an advantage to using an established questionnaire which is that the development work has already been undertaken. Thus, published information regarding the validity and the reliability of the instrument in different populations exists, e.g., in Finland, China and Singapore, but not in Saudi Arabia which where I intended to conduct

the study. Second, Pölkki et al.'s (2002) instrument was designed to obtain responses from paediatric nurses to specific questions related to non-pharmacological pain management. Another instrument used by Salanterä et al. (1999) to measure nurses' knowledge of non-pharmacological and pharmacological pain management methods in children was identified, but Pölkki et al.'s (2002) instrument was judged to be more appropriate for several reasons. Salanterä et al. (1999) developed their instrument on the basis of a literature review of pain in both children and adults, whereas the current study focuses only on pain in children. Moreover, the instrument includes only one question asking the nurses if they think there are methods other than medication that can be used to control pain, and it includes only seven questions about various non-pharmacological methods (conversation, rocking, parent presence, imagination, play therapy, massage and cold compress), whereas, based on the literature review, there are many other non-pharmacological methods. Most of the questions were about pharmacological methods which are not the focus of the current study.

For the above reasons, the Pölkki et al. (2002) questionnaire was used to collect the quantitative data for the study. After determining the optimal instrument for quantitative data collection, I contacted the original author (i.e., Pölkki) and obtained permission to use the questionnaire. Before applying Pölkki's et al.'s (2002) instrument, some modifications to some questions were made. For example, some questions regarding surgical procedures were excluded from the questionnaire, and some questions were added in order to address all the research questions. The added questions covered topics of nationality, religion, type of hospital, and other non-pharmacological therapies used to relieve children's procedural pain in the ward.

The initial questionnaire was used to investigate postoperative pain management in hospitalized children, but it was adjusted to be used for pain after medical procedures. Thus, some questions that were specifically designed for postoperative care were amended to focus

on post-procedural care, as follows: 'I use thermal regulation as a method of postoperative pain relief' was changed to 'I use thermal regulation as a method of post procedural pain relief'. Some questions designed specifically for postoperative care were removed, including questions regarding the type of anaesthesia (general/local anaesthesia), postoperative placement (recovery room, inpatient ward/ICU), postoperative monitoring in the ward, and pain medication after the procedure.

The children included in Pölkki's et al.'s (2002) study were from 8 to 12 years old but the focus was changed for the current study to be 3 to 14 years old (pre-school and school age children).

3.17.3 Questionnaire validity and reliability

Bell (2005) says that reliability relates to the consistency or dependability of a measure. If the measure is reliable, you can be confident that all the items that make up the measure are consistent with each other, and that if you were to use the measure again with the same individuals, they would be rated similarly. Validity relates to whether the instrument is measuring what it is intend to measure, and represents the overarching quality of the measure (Bell, 2005).

The instrument was subjected to two kinds of validity assessment:

• Face validity is concerned with the clarity of the language used in the questionnaires and with the structure.

• Content validity is concerned with the compatibility of the instrument's content with the aims of the study and the research questions.

3.18 Survey administration

After obtaining permission from the head nurses, I attended the last five minutes of a staff meeting in both hospitals to introduce myself and to explain the purpose of the research to the

nurses. Subsequently, copies of the questionnaire were distributed to selected nurses by me. To maintain confidentiality, each questionnaire was attached to an empty envelope. Completed questionnaires were returned in sealed envelopes to the primary researcher or to the ward clerk (and then collected by me). I visited the units frequently to encourage and remind nurses to fill in the questionnaire, as well as to collect completed questionnaires. The questionnaires were coded before distribution. The name of the department was written on the questionnaire to allow me to keep track of the response rate for each department.

I distributed 50% more questionnaires than the required sample size, to cover the possibility of no response from some participants. To increase the response rate, I followed up with the participants on a regular basis to thank those who had completed the survey and remind those who had not. An agreement between me and the participants about date and time to collect the completed the survey was set. I had to remind some participants more than once about the survey, and one nurse asked for another copy of the questionnaires because she had lost hers.
A total of 99 questionnaires were distributed at the military hospital, and 78 completed questionnaires were collected. The response rate in the military hospital was 78.8%. The governmental hospital has a bigger capacity and a paediatric hospital, which implies a bigger sample. More copies of the questionnaire (135) were distributed to the paediatric nurses at the governmental hospital, resulting in 103 completed questionnaires. The response rate in the governmental hospital was 76.3%.

The total number of nurses who completed the questionnaires was 181. These nurses were from a variety of paediatric departments, including PICU, Day Care Unit (DCU), paediatric medical, paediatric outpatients and paediatric ER departments. The total response rate was 77.3%. Campbell and Swinscow (2009) report that 65% to 70% is a reasonable response rate.

The total time allotted for the quantitative data collection was about ten weeks, running from 22 July 2012 to 9 October 2012 in the governmental hospital and from 1 August 2013 to 30 September 2013 in the military hospital. The data collection was done in two phases where the first phase was to collect quantitative data and the second phase was to collect qualitative data.

3.19 Quantitative data analysis

The quantitative data were analyzed using the SPSS version 21. A total of 181 questionnaires were entered into SPSS. Any missing answers were added as 999. Any questions that had more than one response selected were entered into SPSS as missing answers. After data from all 181 questionnaires had been entered; the data were reviewed excluding any data entry errors. Before analysis, selected variables were recoded as follows:

• Hospital type: Governmental=1, Military=2;

• Nationality: Indian=1, Filipino=2, Others=3;

• Religion: Islamic=1, Christian=2, Hindu=3 (Hindu was excluded from further analysis due to the sample size);

• Have children: Yes=1, No=2;

• Previous hospitalization of children: Yes=1, No=2;

• Level of education: Diploma=1, Associate degree=2, Baccalaureate=3, Master's=4, Other=5;

• Nursing position: Charge Nurse=1, Staff Nurse One=2, Staff Nurse Two=3, Other=4;

• Age: 20 to 30=1, 31 to 40=2, 41 to 50=3, 51 to 60=4.

Descriptive statistical analyses were applied to summarize the demographic characteristics of the paediatric nurses and their use of non-pharmacological pain management methods. Frequencies, percentages, means and standard deviations (SDs) were determined.

A scale with five divisions (i.e., the Likert scale) was used in the questionnaire for questions about the frequency of the paediatric nurses' use of non-pharmacological methods. The scale was recoded into three divisions, as follows: 'not at all/very seldom', 'sometimes' and 'nearly always/always'.

Multiple linear regression analysis was applied to test the relationships between the dependent and the independent variables (Montgomery et al., 2006; Chatterjee et al., 2000). Montgomery et al. (2012, p.1) define regression analysis as 'a statistical technique for investigating and modelling the relationship between variables'.

The following table presents the dependent and the independent variables;

Table 3.2: Dependents and independents variable in the current study

Independent variables	**Depended variables**
Nurses age	Preparatory information
Gender	Distraction,
Religion	Guided imagery
Nationalities	Parental guidance
Level of education	Other non-pharmacological methods including; heat and cold application, TENS, verbal or material rewarding, relaxation, provide suitable room temperature, interior decoration, touching, minimize the noise, encourage the child's parents to bring to the ward some of the child's own belongings, ask the child to suggest ways to relive his/her pain, provide comfortable environment, help the child with the daily activities, comfort and reassure the child, spend time with the child, positioning, massage and breathing technique.
Parenthood and family experience	----------
Length of nursing experience	----------
Hospital type	----------
Nursing field	----------
Nursing position	----------

In relation to the computational mission of evaluating all possible regressions, various methods have been suggested for evaluating a small number of subsets by adding or deleting

variables one at a time, according to a particular criterion. These procedures, which are usually referred to as stepwise methods, are based on the differences between two basic ideas: Backward Elimination (BE) and Forward Selection (FS).

• **Backward Elimination** begins with an equation in which all variables are included, and then removes variables one at a time. In each step, the variable with smallest F-ratio, as computed from the present regression, is removed if the F-ratio does not exceed a specific value.

• **Forward Selection** begins with no variables in the equation and adds one variable at a time until all of the variables are included or until a stopping criterion is satisfied. The variable considered for inclusion at any step is the one that yields the largest single degree of freedom (d.f.) F-ratio of the variables eligible for inclusion (Hocking, 1976).

The selection of independent variables is done using a step wise method. Whenever there is a single independent variable, it is a simple linear regression model, otherwise if there is more than one independent variable then the model becomes multiple linear regression. Each dependent variable is taken one at a time. An example of a dependent variable is preparatory information and an independent variable is hospital type (Gov.), education level (BSc) or age (51-60 years old).

There are four models (distraction, guided imagery, preparatory information, and other non-pharmacological methods). There are more than one independent variable and it's difficult to illustrate a single fitted line on a scatter plot for each model, because there are 3D plots when there is one dependent variable and two independent variables.

Before running the multiple linear regression analysis, the mean values for each non-pharmacological method were calculated as follows: 20 questions about preparatory information, 5 questions about guided imagery, 7 questions about distraction, 20 questions

about other methods of non-pharmacological pain management, and finally, 29 questions about parental guidance. Following this, the mean of each method of non-pharmacological pain management was included in the multiple linear regression, along with the participants' characteristics.

All the independent variables which have two values were recoded as 0 and 1 to be able to run the regression analysis. For hospital type, the governmental hospital was the referral dummy variable. Religion was recoded as 0 and 1, where 0 represents Muslim and 1 represents Christian, making Islam the referral dummy variable. Most of the participants were Muslims and Christians, with only 3 of them being Hindu. Those 3 were excluded from the analysis because of the small sample size. In the nursing field, outpatients department was used as the referral dummy variable. For nursing position, charge nurse was the referral dummy variable. Education level was recoded as 0 and 1, where 0 represents diploma and 1 represents bachelor degree (BSc). Associate degree and Master's degree where omitted because of the small sample size. The length of experience in paediatric nursing care was used without recoding. Having children was recoded as 0 and 1 where 0 represents no and 1 represents yes. Having the experience of having their own children hospitalized was recoded as 0 and 1 where 0 represents yes and 1 represents no.

The mean of each non-pharmacological method was used to run the multiple linear regression analysis with all the independent variables, including age, nationality, religion, having children, having experience of the children being hospitalized, nursing field, nursing position, level of education, length of experience in paediatric nursing care and hospital type. The mean of each non-pharmacological method (preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance) was used to find the percentage of paediatric nurses who use of each of those methods. A transformation process

was done for ‘classification of variables into groups considering the average levels of usage’. Three levels of usage were coded, low, medium and high. Mean scores less than 1.33 were coded ‘low’, scores between 1.33 and 3.66 as ‘medium’, and scores greater than 3.67 as ‘high’.

I decided to use the medium and high levels of usage to interpret the results which gave a more reasonable level of usage.

During data entry, several important aspects were taken into consideration such as the following:

1. Entering and storing data

When entering data, it is important that every column represents a different variable while every row represents an individual subject’s data. For categorical variables, every category must be input as a numerical value.

2. Data checking

Mistakes in recorded data can happen frequently. Mistakes can be made during data collection, data recording, transcription or entering the data into the computer. It is difficult to know what the correct data is, so attention is needed to ensure that the recorded values are reasonable. The entered data was scrutinized for possible mistakes or omissions. During the data checking some mistakes were corrected by reviewing the original questionnaires or by re-measuring the variable. This process is called ‘data checking’ or ‘data cleaning’.

3. Describing data

Describing the data started with counting the number of observations in every category and presenting them as percentages of the whole sample size.

4. Presenting data and findings in tables

Quantitative data findings were presented in tables to make it easier for the reader to scrutinize the numbers. Various types of data were presented in tables such as means and standard deviations (Gerrish and Lacey, 2010).

3.20 Multiple linear regression

Regression analysis is a commonly used statistical technique which provides a simple method for establishing practical relationships between variables (Chatterjee et al., 2000; Montgomery et al., 2006). Chatterjee et al. (2000) define regression analysis as 'a conceptually simple method for investigating functional relationships among variables'.

Before running the regression analysis, the means of preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance were calculated for each of them separately as shown in Tables 4.15, 4.16, 4.17, 4.18 and 4.19. From the questionnaire, preparatory information methods had 20 items, guided imagery had 5 items, distraction had 7 items, other methods had 20 items and parental guidance had 29 items.

The mean values of each non-pharmacological method were used to run the multiple linear regression analysis with all the dependent variables including preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance.

In order to run the regression analysis, dummy variables were created. A dummy variable is 'an artificial variable created to represent an attribute with two or more distinct categories/levels' (Skrivanek, 2009, p.1). The main aim of creating dummy variables is to represent the nominal-level of the independent variables in the statistical methods such as regression analysis. Without the dummy variables, these statistical methods would not be able to include nominal-level variables, which would be a major limitation.

I started creating the dummy variables by choosing one of the categories to be a reference category; this category was used to compare the other categories. All the independent variables having two values were recoded as 0 and 1 to run the regression analysis. I created dummy variables to be able to represent every of the other categories. In the following table, all the created dummy variables are presented in detail:

Table 3.3: Creating dummy variables

Independent variables	**Dummy variables**	**Comments**
Hospital type	Governmental= 0 Military = 1	
Religion	Islam= 0 Christian= 1	Most of the participants were either Muslim or Christian; only 3 were Hindu, thus they were excluded from the analysis due to the small sample size.
Nursing field	Outpatient department= 0	
Nursing position	Charge nurse =0	
Education level	Diploma = 0 Bachelor's degree = 1	Associate degree and master's degree were omitted because of the small sample size.
Length of experience in paediatric nursing care		The length of experience in paediatric nursing care was used as it was, without recoding because it is nominal.
Having children	No = 0 Yes = 1	
Having experience of their own children being hospitalized	No= 1 Yes= 0	

There was no main reason to use a specific answer as a reference. The dummy variable was created just to be able to run the regression analysis and to interpret the result in a meaningful way by comparing the categories with the dummy variable.

The mean values of each non-pharmacological method were then used to run the multiple linear regression analysis with all the dependent variables, including preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance.

After calculating the means of all the dependent variables and recoding the independent variables, the data was ready to run the multiple linear regression analysis. I then interpreted the regression analysis for every dummy variable as how that category compares to the reference category.

Pölkki et al.'s (2002) study applied a chi-squared test to the variables that correlate with each other and a nonparametric Kruskall-Wallis ANOVA to assess the statistically significant differences between the groups. A chi-squared test was used to assess if there were any relationships between the participants' background factors and non-pharmacological pain management methods. For the current study, I used frequencies for hospital type, gender, work experience in paediatric, work experience in healthcare, age, nationality, religion, parenthood status, previous experience of hospitalization, educational characteristics, paediatric nurses' departments and positions, work organization and co-operation of multi-professional, nurses responses regarding pain management guidance, applying non-pharmacological methods and parental guidance.

The frequencies were done and presented once for all the sample size and then by hospital. All the results are presented in the quantitative chapter.

I started to run crosstab tests between the dependents and the independent variables but because there are many dependent and independent variables, there is a chance that there is a statistically significant relationship between them by chance only. Thus, I decided to apply mutable linear regression analysis which helps assess if there are any relationships between the background factors and the use of non-pharmacological methods. The reason for this

choice is that a chi-squared test can test if there are any relationships between two variables only (bivariate relationships between two categorical variables) and the result will only show if the relationships exist but not the type of relationships. Kruskall-Wallis ANOVA, which is a non-parametric test, can test only one categorical variable at a time. The difference from the chi-square test is that the Kruskall-Wallis ANOVA takes a numerical dependent variable while the chi-square considers a categorical dependent.

Multiple linear regression can measure the size of the effect of the independent variables on the dependent variable. After calculating the mean values for each type of non-pharmacological method (preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance), I used the mean value of each of those methods and tested for the existence of, and the size of, the effect for all the independent variables (age, gender, nationality, having children, having experience of the children being hospitalized, nursing field, level of education, years of experience, nursing position, and hospital type). For example, by using multiple linear regression, I found any relationships between level of education and using distraction. Specifically, I found nurses at which level of education are applying these methods more or less than those at other levels. This can't be done with the chi-squared or Kruskall-Wallis ANOVA tests.

The questionnaires included five open-ended questions as follows;

1- What other non-pharmacological therapies do you use to relieve children's procedural pain in your work place?

2- What advantages do you perceive when using non-pharmacological methods in your daily nursing practice?

3- What disadvantages do you perceive when using non-pharmacological methods in your daily nursing practice?

4- What would help you to use non-pharmacological methods in your daily nursing practice?

5- What barriers prevent you from using non-pharmacological methods in your daily nursing practice?

A total of 81 participants from the governmental hospital and 58 participants from the military hospital answered some of those questions. The answers are presented in detail at the end of the quantitative chapter.

3.21 Phase two

The inclusion criterion for phase 2 of the study was that participants should be in managerial (ward level or above) or educational roles (working across ward contexts). These participants could be anticipated to have substantial experience of paediatric nursing and insights into the skills and knowledge required for paediatric nursing care. Role titles included head nurses, charge nurses, clinical resource management and health care educators. These participants were well positioned to know the hospitals' policies and procedures and barriers and motivations that might either help or prevent paediatric nurses' application of non-pharmacological pain management methods.

3.21.1 Sample size for qualitative data collection

Qualitative sample size is strongly connected to data saturation (Jackson, 2008). Thus, determining qualitative sample size in advance can be inappropriate, although a primary decision on the expected sample size is required for ethical approval. As such, in this study, the estimated sample size was between 15 and 20 participants according to the sample size for this qualitative design suggested by many qualitative researchers (Polit and Beck, 2008; McCance and Mcilfatrick, 2008; Holloway and Wheeler, 2010).

The total number of the actual participants involved in the study was 12. These paediatric nurses were selected according to the inclusion criteria as well as their years of experience with paediatric patients, in order to collect rich information about the research topic.

3.21.2 Purposive sampling

Sometimes, the aim of the sampling in qualitative research is not to focus on a representative sample of the total population, but rather to focus on the key people, settings or events that can provide a rich data (Gerrish and Lacey, 2006). This type of sampling is commonly used in qualitative studies to identify and select rich sources of information to make the most effective use of inadequate resources (Patton, 2002). This purposive sampling includes identifying and selecting participants who have knowledge or experience regarding the phenomenon under study (Creswell and Plano Clark, 2011). Bernard (2002) adds that the selection of participants should take into account their availability and their willingness to participate in the study as well as their ability to communicate their experience and opinions in a reflective, articulate and expressive way.

To be able to purposively select the key people to interview, I had to communicate with managers from each hospital such as the directors in the military hospital and the head of the paediatric hospital in the governmental hospital to ask them to nominate several paediatric health staff who had experience and knowledge of paediatric care. They suggested various people and following discussion the staff to be involved with the study were selected.

3.22 Data collection (Phase two - Qualitative data collection)

3.22.1 Semi-structured interviews

Semi-structured interviews are defined as conversations in which the researcher knows what he/she wants to find out and thus has various questions to ask and a clear idea about the issues that will be covered (Miles and Gilbert, 2005). Semi-structured interviews have been

described as verbal questioning of research participants using a mixture of pre-determined questions and follow-up probes (Sechrist and Pravikoff, 2002). Miles and Gilbert (2005) comment that, in semi-structured interviews, the conversation is flexible and is expected to change significantly between participants.

Semi-structured interviews are widely used in qualitative research. Such interviews can be completed with individuals or in groups, and they can last from 30 minutes to several hours. In individual interviews, the researcher can collect rich data about social and personal matters. In group interviews, in contrast, people might not feel comfortable providing so much information (Bloom and Crabtree, 2006). Semi-structured interviews usually include pre-determined, open-ended questions, as well as other questions that emerge during the interview.

This phase of data collection included 12 face-to-face interviews. Five questions were generated for the qualitative data collection to answer the research questions. Those questions were generated in order to understand and explain the quantitative data findings by gathering in-depth qualitative information.

The following questions were asked to collect qualitative data.

• When I mention non-pharmacological pain management, what does this bring to your mind?

• What roles do you think non-pharmacological pain management could play in paediatric care?

• My survey suggested that some nurses use non-pharmacological pain management, while some of them don’t. Do you have any suggestions for why this might be the case?

• In your unit, what sort of support do you require in order to encourage nurses to use non-pharmacological pain management more consistently?

• Can you help me to understand how pain is managed in the hospital?

Each participant was given the chance to speak in Arabic or in English. All of the interviews were completed in English, but some Arabic participants provided certain information in Arabic when they felt this approach was easier for them or when they could not find the right word to explain what they wanted to say in English.

During the interviews, I asked the questions, and each participant was given the chance to add more information about the topic. Whenever a participant provided information that was not clear to me, he or she was asked to clarify their answer and to give examples if possible.

Some participants continued to provide useful information after the audio-recorder had been switched off. When this occurred, with the participants' permission, I documented the information immediately after leaving the participant's office. Each interview lasted for about an hour. Most of the participants chose their offices as the location for the interviews. They also decided, individually, the best dates and times for the interviews, according to their schedules.

3.23 Data analysis in qualitative research

3.23.1 Thematic analysis

Thematic analysis is an approach that is often used in nursing research (Vaismorade et al., 2013). A thematic analysis is primarily defined as 'a method for identifying, analysing and reporting patterns (themes) within data' (Braun and Clarke, 2006, p.79).

3.23.2 Steps of thematic analysis

a. Familiarization with the data

First, the researcher should immerse him/herself in and become well aware of the data. This could involve reading and re-reading the interviews (and listening to the audio-recorded interviews at least once, if relevant) and beginning to write any primary analytic observations (Clarke and Braun, 2013).

b. Coding

Coding goes beyond data reduction; it is part of the analysis process. In coding, the researcher can identify conceptual and semantic readings of his/her data (Clarke and Braun, 2013).

c. Searching for themes

As described by Clarke and Braun, ‘a theme is a coherent and meaningful pattern in the data relevant to the research question’ (2013). Looking for themes is similar to coding, as both capture any similarities in the data. This step will end with a collation of all the coded data related to every theme.

d. Reviewing themes

In this step, the researcher will check whether the themes ‘work’ in relation to the coded extracts and the whole data set. The researcher must reflect on the themes and determine whether they tell a convincing story regarding the data. Then, the researcher must begin to define the nature of every theme and the relationships between them. It may be necessary to merge two themes, to divide a theme into two or more themes, or even to remove the themes completely and start the process of developing themes over again (Clarke and Braun, 2013).

e. Defining and naming themes

In this step, the researcher conducts and writes a full analysis of each theme. The researcher must consider the story behind each theme and how each theme fits into the overall data set. This step also involves determining the core of every theme and building a brief and informative name for every theme (Clarke and Braun, 2013).

f. Write-up

Writing is an essential part of the analytic process, not only in thematic analysis, but also in most qualitative studies. The write-up stage includes putting together the analytic narrative and (vivid) extracts from the data in order to provide the reader with a consistent and

convincing story about the data. The write-up also involves contextualizing the data within current literature (Clarke and Braun, 2013).

3.23.3 Thematic analysis for the current research

The thematic analysis for this research involved using a Microsoft Word document to transcribe the twelve interviews one by one, while translating the Arabic words that some of the Arabic participants used during the interviews. The researcher listened to each interview more than once to capture exactly what the participants said and to transcribe it precisely. Then, the researcher read each interview multiple times to become familiar with the data. All the transcripts were anonymized and participants' job titles were made more generic (e.g., 'paediatric director' or 'PICU head nurse' were changed to 'manager') to avoid identifying individuals. Next, codes and themes were generated. From this process, three major themes and several sub-themes emerged and will be presented in detail in Chapter Five.

Each of the themes and sub-themes were analysed deeply to determine the real situation in each hospital and to develop a full picture of the factors either helping or preventing paediatric nurses with regard to the application of non-pharmacological pain management. I transcribed the interviews word-for-word. Thus, the direct quotations used in the integration chapter were said by the participants exactly as written. These themes and sub-themes are discussed in full detail in the integration chapter.

3.24 The influence of me a researcher in the research process

I am living in Riyadh, thus accessing the hospitals was easy for me. I speak Arabic and English and this made my communication with different people from different nationalities as well as the data collection in both hospitals possible. Furthermore, my experience as a paediatric nurse helped me to ask the right questions to understand paediatric nurses perceptions of non-pharmacological pain management methods. Moreover, it is important to

mention that as a Saudi nurse who is familiar with the Saudi culture, it was easy for me to understand what the nurses reported during the individual interviews such as applying spiritual and herbal treatments by some families, barriers to applying non-pharmacological methods such as language barriers, cultural and religious barriers. The participants reported several issues concerning their daily practice about non-pharmacological pain management methods. My nationality, religion, experience and knowledge helped me to communicate with the participants and ask them questions that helped me to explain and explore their perceptions about the research topic.

3.25 Ethical considerations

In this section, ethical principles and how these were pursued through each stage of the study will be discussed.

Brink (2006) stated that it is imperative to address ethical concerns adequately during the design phase of any research that includes human beings as subjects. This is because the researcher should protect their subjects from any harm or violation of human rights. For that reason, the research was planned carefully. Lowes (1996) stated that it is unethical to conduct a study that is badly designed or unlikely to present useful information.

During the data collection, I introduced myself to the participants and assured them that there were no right or wrong answers. Participants were informed of the confidentiality of the data, their right to withdraw from the study at any time and that they had been chosen to participate in the study due to their extensive experience and knowledge of paediatric nursing care. All the participants included in the quantitative and qualitative data collection were informed that their participation was voluntary and that they had the right to withdraw from the study at any time with no effect on them. In addition, the participants were informed that no harm could come to them as a result of the study (Beck and Polit, 2014; Fouka and Mantzorou, 2011).

Prior to the interviews, each participant signed a consent form agreeing to participate in the study and allowing the interview to be audio recorded (Beck and Polit, 2014; Fouka and Mantzorou, 2011). Returned or completed questionnaires were accepted as an indication of consent to participate in the research.

The cover page of the questionnaire contained the research aims and objectives, as well as a guarantee of the respondents' anonymity and voluntary involvement in the study. Contact information for me was provided to the participants and attached to the questionnaires. All of the data were stored in a secure place, to which only me and my supervisors had access. Verbal agreement was secured with the head nurses of the departments involved prior to taking photos of some play rooms and some paediatric departments' interior decoration. No photos were taken of any patients or staff. The purpose of taking those photos is to present in depth information about the paediatric department environment and the hospital facilities provided for paediatric patients in each hospital.

The original title of the current study was 'paediatric nurse' knowledge, attitudes, and use of non-pharmacological methods to control children's procedural pain in hospitals in Riyadh'. The ethical approval from the military hospital was received and then I changed the research title. I contacted the head of the research ethics committee regarding this change. He stated that I didn't need to go through the ethical approval process again and he verbally agreed on this change. Ethical approval from the governmental hospital was revived according to the new research title (see Appendix 8).

Ethical approval from the University of Sheffield was obtained prior to data collection. A letter was sent to the ethical committee and/or administrative office of each hospital to explain the aims and objectives of the research. Only after the necessary approvals had been obtained was the data collected.

3.26 Conclusion

This chapter presented the methodology used in the current study. Detailed information about the research setting, sampling, and sample size were discussed. The data collection for the study comprised two methodological approaches: quantitative and qualitative (i.e. the study used a mixed method approach). Since the study applied two different methods, the sampling methods included random sampling for the quantitative data collection and purposive sampling for the qualitative data collection. Ethical issues were presented. Quantitative and qualitative data analyses were presented in detail. The next chapter will present the quantitative findings.

Chapter 4: Quantitative findings

4.1 Introduction

As reported in the methodology chapter, questionnaires were distributed to paediatric nurses employed in two hospitals. In the military hospital the questionnaires were distributed to paediatric nurses working in various paediatric departments including general medical, general medical and surgical, liver, PICU and paediatric emergency departments (ER). A total of 78 completed questionnaires were returned from all the departments, representing a good response rate of 79%. A total of 134 questionnaires were distributed to paediatric nurses working in the governmental hospital, being sent to PICU, paediatric emergency, the day care unit, and the medical and outpatients departments. A total of 103 completed questionnaires were returned, representing another good response rate of 76%. The total number of completed questionnaires from both hospitals was 181.

The statistical analysis for the current study was done using Statistical Package for the Social Sciences (SPSS) 21. To summarize the demographic data for all the participants, descriptive statistics (frequencies) were used. Then, to compare the two hospitals in relation to paediatric nurses' demographic data, and the application of non-pharmacological methods, using SPSS, the file which included all the participants' variables was split into files according to hospital (governmental and military) to compare the groups. Then the data was analyzed again using descriptive statistic analysis (frequencies). First, paediatric nurses' demographic data is presented for all participants from both hospitals then it is presented according to hospital, to compare paediatric nurses' characteristics.

4.2 Participants' characteristics

4.2.1 Gender

Tables 4.1 show the demographic characteristics of all participants included in the survey. In the sample of 181 paediatric nurses, 90% are female, 6.6% are male and 3.4% did not answer. There are no significant differences in the percentages of female and male nurses in the two hospitals, (Military: 88% female; 8% male; 4% non-response. Governmental: 91% female; 6% male; 3% non-response) (Table 4.2).

According to the nursing list provided by the governmental hospital, the total number of paediatric nurses employed is 660, of whom 585 (88.6%) are female, 39 (5.9%) male, and 37 (5.6%) did not specify their gender. In the military hospital, the nurses' list did not include the nurses' nationality or gender.

4.2.2 Age and length of nursing experience

The majority of paediatric nurses are relatively young, with 72.5% being aged between 20 and 40 years old. Nurses in the governmental hospital are younger on average.

Table 4.1 shows that 43% of the paediatric nurses the governmental hospital have between 6 and 10 years of experience in health care while 29% of paediatric nurses in the military hospital have five years or less.

4.2.3 Nationality

Tables 4.1 and 4.2 show that the majority of paediatric nurses are from the Philippines. Indian nurses are the second majority nationality and other nationalities such as Saudi, Sudanese, Jordanian, and Egyptian are in the minority.

Table 4.2 shows the percentage of Filipino and Indian nurses in the governmental hospital (49% and 45% respectively) and in the military hospital (86% and 6%). Other nationalities such as Jordanian, Egyptian, Sudanese and Saudi represent negligible minorities in these two

hospitals. It is noteworthy that the majority of respondents in Phase one were Filipino and Indian and it is possible that they were concerned about the security of their contracts and their continuing remuneration and therefore provided responses that demonstrated a social desirability effect.

According to a nurse manager in the military hospital, the hospital deals with an agency to recruit nurses from the Philippines, which is reflected in the high number of Filipino nurses in the hospital. He added that there are very few applicants from Western countries, and even if the hospital hires them they typically leave the hospital because of dissatisfaction with the housing and transportation provided. He also said that the salaries of the Filipino and Indian nurses were lower compared to those of nurses of other nationalities, such as American, Canadian or British. In this respect, Western nurses' salaries can be up to 17,000 Saudi Riyals per month, while Filipino nurses' salaries do not extend beyond 5,000 Riyals; Indian nurses earn slightly more than their Filipino peers at about 5,500 Saudi Riyals. The cost competitiveness of Filipino and Indian nurses is the fundamental reason for the hospital's dependence on such personnel, not only in terms of salary but the housing and transportation benefits typically offered to expatriate workers in the hospital.

One of the important findings of the survey is the extremely low percentage of Saudi nurses working in the two hospitals compared with other nationalities. In total, only 2.2% of nurses are Saudis compared to 65% Filipino and 29% Indian. As reported in Chapter One, there are various reasons for the severe shortage of Saudi nurses including long working hours, the types of work and insufficient remuneration.

This result is consistent with other studies in suggesting that Saudi Arabia faces a chronic shortage of indigenous nurses in its hospitals. Consequently, the rapid increase in the Saudi

population, and particularly the growing healthcare needs of all age groups, requires the employment of a high proportion of nurses from other countries, in all health sectors.

4.2.4 Religion

Table 4.1and 4.2 show that Christianity is found to be the dominant religion among all participants, followed by Islam. A minority of participants self-identify as Hindu. The majority of respondents from the governmental hospital (78%) and the military hospital (88%) are Christian, with the second most frequently reported religion being Islam (18% and 9% respectively).

Table 4.1: Demographical characteristics of all participants (n=181*)*

Demographic variables	n Total	%Total
Hospital Type		
Governmental	103	56.9
Military	78	43.1
Gender		
Male	12	6.6
Female	163	90.1
Missing answer	6	3.3
Work Experience in Paediatric Nursing		
0-5 years	74	40.9
6-10 years	62	34.3
11-20 years	17	9.4
21-25 years	10	5.5
More than 25 years	18	9.9
Work Experience in Health Care		
0-5 years	36	19.9
6-10 years	58	32.0
11-20 years	30	16.6
21-25 years	23	12.7
More than 25 years	34	18.8
Age (years)		
20-30	74	40.9
31-40	57	31.5
41-50	25	13.8
51-60	19	10.5
Missing answer	6	3.3
Nationality		
Indian	52	28.7
Filipino	117	64.6
Other (Saudi, Sudanese, Jordanian, Egyptian)	12	6.7
Religion		
Islam	26	14.4
Christian	149	82.3
Hindu	3	1.7
Missing answer	3	1.6

Table 4.2: Demographical characteristics of participants by hospital

Demographic variables	Governmental (n=103)	Military (n=78)
Gender		
Male	6(6%)	6(8%)
Female	94(91%)	69(88%)
Missing answer	3(3%)	3(4%)
Work Experience in Paediatric Nursing		
0-5 years	37(36%)	37(47%)
6-10 years	47(46%)	15(19%)
11-20 years	10(10%)	7(9%)
21-25 years	3(3%)	7(9%)
More than 25 years	6(6%)	12(15%)
Mean (SD)	7.76(65.76)	9.03 (100.61)
Work Experience in Health Care		
0-5 years	13(13%)	23(29%)
6-10 years	44(43%)	14(18%)
11-20 years	17(17%)	13(17%)
21-25 years	15(15%)	8(10%)
More than 25 years	14(14%)	20(26%)
Mean (SD)	11.51 (82.27)	12.50 (106.12)
Age (years)		
20-30	43(42%)	31(40%)
31-40	38(37%)	19(24%)
41-50	14(14%)	11(14%)
51-60	7(7%)	12(15%)
Missing answer	1(0.97%)	5(6.4%)
Mean (SD)	34.95 (8.50)	36.19 (10.51)
Nationality		
Indian	46(45%)	6(8%)
Filipino	50(49%)	67(86%)
Other (Saudi, Sudanese, Jordanian, Egyptian)	7(7%)	5(6%)
Religion		
Islam	19(18.4%)	7(9%)
Christian	80(77.7%)	69(88.5%)
Hindu	3(2.9%)	0
Missing answer	1(1%)	2(2.6%)

4.2.5 Parenthood and family experience

Table 4.3 reveals that 105 participants are parents (58%) while 73 (39.8%) do not have children. The analysis per hospital shows that 61.2% of the participants from the governmental hospital are parents and 53.8% of the participants from the military hospital are parents.

Table 4.3: Parenthood status

Parenthood status	N	%	Gov. (n=103)	Military (n=78)
Do you have children?				
Yes	105	58	63(61.2%)	42(53.8%)
No	72	39.8	38(36.9%)	34(43.6%)
Missing answer	4	2.2	2(1.9%)	2(2.6%)
Number of children				
0	72	39.8	38(36.8%)	34(43.6%)
1	46	25.4	33(32%)	13(16.7%)
2	35	19.3	22(21.4%)	13(16.7%)
3	14	7.7	6(5.8%)	8(10.3%)
4	9	5	2(2%)	7(9%)
Missing answer	5	2.8	2(2%)	3(3.7%)

Table 4.4 shows that 41% of the total participants who have their own children (n=105) have experienced their child/children's admission into hospital at least once, and 30.2% of these parents have their children admitted twice.

Table 4.4: Previous experience of hospitalization

Variables	N	%	Governmental (n=103)	Military (n=78)
Have you ever been to hospital with your children?				
0=Not Available	72	39.8	38(36.9%)	34(43.6%)
Yes	43	41.3	24(23.3%)	19(24.3%)
No	61	58.7	38(36.9%)	23(29.5%)
Missing answer	5	2.8	3(2.9%)	2(2.6%)
Total	181	100.0	103(100%)	78(100%)
How many times have your children been admitted to hospital?				
0=Not Abdicable	127	70.2	70(68%)	57(73.1%)
1	22	51.2	14(13.6%)	8(10.3%)
2	13	30.2	5(4.9%)	8(10.3%)
3	4	9.3	3(2.9%)	1(1.3%)
4	1	2.3	None	1(1.3%)
5	1	2.3	1(1%)	None
Total	168	95.3	93(90.3%)	75(96.2%)
Missing answer	13	4.7	10(9.6%)	3(3.7%)
Total	181	100.0	103(100%)	78(100%)

4.2.6 Education

One factor that I consider to be important in this study is the education and training characteristics of the study sample. The results of the survey are presented in Table 4.5. Most of the participants (64%) are holders of bachelor's degrees (BSc), while 31% are diploma holders. Only 2.2% hold master's degrees, while 1.7% of participants hold an associate degree in nursing. No answer to this was returned by 1.1% of participants. The analysis per hospital showed that more than half of the participants from the governmental hospital (53.4%) hold a BSc while 78.2% of the participants from the military hospital hold a BSc.

52% of the total respondents reported having received non-pharmacological paediatric pain management education, either in nursing school or as part of continuing education after graduation. 63.1% of the participant from the governmental hospital reported having

education about non-pharmacological pain management and 57.7% of the participant from the military hospital reported not receiving any education about the same topic. Furthermore, Table 4.5 shows that 45% of participants reported not having any education in non-pharmacological paediatric pain management, either in nursing school or during continuing education after graduation. Almost half of the sample (49.2%) showed an interest in learning more about non-pharmacological pain management. Only a very small percentage said they did not want to learn more but a large number did not provide a response to this question. About 39% of the participants from the governmental hospital showed their interests in learning about non-pharmacological pain management and about 63% of the participants from the military hospital reported that they wished to have education involving non-pharmacological pain management.

If the nurses are not receiving education about this topic, either in their nursing school or in the hospitals, this essentially means that they are only trained (and competent) to administer pharmacological pain management.

Table 4.5: Educational characteristics of all participants and by hospital

Educational variables	n	%	Governmental (n=103)	Military (n=78)
Educational level				
Diploma	56	30.9	43(41.7%)	13(16.7%)
Associate degree	3	1.7	1(1%)	2(2.6%)
Baccalaureate	116	64.1	55(53.4%)	61(78.2%)
Master's	4	2.2	2(1.9%)	2(2.6%)
Missing answer	2	1.1	2(1.9%)	None
Did you have any education on non-pharmacological paediatric pain management either in nursing school or during continuing education after graduation?				
Yes	94	51.9%	65(63.1%)	29(37.2%)
No	81	44.8%	36(35%)	45(57.7%)
Missing answer	6	3.3%	2(1.9%)	4(5.1%)
How many hours in post-qualification training have you received?				
0	79	43.6%	35(34%)	44(56.4%)
1-5 hours	31	17.1%	24(23.3%)	7(9%)
6-10 hours	13	7.2%	9(8.7%)	4(5.1%)
11-15 hours	3	1.7%	2(1.69%)	1(1.3%)
More than 15 hours	5	2.8%	None	5(6.4%)
Cannot remember	45	24.9%	32(31.1%)	13(16.7%)
Missing answer	5	2.8%	1(1%)	4(5.1%)
Do you wish to have education involving non-pharmacological pain management?				
0=Not Applicable	17	9.4	None	17(21.8%)
Yes	89	49.2%	40(38.8%)	49(62.8%)
No	6	3.3%	1(1%)	5(6.4%)
Missing answer	69	38.1%	62(60.2%)	7(9%)

4.2.7 Nursing position-work organization and experience of multi-professional working

The results in Table 4.6 indicate that 47% of respondents are at the grade of staff nurse 1. Table 4.6 also shows that about 62% of the participants from the governmental hospital are staff nurse 1 and almost 63% of the participants from the military hospital are staff nurse 2. There are staff nurses who provide direct professional nursing care to patients, while 45% are at the grade of staff nurse 2, indicating staff nurses who provide only basic patient care.

According to a nursing manager, nurses in the staff nurse 2 category cannot act as team leaders or dispense narcotics to patients. Only 8% were charge nurses. Table 4.6 shows the participants' departments in both hospitals. 33% of the participants from the governmental hospital are working in the children's intensive care department (ICU) and 36% of the participants from the military hospital are working in ICU.

Primary nursing is a way of organizing the nursing staff in a department. Patients are divided into groups, each group being allocated to one staff nurse. This member of staff is referred to as the 'primary nurse' and is responsible for delivering total nursing care to the patients under his/her responsibility (Bowers, 1989).

Primary nursing was reported to be the predominant work type (93%) in both hospitals. 90% of the participants from the governmental hospital reported themselves to be primary nurses while about 97% of the participants from the military hospital considered themselves primary nurses.

More than half of all nurses reported good working relationships with other healthcare professionals when they were asked to evaluate the multi-professional co-operation between doctors, nurses, physiotherapists and others, as shown in Table 4.7. To compare the two hospitals, 60.2% of the participants from the governmental hospital reported that the work

between multiple health workers in the organization was fluent while 58% of the participants from the military hospital stated that the cooperation between multiple health staff in the hospital was fluent.

Table 4.6: Paediatric nurses' departments and positions

Variables	n	%	Gov. (n=103)	Military (n=78)
Children's outpatient department	6	3.3	6(5.8%)	None
Children's intensive care department	62	34.3	34(33%)	28(35.9%)
Children's medical department	53	29.3	33(32%)	20(25.6%)
Children's emergency department	33	18.2	19(18.4%)	14(17.9%)
Other	25	13.8	11(10.8%)	14(17.9%)
Missing answer	2	1.1	None	2(2.7%)
Are you:				
Charge nurse	15	8.3	7(6.8%)	8(10.3%)
Staff nurse 1[a]	85	47.0	64(62.1%)	21(26.9%)
Staff nurse 2[b]	81	44.8	32(31.1%)	49(62.8%)

a. Staff nurse 1 provides direct professional nursing care to patients. b. Staff nurse 2 provides only basic care for the patients and cannot administer medication.

Table 4.7: Work organization and co-operation of multi-professionals in both hospitals

Variables	n	%	Gov. (n=103)	Military (n=78)
Which of the following types of work organization are used in your unit?				
Task-oriented nursing[a]	3	1.7	2(1.9%)	1(1.3%)
Modular nursing[b]	3	1.7	3(2.9%)	None
Primary nursing[c]	169	93.4	93(90.3%)	76(97.4%)
Other	2	1.1	1(1%)	1(1.3%)
Missing answer	4	2.2	4(3.9%)	None
In your opinion, how fluent is multi-professional co-operation between doctors, nurses, physiotherapists etc. in your unit?				
Fluent	92	50.8	62(60.2%)	30(38.5%)
Moderate	82	45.3	37(35.9%)	45(57.7%)
Poor	6	3.3	3(2.9%)	3(3.8%)
Missing answer	1	0.6	1(1%)	None

a. Task-oriented nursing: each nurse on a ward takes responsibility for certain tasks, performing them for his/her patients and each nurse is linked with a senior nurse so s/he can learn how to complete particular tasks.
b. Modular nursing: combination of staff nursing and primary nursing because here professional and non-professionals are co-operatively taking care of the patients and each pair or trio of nursing personnel is responsible for the care of the patients in their case load from admission to discharge.
c. Primary nursing: method of nursing assignment, in which each nurse is given total responsibility for planning, evaluating, and executing nursing care for a small group of patients (4-6).

4.2.8 Pain management guidance

When the participants were asked about the availability of appointed nurses specialized in pain management in their departments, the majority (82%) reported that there were no such appointments. However, 77% did report having written pain management instructions for the nursing staff in respect of pain medication, 76% reported having written pain management instructions for the nursing staff in respect of other pain-relieving actions, 73% stated that there were written instructions available for the child concerning pain medication, and 73% had written instructions available for the child concerning other pain relieving actions in their departments (Table 4.8).

Only 34% of nurses reported having written instructions for parents in terms of children's pain management, and only 39% reported that there were written instructions available for parents concerning other pain relieving actions in the department (Table 4.8). Comparing the two hospitals, we can conclude that neither hospital has specialist nurses for pain management, 70.5% of the participants from the military hospital and 55.3% from the governmental hospital reported not having written instructions available for the parents concerning pain medication. Furthermore, more than half of the participants from both hospitals reported a lack of written instructions available for the parents concerning other pain relief methods.

From this it can be understood that both hospitals' managements are not as concerned with parental education in respect of pain management as they are with that of their staff nurses and patients. In terms of consulting others about the management of children's pain, 82% of the participants from both hospitals reported that they can consult others (Table 4.8), thereby indicating that primary nurses do have additional support in this respect.

Table 4.8: All nurses' responses regarding pain management guidance (n=181)

Statement	n	%	Gov.(n=103)	Military (n=78)
The unit has an appointed nurse specialized in pain management				
Yes	30	16.6	27(26.2%)	3(3.8%)
No	148	81.8	74(71.8%)	74(94.9%)
Missing answer	3	1.6	2(1.9%)	1(1.3%)
The unit has written pain management instructions for the nursing staff concerning pain medication				
Yes	140	77.3	85(82.5%)	55(70.5%)
No	38	21.0	16(15.5%)	22(28.2%)
Missing answer	3	1.7	2(1.9%)	1(1.3%)
The unit has written pain management instructions for the nursing staff concerning other pain relieving methods				
Yes	138	76.2	81(78.6%)	57(73.1%)
No	40	22.1	20(19.4%)	20(25.6%)
Missing answer	3	1.7	2(1.9%)	1(1.3%)
The unit has written instructions available for the child concerning pain medication				
Yes				
No	132	72.9	80(77.7%)	52(66.7%)
Missing answer	45	24.9	20(19.4%)	25(32.1%)
	4	2.2	3(2.9%)	1(1.3%)
The unit has written instructions available for the child concerning other pain relieving methods				
Yes				
No	133	73.5	79(76.7%)	54(69.2%)
Missing answer	42	23.2	21(20.4%)	21(26.9%)
	6	3.3	3(2.9%)	3(3.8%)
The unit has written instructions available for the parents concerning pain medication				
Yes				
No	61	33.7	40(38.8%)	21(26.9%)
Missing answer	112	61.9	57(55.3%)	55(70.5%)
	8	4.4	6(5.8)	2(2.6%)
The unit has written instructions available for the parents concerning other pain relieving methods				
Yes				
No	70	38.7	40(38.8)	30(38.5%)
Missing answer	101	55.8	56(54.4%)	45(57.7%)
	10	5.5	7(6.8%)	3(3.8%)
The nurse can consult others about the management of children's pain				
Yes	149	82.3	84(81.6%)	65(83.3%)
No	22	12.2	13(12.6%)	9(11.5%)
Missing answer	10	5.5	6(5.8%)	4(5.1%)

The following section presents the frequencies of paediatric nurses' application of various non-pharmacological pain management methods (preparatory information, guided imagery, distraction, and other non-pharmacological methods) for all the participants included in the study, followed by a comparison of the practice in each hospital.

4.2.9 Nurses' use of non-pharmacological methods in children's pain relief (n=181)

Preparatory information

In general, nurses in the two hospitals show good awareness of the need to prepare a child for the procedure s/he is scheduled for (Tables 4.9 and 4.10). Cognitive preparation, which can be defined as preparing patients by informing them about what will be done during their procedures, is 'always' given by 72% of the participants. Of the sample, 71% reported 'always' telling the patients about the location of the procedure, 71% reported 'always' informing their patients about the importance of the procedures, and 68% reported 'always' discussing with the child, the type of procedure and by whom it would be done. 77% reported 'always' taking their patients' ages and their developmental level into consideration when they prepared them for the procedures, and 77% stated that they provide more information for older children.

This data suggests either that paediatric nurses working in the governmental hospital are more willing to communicate and to provide preparatory information for their children, or there is greater encouragement and follow-up at management level in the hospital. Another reason could be that the nurses are receiving help when it comes to communicating with the patients, as the majority of the nurses are not Arabic speakers.

It is necessary to explore whether practices differ across the two hospitals. In order to do so using SPSS, I used 'data' to 'split file' to compare groups 'based on hospital types' i.e. governmental and military. Then, I carried out descriptive statistics to see the differences in

applying non-pharmacological methods to each hospital separately (Tables 4.11, 4.12, 4.14, 4.16, 4.18, 4.19 and 4.20).

To compare the two hospitals' use of preparatory information, Tables 4.11 and 4.12 present the number and percentage of paediatric nurses using each preparatory information method. Generally, we can conclude from the results in those two tables that paediatric nurses in both hospitals are providing information to children but when it comes to using books, instruction folders, videos or demonstrations to provide this information to children, the response rate from both hospitals was low compared to other preparatory information methods used. This indicates that the hospitals are not providing the necessary equipment (e.g. videos, books) in paediatric departments in order for the nurses to use them to help the children to understand what the nurses are saying. It is important to highlight here that the majority of paediatric nurses in both hospitals are non-Arabic speaking.

Table 4.9: Preparatory information provided to children (n=181)

Preparatory cognitive information	Seldom n (%)	Sometimes n (%)	Always n (%)	Missing n (%)
I prepare a child carefully for the procedure by telling him/her about what will be done	14 (7.7)	35 (19.3)	130 (71.8)	2 (1.2)
I discuss with the child what kind of procedure will be done	23 (12.7)	29 (16.0)	123 (68.0)	6 (3.3)
I discuss with the child where the procedure will be done	20 (11.0)	28 (15.5)	128 (70.7)	5 (2.8)
I discuss with the child by whom the procedure will be done	26 (14.4)	25 (13.8)	123 (68.0)	7 (3.8)
I discuss with the child why it is important to do the procedure	21 (11.6)	27 (14.9)	128 (70.7)	5 (2.8)
I discuss with the child how long the procedure will last	23 (12.7)	41 (22.7)	112 (61.9)	5 (2.7)
I discuss with the child pain medication after the procedure	31 (17.1)	43 (23.8)	101 (55.8)	6 (3.3)
I discuss with the child other methods of pain relief	36 (19.9)	49 (27.1)	81 (44.8)	15 (8.2)
I encourage the child to ask about misconceptions	51 (28.2)	60 (33.1)	56 (30.9)	14 (7.8)
When informing the patients, I use books/instruction folders	90 (49.7)	37 (20.4)	41 (22.7)	13 (7.2)
When informing the patients, I use videos	134 (74.0)	21 (11.6)	17 (9.4)	9 (5)
When informing the patients, I use demonstrations	72 (39.8)	48 (26.5)	54 (29.8)	7 (3.9)
When preparing the child for a procedure, I discuss with him/her the sensation before the procedure	43 (23.8)	47 (26.0)	86 (47.5)	5 (2.9)
When preparing the child for a procedure, I discuss with him/her the sensation during the procedure	40 (22.1)	43 (23.8)	93 (51.4)	5 (2.9)
When preparing the child for a procedure, I discuss with him/her the sensation after the procedure	36 (19.9)	45 (24.9)	97 (53.6)	3 (1.7)

Table 4.10: Preparatory information provided to children (n=181)

Preparatory sensory information	Seldom n (%)	Sometimes n (%)	Always n (%)	Missing n (%)
If I notice that the child is feeling fear/anxiety, I discuss that openly with him/her	33 (18.2)	42 (23.2)	102 (56.4)	4 (2.2)
I inform the child honestly and openly	32 (17.7)	41 (22.7)	104 (57.5)	4 (2.2)
I make sure that the child has understood the information	36 (19.9)	40 (22.1)	102 (56.4)	3 (1.7)
When I prepare the child for a procedure, I take into account his/her age and developmental level	12 (6.6)	25 (13.8)	140 (77.3)	4 (2.2)
I tell older children more about the procedure than younger children	11 (6.1)	26 (14.4)	141 (77.9)	3 (1.7)

Table 4.11: Preparatory information by hospital

Preparatory sensory information	Seldom n (%) Gov.(n=103) Military(n=78)	Sometimes n (%) Gov.(n=103) Military (n=78)	Always n (%) Gov.(n=103) Military (n=78)	Missing n (%) Gov.(n=103) Military (n=78)
I prepare a child carefully for the procedure by telling him/her about what will be done	4(3.9%) 10(12.8%)	21(20.4%) 14(17.9%)	77(74.8%) 53(67.9%)	1(1%) 1(1.3%)
I discuss with the child what kind of procedure will be done	13(12.6%) 10(12.8%)	14(13.6%) 15(19.2%)	73(70.9%) 50(64.1%)	3(2.9%) 3(3.8%)
I discuss with the child where the procedure will be done	10(9.7%) 10(12.8%)	18(17.5%) 10(12.8%)	72(69.9%) 56(71.8%)	3(2.9%) 2(2.6%)
I discuss with the child by whom the procedure will be done	13(12.6%) 13(16.7%)	11(10.7%) 14(17.9%)	76(73.8%) 47(60.3%)	3(2.9%) 4(5.1%)
I discuss with the child why it is important to do the procedure	12(11.7%) 9(11.5%)	11(10.7%) 16(20.5%)	77(74.8%) 51(65.4%)	3(2.9%) 2(2.6%)
I discuss with the child how long the procedure will last	12(11.7%) 11(14.1%)	18(17.5%) 23(29.5%)	70(68%) 42(53.8%)	3(2.9%) 2(2.6%)
I discuss with the child pain medication after the procedure	17(16.5%) 14(17.9%)	25(24.33%) 18(23.1%)	57(55.3%) 44(56.4%)	4(3.9%) 2(2.6%)
I discuss with the child other methods of pain relief	19(18.4%) 17(21.8%)	23(22.3%) 26(33.3%)	52(50.5%) 29(37.2)	9(8.7%) 6(7.7%
I encourage the child to ask about misconceptions	22(21.4%) 29(37.2%)	36(35%) 24(30.8%)	36(35%) 20(25.6%)	9(8.7%) 5(6.4%)
When informing the patients, I use books/instruction folders	39(37.9%) 51(65.4%)	28(27.2%) 9(11.5%)	30(29.1%) 11(14.1%)	6(5.8%) 7(9%)
When informing the patients, I use videos	74(71.8%) 60(76.9%)	14(13.6%) 7(9%)	10(9.7%) 7(9%)	5(4.9%) 4(5.1%)
When informing the patients, I use demonstrations	30(29.1%) 42(53.8%)	33(32%) 15(19.2%)	36(35%) 18(23.1%)	4(3.9%) 3(3.8%)

Table 4.12: Preparatory information by hospital

Preparatory sensory information	Seldom n (%) Gov.(n=103) Military (n=78)	Sometimesn (%) Gov.(n=103) Military (n=78)	Always n (%) Gov.(n=103) Military (n=78)	Missing n (%) Gov.(n=103) Military (n=78)
When preparing the child for a procedure, I discuss with him/her the sensation before the procedure	18(17.5%) 25(32.1%)	20(19.4%) 27(34.6%)	62(60.2%) 24(30.8%)	3(2.9%) 2(2.6%)
When preparing the child for a procedure, I discuss with him/her the sensation during the procedure	16(15.5%) 24(30.8%)	24(23.3%) 19(24.4%)	60(58.3%) 33(42.3%)	3(2.9%) 2(2.6%)
When preparing the child for a procedure, I discuss with him/her the sensation after the procedure	16(15.5%) 20(25.6%)	21(20.4%) 24(30.8%)	64(62.1%) 33(42.3%)	2(1.9%) 1(1.3%)
If I notice that the child is feeling fear/anxiety, I discuss that openly with him/her	12(11.7%) 21(26.9%)	24(23.3%) 18(23.1%)	65(63.1%) 37(47.4%)	2(1.9%) 2(2.6%)
I inform the child honestly and openly	14(13.6%) 18(23.1%)	16(15.5%) 25(32.1%)	71(68.9%) 33(42.3%)	2(1.9%) 2(2.6%)
I make sure that the child has understood the information	17(16.5%) 19(24.4%)	17(16.5) 23(29.5%)	67(65%) 35(44.9%)	2(1.9%) 1(1.3%)
When I prepare the child for a procedure, I take into account his/her age and developmental level	5(4.9%) 7(9%)	12(11.7%) 13(16.7%)	84(81.6%) 56(71.8%)	2(1.9%) 2(2.6%)
I tell older children more about the procedure than younger children	5(4.9%) 6(7.7%)	8(7.8%) 18(23.1%)	88(85.4%) 53(67.9%)	2(1.9%) 1(1.3%)

Guided imagery methods

Guided imagery is defined as a distraction method in which the child's attention is focused away from pain (Huth et al., 2004). Table 4.13 shows that 40% of nurses 'always' encourage the child to think positively during pain, 41% 'always' urge the child to think about a pleasant place, and 42% 'always' urge the child to think about his/her favourite activity. Trying to focus the child's thoughts and attention away from pain is 'always' done by 65% of

nurses. However, about one-quarter (27%) of the nurses reported ‘always’ encouraging the child to think about a nice trip.

In general, over 70% of the total participants use guided imagery as a non-pharmacological pain management method with the patients. This again reflects paediatric nurses’ willingness to communicate with their patients and try to focus their attention away from painful procedures. As well as showing nurses’ belief in the effectiveness of the imagery method in controlling the patients’ pain.

Comparing the two hospitals, almost half the participants from the governmental hospital encourage children to think about/imagine pleasant and positive matters when they feel pain after the procedure, while the highest percentage of participants from the military hospital ‘sometimes’ use this method. The highest response rate from both hospitals was that they ‘always’ urge children to think about a pleasant place. However, urging a child to think about a nice excursion/trip is applied ‘seldom’ by participants from both hospitals. More than half of the participants from the governmental hospital ‘always’ urge children to think about a favourite activity while this method is ‘sometimes’ applied by participants from the military hospital. More than 70% of the participants from the governmental hospital try to focus the children’s thoughts/attention away from pain and about 50% of the participants from the military hospital use the same method.

Table 4.13: Percentage of use of guided imagery methods as pain relief among all nurses (n=181)

Guided imagery methods	Seldom n (%)	Sometimes n (%)	Always n (%)	Missing n (%)
I encourage the child to think about/imagine pleasant and positive matters when she/he feels pain after the procedure	33 (18.2)	68 (37.6)	73 (40.3)	7 (3.9)
I urge the child to think about a pleasant place	41 (22.7)	43 (23.8)	74 (40.9)	23 (12.6)
I urge the child to think about a nice excursion/trip	71 (39.2)	31 (17.1)	48 (26.5)	31 (17.1)
I urge the child to think about a favourite activity	30 (16.6)	47 (26.0)	76 (42.0)	28 (15.4)
I try to focus the child's thoughts/attention away from pain	16 (8.8)	32 (17.7)	117 (64.6)	16 (8.9)

Table 4.14: Percentage of use of guided imagery methods as pain relief by hospital

Guided imagery methods	Seldom n (%) Gov.(n=103) Military (n=78)	Sometimes n (%) Gov.(n=103) Military (n=78)	Always n (%) Gov.(n=103) Military (n=78)	Missing n (%) Gov.(n=103) Military (n=78)
I encourage the child to think about/imagine pleasant and positive matters when she/he feels pain after the procedure	19(18.4%) 14(17.9%)	31(30.1%) 37(47.4%)	50(48.5%) 23(29.5%)	3(2.9%) 4(5.1%)
I urge the child to think about a pleasant place	21(20.4%) 20(25.6%)	22(21.4%) 21(26.9%)	47(45.6%) 27(34.6%)	13(12.6%) 10(12.8%)
I urge the child to think about a nice excursion/trip	39(37.9%) 32(41%)	17(16.5%) 14(17.9%)	31(30.1%) 17(21.8%)	16(15.5%) 15(19.2%)
I urge the child to think about a favourite activity	16(15.5%) 14(17.9%)	21(20.4%) 26(33.3%)	53(51.5%) 23(29.5%)	13(12.6%) 15(19.2)
I try to focus the child's thoughts/attention away from pain	5(4.9%) 11(14.1%)	16(15.5%) 16(20.5%)	76(73.8%) 41(52.6%)	6(5.8%) 10(12.8%)

Distraction methods

Table 4.15 shows that 60% of the participants reported that they 'always' use game-playing as a distraction method, and that 56.4% reported 'always' watching TV/videos as a distraction method. The lowest percentages are related to using hobby crafts to distract children, with only 22.7% of respondents saying that they 'always' use it. Listening to music

and using humour were reported as being 'always' used by 35% and 32% of nurses respectively.

The fact that more than half the participants reported using game-playing as a distraction method, might be accounted for by the availability of many play rooms for the patients in both hospitals. I observed during the quantitative data collection that both hospitals have many play rooms for the children. I also observed a social worker playing with the children in one of the play rooms (field notes).

Furthermore, a high percentage of participants allowed their patients' to watch TV/videos because the hospitals provides TVs in almost every patient room, and patients can borrow DVDs of cartoons from the play rooms (field notes).

Table 4.15: Percentage of use of distraction methods as pain relief among all users (n=181)

Distraction methods	**Seldom n (%)**	**Sometimes n (%)**	**Always n (%)**	**Missing n (%)**
Do you use books/magazines (as distraction)?	75 (41.4)	44 (24.3)	43(23.8)	19 (10.5)
Do you talk about the child's daily life (as distraction)?	49 (27.1)	50 (27.6)	63 (34.8)	19 (10.5)
Do you use playing games (as distraction)?	23 (12.7)	36 (19.9)	108 (59.7)	14 (7.7)
Do you use watching television/videos (as distraction)?	34 (18.8)	33 (18.2)	102 (56.4)	12 (6.6)
Do you use listening to music (as distraction)?	48 (26.5)	54 (29.8)	64 (35.4)	15 (8.3)
Do you use hobby crafts (as distraction)?	79 (43.6)	41 (22.7)	41 (22.7)	20 (11)
Do you use humour (as distraction)?	54 (29.8)	49 (27.1)	57 (31.5)	21 (11.6)

Table 4.16 presents the differences between the two hospitals regarding paediatric nurses application of different distraction methods. In both hospitals, the participants' response to using books, magazines or hobby crafts as distraction methods was low, reported as being used 'seldom'. This suggests that the hospitals do not provide the material needed for paediatric nurses to use with children. Allowing the children to play games and to watch TV or videos to distract children from pain is used 'always' by more than 50% of the participants

in each hospital and this shows that the hospitals are providing TVs and play rooms for the children. Furthermore, I observed during the quantitative data collection that there are many play rooms for children in each hospital and I noticed the availability of TVs for children but the TVs are not available in every patients' room (field notes).

Table 4.16: Percentage of use of distraction methods as pain relief by hospital

Distraction methods	Seldom n (%) Gov.(n=103) Military (n=78)	Sometimes n (%) Gov.(n=103) Military (n=78)	Always n (%) Gov. (n=103) Military (n=78)	Missing n (%) Gov. (n=103) Military (n=78)
Do you use books/magazines (as distraction)?	39(37.9%) 36(46.2%)	28(27.2%) 16(20.5%)	26(25.2%) 17(21.8%)	10(9.7%) 9(11.5%)
Do you talk about the child's daily life (as distraction)?	28(27.2%) 21(26.9%)	21(20.4%) 29(37.2%)	45(43.7) 18(23.1%)	9(8.7%) 10(12.8%)
Do you use playing games (as distraction)?	10(9.7%) 13(16.7%)	20(19.4%) 16(20.5%)	67(65%) 41(52.6%)	6(5.8%) 8(10.3%)
Do you use watching television/videos (as distraction)?	16(15.5%) 18(23.1%)	20(19.4%) 13(16.7%)	63(61.2%) 39(50%)	4(3.9) 8(10.3%)
Do you use listening to music (as distraction)?	22(21.4%) 26(33.3%)	35(34%) 19(24.4%)	39(37.9%) 25(32.1%)	7(6.8%) 8(10.3%)
Do you use hobby crafts (as distraction)?	38(36.9%) 41(52.6%)	25(24.3%) 16(20.5%)	29(28.2%) 12(15.4%)	11(10.7%) 9(11.5%)
Do you use humour (as distraction)?	24(23.3%) 30(38.5%)	34(33%) 15(19.2%)	33(32%) 24(30.8%)	12(11.7%) 9(11.5%)

Other non-pharmacological methods

More than half of the respondents said that they 'always' encourage children to relax different parts of their bodies in order to alleviate the sensation of pain (Table 4.17). 66% claimed that they 'always' teach their patients breathing techniques, and 70% said that they 'always' encourage children verbally.

About three-quarters of the nurses (75.1%) claimed that they 'always' use positioning as a non-pharmacological method, 72% claimed to help the children with their daily activities when they had pain after procedures, and 64.6% reported 'always' spending time with children when they were experiencing pain. 85% of participants reported 'always' providing the child with the opportunity to rest by minimizing the noise. 83% reported that they 'always' comfort and reassure a child in pain, 79% stated that they 'always' provide a

suitable room temperature and good air conditioning for the patients, and 78% reported 'always' alleviating the children's post-procedure pain by making the environment comfortable and touching the children as a method of pain relief. 70% of nurses claimed that they 'seldom' use transcutaneous electrical nerve stimulation (TENS) as a pain-relieving method.

The percentage of nurses giving patients material rewards is lower than other non-pharmacological methods; 33% reporting 'always' and 30% 'sometimes'. Massaging patients to relieve their pain was reported to 'always' be used by 45% of the respondents, a further 35% said they 'sometimes' use massage, and less than 17% reported 'seldom' doing it. The participants' responses reflect the fact that paediatric nurses are using such methods but not as much as they use other techniques. It may be that massaging is used according to the patients' needs and the nurses' time, and that is reflected in the 45% of nurses reporting 'always' and 35% 'sometimes' massaging their patients. Furthermore, the fact that massaging a patient can be time-consuming, might be a reason for not applying this type of non-pharmacological method as frequently as other methods that are more passive for the nurse, such as allowing the patient to watch TV or to play.

Table 4.18 presents the differences between the applications of other non-pharmacological pain management methods in each hospital. Generally, it can be concluded that more than half of paediatric nurses in each hospital 'always' apply the techniques of relaxation; breathing technique; verbal rewarding; positioning; presence; comfort and reassurance; touching; helping the child with daily activities; providing a comfortable environment, room temperature and minimal noise; and encouraging the child's parents to bring to the ward some of the child's own belongings. The percentage 'always' using those methods is higher for paediatric nurses working in the governmental hospital, being 70 to 91% of the nurses. Some of the other non-pharmacological methods were reported to be less used, such as

material reward; hot and cold application; massage; paying attention to the interior decoration of the ward; and asking the child to suggest ways to relieve his/her pain in the ward. Even though all of these methods are less used by paediatric nurses, again they are used more by nurses working in the governmental hospital, except using cold application which is a little higher for nurses in the military hospital. Finally, TENS was reported to be ‘seldom’ used by three quarters of paediatric nurses in both hospitals.

Table 4.17: Percentage of use of other non-pharmacological methods as pain relief among all nurses (n=181).

Non-pharmacological methods	Seldom n (%)	Sometimes n (%)	Always n (%)	Missing n (%)
I encourage the child to relax different parts of his/her body to alleviate the sensation of pain	27 (14.9)	44 (24.3)	103 (56.9)	7 (3.9)
I teach the child the correct breathing technique to alleviate his/her pain	20 (11.0)	36 (19.9)	119 (65.7)	6 (3.3)
I encourage the child by rewarding her/him verbally	13 (7.2)	34 (18.8)	127 (70.2)	7 (3.9)
I give the child a material reward	61 (33.7)	54 (29.8)	59 (32.6)	7 (3.9)
I reward the child in some other way	40 (22.1)	17 (9.4)	36 (19.9)	88(48.6)
I use cold application to relieve the child's pain	50 (27.6)	61 (33.7)	61 (33.7)	9 (5)
I use heat application to relieve the child's pain	51 (28.2)	64 (35.4)	55 (30.4)	11 (6.1)
I massage the child to relieve his/her pain	30 (16.6)	64 (35.4)	81 (44.8)	6 (3.3)
I alleviate the child's post-procedure pain by positioning	9 (5.0)	30 (16.6)	136 (75.1)	6 (3.3)
I use the TENS technique to relieve the child's post procedure pain	127 (70.2)	22 (12.2)	18 (9.9)	14 (7.8)
I spend time with the child when she/he feels pain	14 (7.7)	43 (23.8)	117 (64.6)	7 (3.9)
I comfort and reassure the child (e.g. speak to him/her in a calm voice or tell him/her that everything will be right)	6 (3.3)	18 (9.9)	150 (82.9)	7 (3.9)
I use touching as a method of pain relief (e.g. stroke the child's head, hold his/her hand)	7 (3.9)	25 (13.8)	141 (77.9)	8 (4.5)
I help the child with daily activities when she/he has pain after the procedure	11 (6.1)	33 (18.2)	130 (71.8)	7 (3.9)
I try to alleviate the child's post procedure pain by making the environment comfortable for him/her	3 (1.7)	29 (16.0)	141 (77.9)	8 (4.5)
I provide a suitable room temperature and good air conditioning	6 (3.3)	22 (12.2)	143 (79.0)	10 (5.6)
I provide the child with an opportunity to rest by minimizing noise	2 (1.1)	17 (9.4)	154 (85.1)	8 (4.4)
I encourage the child's parents to bring to the ward some of the child's own belongings	18 (9.9)	39 (21.5)	114 (63.0)	10 (5.6)
I pay attention to the interior decoration of the ward	47 (26.0)	57 (31.5)	66 (36.5)	11 (6.1)
I ask the child to suggest ways to relieve his/her pain in the ward	46 (25.4)	51 (28.2)	73 (40.3)	11 (6.1)

Table 4.18: Percentage of use of other non-pharmacological methods as pain relief by hospital

Non-pharmacological methods	Seldom n (%) Gov. (n=103) Military (n=78)	Sometimes n (%) Gov. (n=103) Military (n=78)	Always n (%) Gov. (n=103) Military (n=78)	Missing n (%) Gov. (n=103) Military (n=78)
I encourage the child to relax different parts of his/her body to alleviate the sensation of pain	16(15.5%) 11(14.1%)	24(23.3%) 20(25.6%)	60(58.3) 43(55.1%)	3(2.9%) 4(5.1%)
I teach the child the correct breathing technique to alleviate his/her pain	12(11.7%) 8(10.3%)	17(16.5%) 19(24.4%)	72(69.9%) 47(60.3%)	2(1.9%) 4(5.1%)
I encourage the child by rewarding her/him verbally	3(2.9%) 10(12.8%)	12(11.7%) 22(28.2%)	85(82.5) 42(53.8%)	3(2.9%) 4(5.1%)
I give the child a material reward	27(26.2%) 34(43.6%)	34(33%) 20(25.6%)	40(38.8%) 19(24.4%)	2(1.9%) 5(6.4%)
I reward the child in some other way	20(25.6%) 20(25.6%)	11(10.7%) 6(7.7%)	28(27.2%) 8(10.3%)	44(42.7%) 44(56.4%)
I use cold application to relieve the child's pain	39(37.9%) 11(14.1%)	29(28.2%) 32(41%)	31(30.1%) 30(38.5%)	4(3.8%) 5(6.4%)
I use heat application to relieve the child's pain	38(36.9%) 13(16.7%)	29(28.2%) 35(44.9%)	32(31.1%) 23(29.5%)	4(3.9%) 7(9%)
I massage the child to relieve his/her pain	14(13.6%) 16(20.5%)	33(32%) 31(39.7%)	54(52.4%) 27(34.6%)	2(1.9%) 4(5.1%)
I alleviate the child's post-procedure pain by positioning	5(4.9%) 4(5.1%)	16(15.5%) 14(17.9%)	80(77.7%) 56(71.8%)	2(1.9%) 4(5.1%)
I use the TENS technique to relieve the child's post procedure pain	75(72.8) 52(66.7%)	10(9.7%) 12(15.4%)	12(11.7%) 6(7.7%)	6(5.8%) 8(10.3%)
I spend time with the child when she/he feels pain	6(5.8%) 8(10.3%)	17(16.5%) 26(33.3%)	78(75.7%) 39(50%)	2(1.9%) 5(6.4%)
I comfort and reassure the child (e.g. speak to him/her in a calm voice or tell him/her that everything will be right)	2(1.9%) 4(5.1%)	5(4.9%) 13(16.7%)	94(91.3%) 56(71.8%)	2(1.9%) 5(6.4%)
I use touching as a method of pain relief (e.g. stroke the child's head, hold his/her hand)	4(3.9%) 3(3.8%)	10(9.7%) 15(19.2%)	86(83.5%) 55(70.5%)	3(2.9%) 5(6.4%)
I help the child with daily activities when she/he has pain after the procedure	7(6.8%) 4(5.1%)	10(9.7%) 23(29.5%)	84(81.6%) 46(59%)	2(1.9%) 5(6.4%)
I try to alleviate the child's post procedure pain by making the environment comfortable for him/her	2(1.9%) 1(1.3%)	10(9.7%) 19(24.4%)	88(85.4%) 53(67.9%)	3(2.9%) 5(6.4%)
I provide a suitable room temperature and good air conditioning	2(1.9%) 4(5.1%)	13(12.6%) 9(11.5%)	83(80.6%) 60(76.9%)	5(4.9%) 5(6.4%)
I provide the child with an opportunity to rest by minimizing noise	1(1%) 1(1.3%)	7(6.8%) 10(12.8%)	91(88.3%) 63(80.8%)	4(3.9%) 4(5.1%)
I encourage the child's parents to bring to the ward some of the child's own belongings	8(7.8%) 10(12.8%)	18(17.5%) 21(26.9%)	73(70.9%) 41(52.6%)	4(3.9%) 6(7.7%)
I pay attention to the interior decoration of the ward	25(24.3%) 22(28.2%)	27(26.2%) 30(38.5%)	47(45.6%) 19(24.4%)	4(3.9%) 7(9%)
I ask the child to suggest ways to relieve his/her pain in the ward	24(23.3%) 22(28.2%)	22(21.4%) 29(37.2%)	51(49.5%) 22(28.2%)	6(5.8%) 5(6.4%)

The last section of the questionnaire included twenty nine questions about the application of parental guidance. Tables 4.19 and 4.20 present the differences between paediatric nurses'

use of those methods in the governmental hospital and the military hospital. Generally, applying parental guidance is used by paediatric nurses in both hospitals, but it is used more by paediatric nurses working in the governmental hospital. Again, TENS is ‘seldom’ used by participants from both hospitals. This indicates that this technique is either not authorized to be used in the hospital or nurses might not have enough knowledge of the method.

Table 4.19: Percentage of use of parental guidance by hospital

Parental guidance method	**Seldom** n (%) Gov.(n=103) Military (n=78)	**Sometimes** n (%) Gov.(n=103) Military (n=78)	**Always** n (%) Gov.(n=103) Military (n=78)	**Missing** n (%) Gov.(n=103) Military (n=78)
I prepare the parent by telling them what kind of procedure will be done?	5(4.9%) 5(6.4%)	2(1.9%) 11(14.1%)	92(89.3%) 60(76.9%)	4(3.9%) 2(2.6%)
I prepare the parent by telling them where the procedure will be done?	1(1%) 9(11.5%)	5(4.9%) 7(9%)	93(90.3%) 60(76.9%)	4(3.9%) 2(2.6%)
I prepare the parent by telling them by whom the procedure will be done?	2(1.9%) 9(11.5%)	7(6.8%) 10(12.8%)	90(87.4) 56(71.8%)	4(3.9) 3(3.8%)
I prepare the parent by telling them why is it important to do the procedure?	6(5.8%) 10(12.8%)	4(3.9%) 10(12.8%)	89(86.4) 55(70.5%)	4(3.9%) 3(3.8%)
I prepare the parent by telling them how long the procedure will last?	5(4.9%) 10(12.8%)	10(9.7%) 10(12.8%)	81(78.6%) 55(70.5%)	7(6.8%) 3(3.8%)
I prepare the parent by telling them about the preparations for the procedure (abstaining from food, premedication etc.)	1(1%) 3(3.8%)	3(2.9%) 2(2.6%)	92(89.3%) 69(88.5%)	7(6.8%) 4(5.1%)
I prepare the parent by telling them post procedure limitations (e.g. what things can/cannot be done by the child)	1(1%) 3(3.8%)	5(4.9%) 2(2.6%)	92(89.3%) 70(89.7%)	5(4.9%) 3(3.8%)
I prepare the parent by telling them about other methods of pain relief	4(3.9%) 10(12.8%)	10(9.7%) 12(15.4%)	76(73.8%) 50(64.1%)	13(12.6%) 6(7.7%)
If I notice that the parents are feeling fear/anxiety, I discuss that openly with them	6(5.8%) 8(10.3%)	18(17.5%) 27(34.6%)	76(73.8%) 40(51.3%)	3(2.9%) 3(3.8%)
I discuss with the parents in advance the child's possible sensation during the procedure	7(6.8%) 9(11.5%)	18(17.5%) 25(32.1%)	75(72.8%) 42(53.8%)	3(2.9%) 2(2.6%)
I discuss with the parents in advance the child's possible sensation after the procedure	4(3.9%) 7(9%)	16(15.5%) 24(30.8%)	80(77.7%) 45(57.7%)	3(2.9%) 2(2.6%)
If I notice that the parents are feeling fear/anxiety, I discuss that openly with them	5(4.9%) 5(6.4%)	19(18.4%) 22(28.2%)	76(73.8%) 49(62.8%)	3(2.9%) 2(2.6%)
I involve the parents in the child's pain management	4(3.9%) 7(9%)	9(8.7%) 15(19.2%)	85(82.5%) 54(69.2%)	5(4.9%) 2(2.6%)
I teach the parents ways to relieve their child's pain after the procedure	4(3.9%) 8(10.3%)	10(9.7%) 15(19.2%)	86(83.5%) 53(67.9%)	2(1.9%) 2(2.6%)

Table 4.20: Percentage of use of parental guidance by hospital

Parental guidance method	**Seldom n (%)** **Gov.(n=103)** **Military (n=78)**	**Sometimes n (%)** **Gov. (n=103)** **Military (n=78)**	**Always n (%)** **Gov. (n=103)** **Military (n=78)**	**Missing n (%)** **Gov. (n=103)** **Military (n=78)**
I ask the child to think about/imagine pleasant and positive things	14(13.6%) 18(23.1%)	26(25.2%) 25(32.1%)	57(55.3%) 30(38.5%)	6(5.8%) 5(6.4%)
I distract the child's thoughts away from pain (by arranging some meaningful activities)	9(8.7%) 10(12.8%)	19(18.4%) 24(30.8%)	67(65%) 39(50%)	8(7.8%) 5(6.4%)
I encourage the child to relax different parts of his/her body	11(10.7%) 6(7.7%)	15(14.6%) 22(28.2%)	69(67%) 45(57.7%)	8(7.8%) 5(6.4%)
I encourage the child to breathe deeply and slowly	3(2.9%) 4(5.1%)	14(13.6%) 15(19.2%)	80(77.7%) 54(69.2%)	6(5.8%) 5(6.4%)
I give the child positive reinforcement after the procedure (reward verbally/ by giving a material reward)	8(7.8%) 9(11.5%)	26(25.2%) 25(32.1%)	64(62.1%) 39(50%)	5(4.9%) 5(6.4%)
I use cold or heat application	27(26.2%) 9(11.5%)	27(26.2%) 32(41%)	44(42.7%) 33(42.3%)	5(4.9%) 4(5.1%)
I massage the child	12(11.7%) 6(7.7%)	25(24.3%) 30(38.5%)	61(59.2%) 37(47.4%)	5(4.9%) 5(6.4%)
I position the child comfortably	1(1%) None	10(9.7%) 9(11.5%)	88(85.4%) 64(82.1%)	4(3.9%) 5(6.4%)
I give the child TENS treatment (transcutaneous nerve stimulation)	57(55.3%) 49(62.8%)	21(20.4%) 10(12.8%)	19(18.4%) 11(14.1%)	6(5.8%) 8(10.3%)
I spend time with the child	4(3.9%) 3(3.8%)	16(15.5%) 20(25.6%)	78(75.7%) 49(62.8%)	5(4.9%) 6(7.7%)
I comfort/reassure the child	1(1%) 2(2.6%)	8(7.8%) 12(15.4%)	90(87.4%) 60(76.9%)	4(3.9%) 4(5.1%)
I use touching as a way to alleviate pain	2(1.9%) 2(2.6%)	9(8.7%) 15(19.2%)	89(86.4) 55(70.5%)	3(2.9%) 6(7.7%)
I help the child with daily activities (basic care)	7(6.8%) 2(2.6%)	9(8.7%) 15(19.2%)	82(79.6%) 56(71.8%)	5(4.9%) 5(6.4%
I arrange a comfortable environment for the child (e.g. by bringing the child's own belongings)	3(2.9%) 7(9%)	16(15.5%) 16(20.5%)	79(76.7%) 50(64.1%)	4(3.9%) 5(6.4%)
I guide the parents in matters related to pain medication	4(3.9%) 6(7.7%)	13(12.6%) 18(23.1%)	82(79.6%) 50(64.1%)	4(3.9%) 4(5.1%)

From the tables (4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19 and 4.20) we can conclude that there is a social desirability response bias because a high percentage of the responses are 'sometimes' and an even higher percentage reported 'always' using the majority of the non-pharmacological pain management methods. This is discussed in detail in the discussion chapter.

After determining what type of non-pharmacological pain management methods are used by the paediatric nurses, it is worth doing further analysis to identify if there are any relationships between nurses' characteristics and their use of different types of non-pharmacological methods to control children's pain during medical procedures.

I discussed, with a senior statistician, the idea of carrying out univariate analysis for each of the dependent variables. His advice was that given the number of tests it is almost inevitable that it would produce significant findings if only by chance. His advice was not to go ahead with univariate analysis.

4.2.10 Residual Analysis

Residual analysis is performed to check the normality, constant variance and zero mean of the residuals extracted from each regression model as follows. Linearity assumed in each model is also checked as the same time (Appendix 9).

Histograms and the normal probability plots indicate minor deviations from the normal distribution of the residuals in all models, however, it would not be an issue for the underlying tests in parameters due to the large sample size of 181. T-tests for zero mean clearly justify the zero mean of residuals due to p-values which are almost one in all models. Scatter plots of residuals against fitted values do not indicate evidence for deviations from the constant variance assumption or linearity in any of the regression models. Overall, it can be stated that the estimates in each regression do not suffer from any biases due to invalidity of assumptions.

4.3 Multiple linear regression

Pollki et al.'s (2001) study applies a chi-squared test to sum the variables that correlate with each other and uses nonparametric Kruskall-Wallis ANOVA to assess the statistical significance of differences between the groups. They use a chi-squared test to assess whether there is any relationship between the participants' background factors and non-

pharmacological pain management methods. For the current study, I decided to apply multiple linear regression analysis which help to assess if there is any relationship between the background factors and the use of non-pharmacological methods. The reason for this choice was that a chi-squared test can test if there is a relationship between two variables (bivariate relationships between two categorical variables) and the result will only show if the relationship exists but not the type of relationship. Furthermore, Kruskall-Wallis ANOVA is a nonparametric test and it can be used to test for only one categorical variable at a time. The difference is that Kruskall-Wallis ANOVA takes a numerical dependent variable while a chi-squared test considers a categorical dependent.

Multiple linear regression can measure the effect and the size of the effect of the independent variables on a dependent variable. After calculating the mean values for each type of non-pharmacological method (preparatory information, distraction, guided imagery, other non-pharmacological methods and parental guidance) I used the mean of each of those methods and tested the existence, and size, of the effect for all the independent variables (age, gender, nationality, having children, having experience of their children being hospitalized, nursing field, level of education, years of experience, nursing position, and hospital type). For example, by using multiple linear regression, I can test if there are any relationships between nursing level of education and using distraction. Specifically, I can know at which levels of education nurses apply these methods more or less than at other levels, unlike with the chi-squared test and Kruskall-Wallis ANOVA (George and Mallery, 2003).

The adjusted R squared for each non-pharmacological method is as follows; preparatory information: 15.2%, guided imagery: 11.2%, distraction: 26.5%, other non-pharmacological methods: 13% and parental guidance: 10.9%. Adjusted R squared determines the ratio of the difference in the dependent variable caused by the explanatory variables. It is important to highlight that those outcomes are modest, meaning that there might be other factors that

affect using non-pharmacological pain management methods. For example; from the adjusted R squared presented in Table 4.21 we can report that 15.2% variation of the dependent variables is explained by the independent variable. This indicates that hospital type, education level and nurses' age affected the paediatric nurses in applying preparatory information by 15.2% only, which indicates that there are other factors affecting paediatric nurses applying preparatory information.

Furthermore, the beta results show that the paediatric nurses in the governmental hospital are more likely to apply preparatory information than paediatric nurses in the military hospital. Paediatric nurses holding a diploma in nursing are more likely to apply preparatory information than paediatric nurses holding a bachelor's degree in nursing. Moreover, older paediatric nurses (aged 51-60) are more likely to use preparatory information with their patients than nurses from lower age groups.

Table 4.21: Preparatory information

R	R Squared	Adjusted R Squared	F	Sig
0.426	0.181	0.152	5.701	0.001

The regular model is fitted with a dependent variable (preparatory information) and nurses background as independent variable. The step wise selecting method filters hospital type (Gov.), level of education (BSc) and age (51-60 years old).

Table 4.22: Preparatory information and nurses backgrounds

Independent variables	B	Beta	T	Sig
(Constant)	3.475	---	15.962	0.000
Hospital type (Gov.)	0.592	0.334	3.122	0.002
Education level (BSc)	-0.444	-0.237	-2.325	0.023
Age 51-60 years	0.501	0.224	2.107	0.038

From Table 4.23 we can conclude that 11.2% variation in the dependent variables is explained by the independent variables. Furthermore, paediatric nurses holding bachelor's degrees in nursing are less likely to use guided imagery compared to paediatric nurses holding a diploma in nursing.

Table 4.23: Guided imagery

R	R Squared	Adjusted R Squared	F	Sig
0.350	0.122	0.112	11.832	0.001

The regular model is fitted with a dependent variable (Guided imagery) and nurses background as an independent variable. The step wise selecting method filters level of education (BSc).

Table 4.24: Guided imagery and nurses background

Independent variables	B	Beta	T	Sig
(Constant)	3.956	---	20.117	0.000
Education level (BSc)	-0.814	-0.350	-3.440	0.001

The adjusted R squared (Table 4.25) shows that 26.5% of variation in the dependent variables is explained by the independent variables. It can be concluded that paediatric nurses holding bachelor's degrees in nursing are less likely to apply distraction methods compared to nurses holding diplomas. Furthermore, paediatric nurses in emergency departments are less likely to apply distraction methods than paediatric nurses in outpatients departments, ICUs, medical and other departments. Paediatric nurses from the age of 51-60 are more likely to apply distraction methods than paediatric nurses from other lower age groups. Paediatric nurses in the governmental hospital are more likely to apply distraction methods than paediatric nurses working in the military hospital. Finally, staff nurses 1 are less likely to apply distraction methods than other nurses (staff nurses 2, charge nurses).

Table 4.25: Distraction

R	R Squared	Adjusted R Squared	F	Sig
0.556	0.309	0.265	6.987	0.000

The regular model is fitted with a dependent variable (distraction) and nurses background as an independent variable. The step wise selecting method filters hospital type (Gov.), level of education (BSc), age (51-60 years old), nursing field (ER) and nursing position (staff nurse 1).

Table 4.26: Table 4.26: Distraction and nurses' background

Independent variables	B	Beta	T	Sig
(Constant)	3.465	---	12.306	0.000
Education level (BSc)	-0.737	-0.322	-3.303	0.001
Nursing field (emergency)	-0.620	-0.250	-2.610	0.011
Age 51-60 years	0.860	0.294	2.947	0.004
Hospital type (**Gov.**)	0.709	0.323	3.114	0.003
Nursing position (staff nurse 1)	-0.445	-0.204	-2.030	0.046

Table 4.27 shows that 13% of variation in the dependent variables is explained by the independent variables, meaning that paediatric nurses working in the emergency department are less likely to apply other non-pharmacological methods than paediatric nurses working in outpatients departments, ICUs, medical and other departments. Furthermore, paediatric nurses working in the governmental hospital are more likely to apply other non-pharmacological pain management than nurses working in the military hospital.

Table 4.27: Other non-pharmacological methods

R	R Squared	Adjusted R Squared	F	Sig
0.388	0.150	0.130	7.427	0.001

The regular model is fitted with a dependent variable (other non-pharmacological methods) and nurses background as an independent variable. The step wise selecting method filters hospital type (Gov.) and nursing field (ER).

Table 4.28: Other non-pharmacological methods and nurses' background

Independent variables	B	Beta	T	Sig
(Constant)	3.596	---	28.601	0.000
Nursing field (emergency)	-0.575	-0.334	-3.317	0.001
Hospital (**Gov.**)	0.327	0.215	2.137	0.036

Table 4.29 shows that 10.9% of variance in the dependent variables is explained by the independent variables. Working in an emergency department (ER) is a significant barrier to the use of parental guidance. Furthermore, working in the governmental hospital is a significant predictor of the use of parental guidance.

Histograms of all residual series were found to be symmetrically distributed, supporting the normality assumptions. The histograms present the sample data's shape, which means that we can identify from the histogram if the data was normally distributed.

Table 4.29: Parental guidance

R	R Squared	Adjusted R Squared	F	Sig
0.361	0.130	0.109	6.222	0.003

The regular model is fitted with a dependent variable (parental guidance) and nurses background as an independent variable. The step wise selecting method filters hospital type (Gov.) and nursing field (ER).

Table 4.30: Parental guidance and nurses' background

Independent variables	B	Beta	T	Sig
(Constant)	3.970	---	33.922	0.000
Nursing field (emergency)	-0.461	-0.292	-2.852	0.005
Hospital type (**Gov.**)	0.320	0.230	2.241	0.028

In summary, the previous results indicate that there are significant independent variables affecting the paediatric nurses' application of non-pharmacological pain management. Figure 4.1 summarizes those variables in relation to applying specific non-pharmacological pain management methods.

The governmental hospital is a (positive) significant factor in the paediatric nurses' use of most of the non-pharmacological methods; preparatory information, distraction, other non-pharmacological methods and parental guidance. For paediatric nurses, being 51-60 years old is a (positive) significant factor in using preparatory information and distraction.

Having a BSc is a (negative) significant factor in the paediatric nurses' use of preparatory information, guided imagery, and distraction. In other words, paediatric nurses holding a diploma apply those methods significantly more than nurses holding bachelor's degrees.

As for the nursing field (specialty), ER is a (negative) significant factor in the paediatric nurses' use of distraction, other non-pharmacological methods, and parental guidance. In

other words, paediatric nurses in ER reported apply these techniques significantly less than paediatric nurses in outpatient departments, ICUs, medical and other departments.

Nursing position (SN1) is a (negative) significant factor in the paediatric nurses use of distraction. In other words, staff nurses 1 reported applying distraction methods significantly less frequently than other nurses.

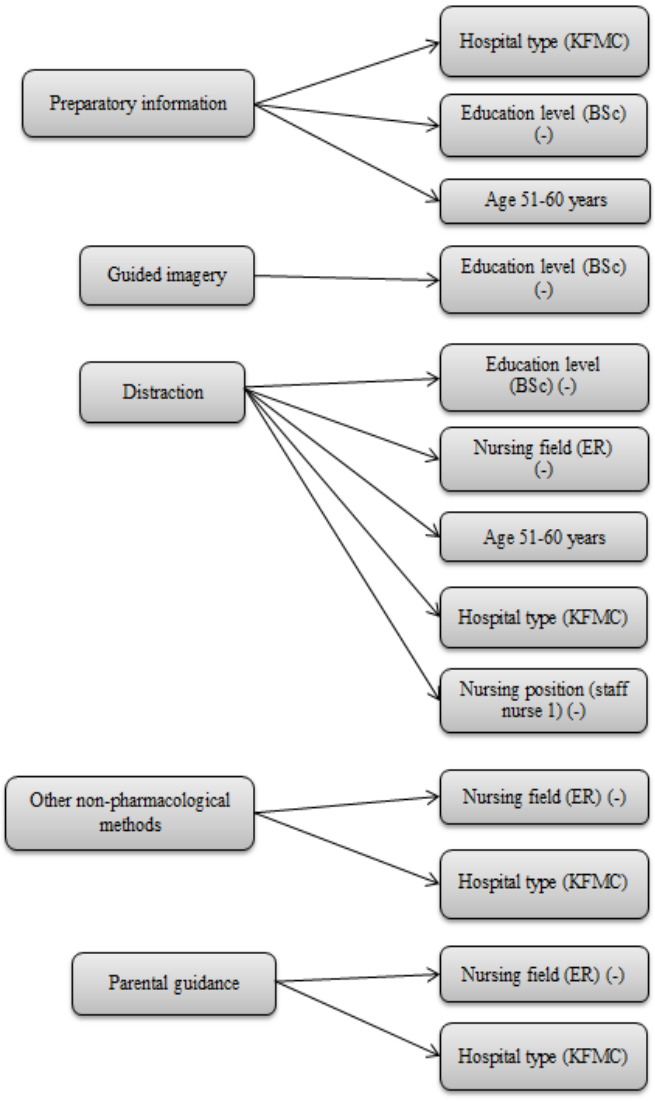

Figure 4.1: Summary of the significant quantitative results (multiple linear regression).

At the end of the questionnaires there were five open-ended questions as follows:

1- What other non-pharmacological therapies do you use to relive children's procedural pain in your work place?

2- What advantages do you perceive when using non-pharmacological methods in your daily nursing practice?

3- What disadvantages do you perceive when using non-pharmacological methods in your daily nursing practice?

4- What would help you to use non-pharmacological methods in your daily nursing practice?

5- What barriers prevent you from using non-pharmacological methods in your daily nursing practice?

The presented answers to those questions are summarized as follows;

- **Other non-pharmacological therapies**

Almost all the answers provided that relate to the non-pharmacological methods used by nurses are repetitive from the close ended questions. Most of the answers include play therapy, distraction, positioning, heat and cold compress, breathing exercise, relaxation and providing a comfortable environment. The following table presents the non-pharmacological methods used by paediatric nurses, according to hospital.

Table 4.31: Types of non-pharmacological methods used by paediatric nurses

Non-pharmacological type	Governmental	Military
Relational	Communication Talk to the child Rewarding /reassurance/encouraging Touch Presence of nurse/family Smile to the child Eye contact Privacy Rewarding	Preparatory information Presence of nurse/family reassurance Touch
Physical	Massage Positioning Food Heat/cold application	Heat/cold application Positioning Breathing exercise Sleep Minimal handling Relaxation Drawing/colouring
Environmental	Provide comfortable environment Music TV/toys/play room	Provide comfortable environment Music TV/toys/video

- **Advantages of using non-pharmacological methods**

Most of the nurses' answers focused on preventing medication side effects and addiction to medication and narcotics. Some nurses stated that using those methods is an independent nursing role where they do not need to wait for physicians' orders. Furthermore, applying non-pharmacological methods decreases the expense. Additionally, nurses stated that using non-pharmacological methods is a way to build a relationship with the child and gain their trust. The following table summarizes the participants' answers, according to hospital.

Table 4.32: Advantages of using non-pharmacological methods

	Governmental	Military
Advantages to use non-pharmacological methods	• Avoid pharmacological methods/side effects • No side effects • Build trusting relationship with the child and families • Easy to use • Accessible • Reduce the child pain/anxiety • Parents can be involved • Procedures can be done easier and faster • Provide child relaxation • Give children since of controlling pain • Support child and families	• Avid pharmacological methods/side effects • Easy to use • Accessible • No side effects • Control procedure pain/anxiety • Control child stress • Cost effective • Parents can be involved • Build trusting relationship with the child and families • Child relaxation • Can be used at home • No need for physicians orders • Improve the child blood circulation

- **Disadvantages of using non-pharmacological methods**

The participants answer's focus on the effort and time consumed. Moreover, many nurses reported that these methods need time to take action in controlling the child's pain. They cannot be used with every child and can only be used according to the child's age and condition. The following table summarizes the participants' answers, according to hospital.

Table 4.33: Disadvantages to the use of non-pharmacological methods

	Governmental	Military
Disadvantages to use non-pharmacological methods	• Does not always work with every child • Time consuming • Less active comparing to pharmacological methods • The action is slow • Cannot be implemented if the child or parents are not cooperative	• Can cause anxiety/trauma to the child • Time consuming • Cannot be implemented if the child or parents are not involved/cooperative • The action is slow • Can cause injuries from playing materials

- **Facilitators of the use of non-pharmacological methods**

Good communication with the child as well as having their trust; child and family cooperation; availability of material such as video, TVs and reading materials; having education and training about non-pharmacological pain management methods; the availability of clear policy; and support from physicians and other staff are all seen as facilitators of non-pharmacological pain management methods. The following table summarizes the participants' answers, according to hospital.

Table 4.34: Facilitators of the use of non-pharmacological methods

	Governmental	Military
Facilitators to use non-pharmacological methods	• Education/training • Family presence and participation • Have time/less nurse to patients ratio • Have the resources (e.g. TV, play room) • Availability of pain assessment tools • Clear guidelines/policy • Physicians support in providing family education • Ability and willingness of children	• Education/training • Family presence and participation • Availability of pain assessment tools • Have the resources (e.g. TV, play room) • Having trust relationship with the child • To have pain management nurse • To have time

- **Barriers to use non-pharmacological methods**

Lack of communication with children and families; language and cultural barriers; a lack of family support and participation in the child care; a lack of time and a heavy work-load; the children's age and condition; and a lack of equipment such as TVs and play rooms are all barriers to paediatric nurses' use of non-pharmacological pain management methods. The following table summarizes the participants' answers, according to hospital.

Table 4.35: Barriers to use non-pharmacological methods

	Governmental	Military
Barriers to apply non-pharmacological methods	• Child age and condition • Severity of pain • Child fear and anxiety • Lack of equipment's • Family demands on medications • Noisy environment • Myths • Lack of family cooperation • Lack of time –heavy work-load/shortage of staff • Communication/cultural and language	• Child age and condition • Severity of pain • Families negative attitudes • Cannot be use with all procedures types • Child fear and anxiety • Parents anxiety • Lack of time –heavy work-load • Lack of knowledge • Lack of family cooperation • Children and family level of education • Language/culture • Families demand of medications • Child unwillingness

4.4 Conclusion

This chapter presents the quantitative data findings in detail. The multiple linear regression analysis highlights some significant results that either help or hinder paediatric nurses in applying non-pharmacological pain management. The hospital type is a critical factor in helping paediatric nurses apply non-pharmacological pain management. Older paediatric nurses show better use of non-pharmacological methods. Nurses with lower educational level (diploma) apply non-pharmacological methods more than nurses with a higher educational level. Nurses working in emergency departments are less likely to apply non-pharmacological methods to control their patients' procedural pain. Furthermore, staff nurses 2 (who provide only basic care for the patients and cannot administer medication) are more likely to apply non-pharmacological pain management methods than staff nurses 1.

The open-ended questions at the end of the questionnaires presented paediatric nurses perceptions in relation to the advantages and the disadvantages of using non-pharmacological pain management methods. Factors that can promote paediatric nurses use of non-

pharmacological methods and the barriers they are facing are presented according to the paediatric nurses' views.

The open-ended questions at the end of the questionnaires presented paediatric nurses perceptions in relation to the advantages and disadvantages of using non-pharmacological pain management methods. Factors that can promote paediatric nurses use of non-pharmacological methods and the barriers they face are presented according to the paediatric nurses' views.

Those are the important factors to emerge from the quantitative data analysis (phase 1) which influence paediatric nurses' attitudes and practices. In order to explore these results and understand how paediatric nurses age, level of education, nursing field, nursing position and hospital type affect their practice and attitude, there was a need for a second phase (qualitative) of data collection. The next chapter presents the qualitative data results in detail.

Chapter 5: Qualitative findings

5.1 Introduction

In chapter four, some significant factors emerged from the quantitative results. In order to explore and explain those factors, I went into the field to interview paediatric nurses of different ages, levels of education and years of experience in different departments in each hospital to try to explain those findings. For this reason, I carried out face to face interviews and I asked broad questions including the following:

• When I mention non-pharmacological pain management, what does this bring to your mind?

• What roles do you think non-pharmacological pain management could play in paediatric care?

• My survey suggested that some nurses use non-pharmacological pain management, while some of them don't. Do you have any suggestions for why this might be the case?

• In your unit, what sort of support do you require in order to encourage nurses to use non-pharmacological pain management more consistently?

• Can you help me to understand how pain is managed in the hospital?

Since a mixed-method explanatory design is used for the current study, the data collection occurs in two phases. The first phase consists of quantitative data collection (questionnaires), and the second phase is qualitative (individual interviews). The purpose of this design is to use the qualitative data to help explain the quantitative findings (Creswell et al., 2003). This chapter, therefore, uses a deductive approach to explore the qualitative data and, in so doing, seeks to explicate the significant findings of the quantitative data.

Three main themes emerged from the qualitative data analysis. Those themes are organizational factors, relational factors and nurses' autonomy. There are several sub-themes under each main theme. Those themes are presented in detail, as follows:

• Organizational factors related to paediatric nurses' application of non-pharmacological pain management, such as hospital policies and procedures, encouraging nurses, resources, environment etc. and how these organizational factors influence paediatric nurses' application of non-pharmacological pain management.

• Relational factors, such as the relationships between nurses and patients, nurses and families, and nurses and other health members in the hospitals.

• Nurses' autonomy.

Presenting and discussing these factors explains in depth why some paediatric nurses report applying non-pharmacological pain management methods while some do not. It shows the differences between the two hospitals which either encourage or prevent nurses from applying those methods when caring for children.

Figure 5.1 summarizes the three main themes and many sub-themes generated from the qualitative data analysis.

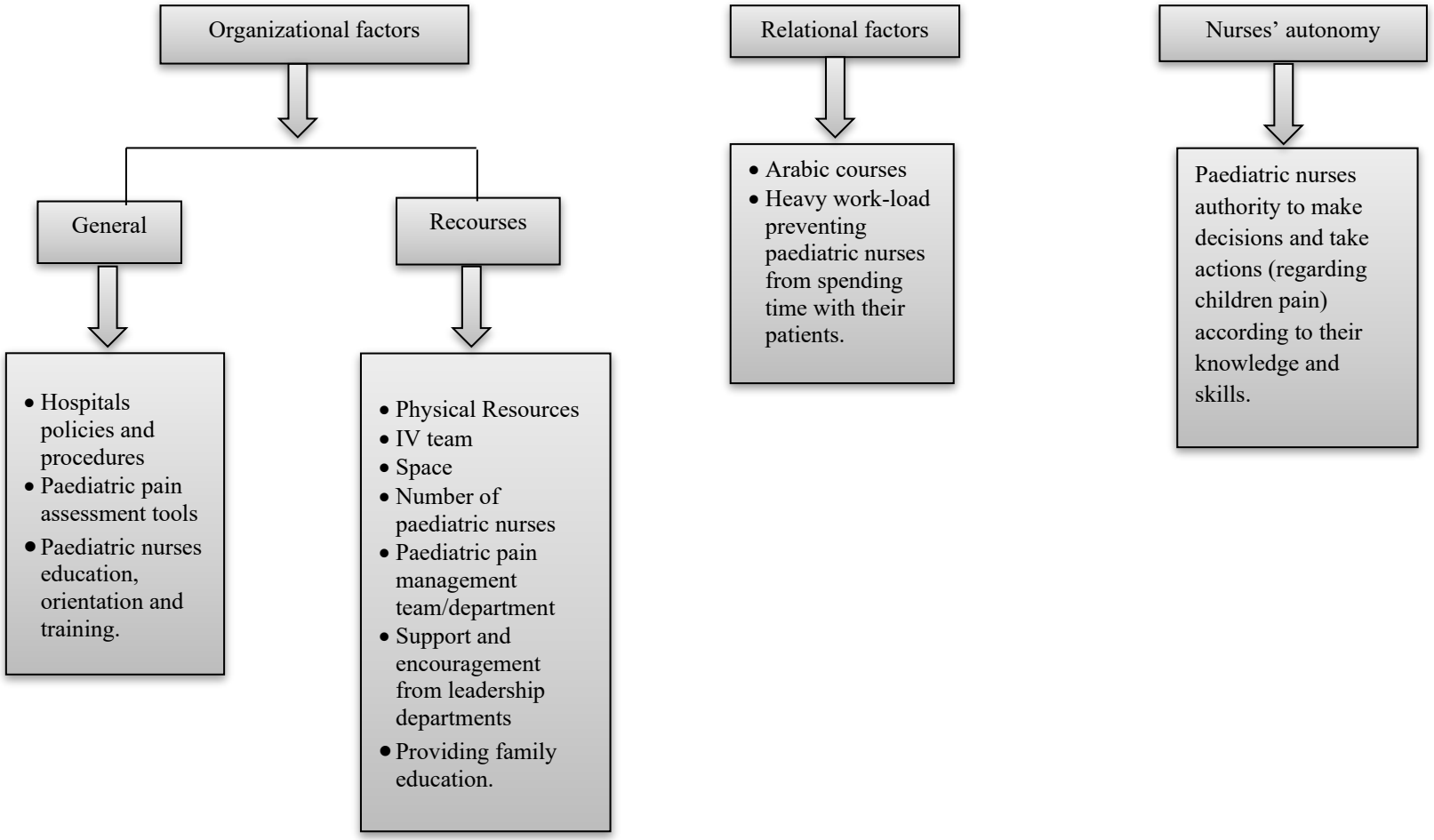

Figure 5.1: Summary of the integration of quantitative and qualitative data analysis.

5.2 Organizational factors

This section presents the organizational infrastructure factors of each hospital and explores how those factors might promote or hinder paediatric nurses' application of non-pharmacological pain management in their daily practice.

The qualitative data analysis shows some differences between the two hospital cultures, including hospital policies and procedures regarding paediatric pain management, pain assessment tools, paediatric nurses' education levels and experience, work-load, space in paediatric departments, Arabic courses for non-Arabic speaking nurses, resources, paediatric pain management teams/departments, support and encouragement from management departments, and the provision of family education. These differences are explored individually to highlight the organizational differences between the two hospitals.

5.2.1 Hospital policies and procedures

In the military hospital, there is a notable lack of policies and procedures regarding paediatric pain management, including non-pharmacological pain management. During the interviews, participants from the military hospital expressed a need for hospital policies and procedures for paediatric pain management. It was reported that paediatric nurses in the military hospital depend on their previous knowledge and skills in order to control their patients' pain levels.

Furthermore, the qualitative data analysis shows that paediatric nurses in the military hospital depended on pharmacological therapy to control their patients' pain. These results were confirmed by the participants during the interviews, during which they noted that nurses may be asked by physicians or head nurses if they have provided medication to patients as prescribed, but not whether they applied any non-pharmacological methods. The data suggests that the organizational culture does not support the trust relationship between primary nurses and management. Moreover, some participants reported that using non-

pharmacological methods in the military hospital depends on the nurse, saying that it is up to her to apply such methods or not. The following quote confirms this perspective:

> *'It's up to the nurses to use non-pharmacological pain relief, but the first step is to use medication. No one will ask; did you read a story or did you use imagination technique or did you give the patient a toy to play with?' (Military, Participant 5, Manager).*

The participants from the military hospital frequently reported that they do not have any policies. Others stated that they have policies, but they are incomplete or that they used to have policies, but these are being revised or updated.

> *'What we have is not completed. We have problem with policy and procedures; some of them are missing, some of them are not completed, some of them need to be updated. I hope it will come soon' (Military, Participant 4, Manager).*

Paediatric nurses working in the military hospital showed their reliance on others for pain management and defer to policy makers for guidance on appropriate management methods.
Of the six participants from the military hospital, only a health educator was sure about the existence of hospital policies; however, he reported that these policies are still awaiting final approval from the quality management department. The other five participants were not sure whether the hospital had any paediatric pain management policies and procedures.

> *Question: Is this policy available for the nurses in the units?*
> *Answer: 'Everybody has this, this is approved, the policy is approved by committee, but still with CQM, 'quality management', everything should go through CQM' (Military, Participant 1, Nursing education).*

> *'We are looking forward for the new policy. It was done, but we are still waiting for the signature, the approval' (Military, Participant 6, nursing education).*
> *'We don't have here in the hospital policy or protocol about pain management, so it's based on your experience… we need policy and protocols… we need a consultant from outside to conduct policy,*

protocols, and even… we have huge physical buildings, but we still lack very critical policy' (Military, Participant 5, Manager).

These findings show that paediatric nurses and paediatric managers in the military hospital are not proactive in seeking to improve their knowledge and practice related to paediatric pain management, especially non-pharmacological pain management because there is no follow-up from the top management. Paediatric nurses are providing pharmacological pain relief because they know it is their responsibility and a physician or a head nurse might follow-up on the prescribed medication. Paediatric nurses seem to rely on others to determine how care is provided for children.

At the governmental hospital, some of the participants highlighted the importance of having clear guidelines, which can guide the paediatric nurses during medical procedures.

Question: What about medical procedures, pain?
Answer: 'Not yet existing. We do not have full guidelines about it' (Military, Participant 4, Manager).
'We need guidelines because, at the end of the day, it will tell you how to conduct non-pharmacological therapy' (Military, Participant 12, Manager).

There are clear pain management policies and procedures, and the hospital updates them every two years. When I asked for a copy of the procedures, they were quickly provided to me. It can be concluded that the governmental hospital has updated pain management policies and procedures and that these are easily accessible to staff nurses. The governmental hospital states in their policy that healthcare providers must use non-pharmacological pain management first before using pharmacological methods.

'In the policy, they mentioned two parts, keeping the patient calm and to decrease the agitation; this is one of the policies. So, in the policy, use non-pharmacological methods for the patient, then go to the pharmacological methods' (Governmental, Participants 2, Manager).

During the individual interviews at the governmental hospital, every participant had a clear understanding of the hospital's policies and reflected on them frequently. Participants exhibited knowledge about different levels of pain and how they are meant to treat each level.

> *'We have mild pain, moderate pain and severe pain. Of course, we have for each part, an intervention or protocol of intervention… we have protocol, we have policy' (Governmental, Participant 10, Manager).*

In summary, a lack of hospital policies and procedures for paediatric pain management in the military hospital could be a reason for the lack of paediatric nurses use of non-pharmacological pain management.

5.2.2 Paediatric pain assessment tools

Having the right tool to assess patients' levels of pain according to their age and condition was often reported during the interviews as an important factor in evaluating patients' pain correctly. In the military hospital, there is a lack of pain assessment tools for patients aged one day to four years old. This was reported to be a barrier to assessing some patients' pain. Since the military hospital does not have pain assessment tools for all age groups, paediatric nurses have to use their observation to evaluate patients' levels of pain.

> *'In the tools, neonate under one, we have a gap here. Pain management from four years up, it is here, but for neonate under one year, no. We have a gap from one to four years. From one to four, we cannot do much about it… pain from one to four, we cannot do much, just use our skills of observation is all we can do there, and it is a waste of time if you write anything about it, because there is nothing to do' (Military, Participant 1, Nursing health education).*

The inclusion of pain assessment as part of the vital signs and physical assessment was recently considered at the military hospital, which reflects the hospital's commitment to promoting the routine assessment of paediatric pain. It can be argued that the consideration of pain assessment as a part of the physical assessment requires education and training and that if paediatric nurses do not receive such training, they might not be able to perform pain assessment and management correctly.

'In the first 30 minutes of the shift, the nurse should do physical assessment from head to toe, involving pain assessment. It was just implemented one year ago' (Military, Participant 5, Manager).

A health educator from the military hospital stated that he always teaches nurses to do a pain assessment as part of checking for vital signs. He reported that nurses are aware of this form of assessment, but that they need continued education. Moreover, when participants were asked about pain assessments during medical procedures, it was reported that the nurses may ask their patients about pain, but do not document anything.

Question: What about pain assessment during medical procedures? Answer: 'They always ask the patients, but nothing is written following the procedure. It depends on the nurses' judgments, whenever she feels it is necessary after the procedure, but in all guidelines it is mentioned' (Military, Participant 1, Nursing health education).

It can be argued that documentation is critical for nurses and other healthcare providers in order to follow up on what the patient has received and what type of management was done.

The data suggests that paediatric nurses at the governmental hospital are able to draw attention to the availability of a range of tools to assess pain. Participants noted that they had access to various types of pain assessment tools, and they showed knowledge of when to use each type, according to patients' age and health condition.

'We have pain management treatment plan. Of course, this is depending on assessment number one. We have many tools or scales we use for the patients, like we have Wong-Baker Scale, mainly for conscious patients who can talk, older age children. We have Happy Faces one to ten. We have scales for unconscious patients, or sometimes conscious but neonate, even one year old or two years old, they do not know how to verbalise, so we are following another scale, like CRIES. We have also FLACC scale. We have different scales according to the care of the patient. For example, we have ventilated patient, and he is on sedation, how can you do assessment? We have specific scales, FLACC tool. Of course, it is according to the policy and procedures and to the age group and patient condition' (Governmental, Participant 10, PICU, Manager).

'We have tools for infant, we have CRIES. For infant, we have FLACC for children. We have Wong-Baker for ventilated patient, we have comfort… so we use these tools, and nurses have been educated over that one… nurses have been trained. There is competency for them; there is awareness' (Governmental, Participant 11, Manager).

'We have a lot of tools to identify, like, if the patient is ventilated or not ventilated' (Governmental, Participant 8, Manager).

The department's competencies encourage paediatric nurses to improve their knowledge and skills, which include their use of non-pharmacological pain management. The quantitative data analysis shows that paediatric nurses at the governmental hospital are applying such methods.

The Swedish National Board of Health and Welfare (2005) define competence as 'the ability and will to perform a task by applying knowledge and skills' (Ljusegren, 2011, p.12). The Nursing and Midwifery Council (NMC) in the United Kingdom uses competence to refer to skills and abilities that can be performed effectively and safely without the need for supervision (Dolan, 2003).

'I remember that pain assessment and re-assessment… it was a part of the unit-specific competencies. So, if any ICU nurse wants to join ICU, he should follow the pain policy, and he should pass the competency of pain assessment and interventions. If you fail, you have to repeat until you pass; otherwise you will be moved to non-critical care.'

Question: Do they have to repeat those courses?
Answer: 'Yes, we have competency. He has to pass, and there are, like, self-reading materials. He has to read it and prepare himself, and the company has very pure nursing practices: pain assessment will be done in ICU or either in the ward, it should be done. It is a basic assessment even in OBD, even in ER; you have to know how to do the assessment for the patient. You should know the different tools that you have for your patients' (Governmental, Participant 10, Manager).

Moreover, as shown by the following quotes, pain assessment is a part of the vital signs check. Paediatric nurses have a choice of using different types of pain assessment tools according to the child's age.

'They can assess the patient very well... nurses check pain as the sixth vital sign, and there are tools for the age group, according to the tool they assess. They have to be knowledgeable nurses' (Governmental, Participant 11, Manager).

'Pain assessment now is one of the vital signs, the sixth vital sign in the governmental hospital (Governmental, Participant 8, Manager).

At the governmental hospital, pain is assessed twice; first, pain is assessed by a paediatric nurse, and then it is assessed by physician. This might reflect the lack of trust in relationships between physicians and nurses.

'When you assess the patient and you find he is in pain, you have to inform the physician, and he will come to confirm if he is in pain or not, and he will prescribe… he will assess the patient to confirm he is in pain, which is good. Double check is always excellent' (Governmental, Participant 10, Manager).

In summary, the organizational infrastructure of the military hospital shows a lack of paediatric pain assessment tools, a lack of education concerning how to use the available tools and a lack of nursing documentation regarding patients' levels of pain. At the governmental hospital, the hospital provides paediatric nurses with different types of paediatric pain assessment tools according to patients' ages and conditions. Furthermore, the data shows that nurses have access to information about when to choose each type of tool.

5.2.3 Paediatric nurses' education, orientation and training

A lack of continuous education for paediatric nurses about non-pharmacological pain management was reported by various participants from the military hospital during the individual interviews.

'Education to physicians and nurses about pharmacological and non-pharmacological pain management. I think that will help' (Military, Participant 5, Manager).

'I did not attend courses about non-pharmacological pain management; it is just through experience and what I observed' (Military, Participant 6, Nursing education).

A nursing educator from the military hospital reported frequently during the interview that continuing education for paediatric nurses is sorely needed because, as he stated, nurses have no information on this topic.

'They know nothing about it… I think we should lecture more, bring up this topic more' (Military, Participant 1, Nursing health education).

Another participant was uncertain about the effectiveness of applying non-pharmacological methods. The following quote reflect the nurse lack of knowledge about non-pharmacological pain management methods.

'It will take time, you know, and we do not know if that non-pharmacological will help' (Military, Participant 6, Nursing education).

A lack of nursing experience was reported often by some participants from the military hospital. Participants highlighted that nurses with no experience or knowledge would not be able to understand the effectiveness of non-pharmacological pain management.

'They don't have enough knowledge about those non-pharmacological methods, but maybe if you can share, and then we will apply. So, knowledge and maybe no experience… believes and if they experience it and they find its working, then they will try again and again, but if they did not try it yet and they don't know what is the benefit, they will not try' (Military, Participant 6, Nursing education).

In contrast, the situation at the governmental hospital is that paediatric head nurses encourage their staff to improve their education by providing time for them to search and read about paediatric healthcare and pain management. At the governmental hospital, nurses not only find new information, but also share it with colleagues. This seems to help paediatric nurses in the governmental hospital update their information especially about non-pharmacological

pain management, and here paediatric nurses show their use of those methods to control their patients' levels of pain.

'Here, we are giving our nurses a time to read or to update themselves about evidence-based practice' (Governmental, Participant 10, Manager).

'I expect staff to do search and come and share it' (Governmental, Participant 7, Manager).

'We are now encouraging the nurses to be involved in a research' (Governmental, Participant 9, Manager).

Continuous education in the governmental hospital is clear to see. It has been reported that nurses develop their practice over time. The hospital delivers general knowledge to paediatric nurses and then specific knowledge according to each department's needs.

'We go to general nursing, and then we go to speciality' (Governmental, Participant 7, Manager).

Moreover, paediatric nurses at the governmental hospital learn from others, such as physicians. This shows the cooperation between different staff and specialities in the hospital by sharing information.

'There are things we learned from other specialities; especially people are coming from paediatrics' (Governmental, Participant 7, Manager).

Providing time for paediatric nurses to read and to improve their knowledge as well as sharing that knowledge during regular staff meetings in the governmental hospital seems to improve their level of education about non-pharmacological pain management which is reflected in their confidence in their daily practice.

A lack of nursing orientation was reported frequently by various participants from the military hospital. Some participants reported that, due to the lack of nursing orientation and training, paediatric nurses practice based only on their previous skills and knowledge, which they gain from their experience in other hospitals. The military hospital provides six weeks of

nursing orientation to new nurses; however, this orientation does not include non-pharmacological pain management. A paediatric nursing manager who had worked in the military hospital for a long time reported not receiving any education about these methods or how they could be used. The next quote clearly illustrates this point.

> *'It is not highly advocated. We have nursing orientation for six weeks. Nobody has even introduced it really, and the only thing that they know is we have play room assistants, and they are organizing activities. This is all they know. Nobody orients them about what is this non-pharmacological pain management and using such tools. So, there is no information to the staff or education on how this management is being done. They cannot really express more on this. If some of them have been in another institution and know how to do non-pharmacological pain management because I observe what they are doing, and this why I can share some thoughts of it, but it is not introduced to me as well. I was never oriented to that… I have not been introduced to this non-pharmacological thing' (Military, Participant 12, Manager).*

The lack of paediatric nursing training was reported to be a barrier to applying non-pharmacological pain management for nurses working in the military hospital. A nursing health educator who had long experience in the military hospital stated that nurses need to receive intensive education and training because only specialists have knowledge about non-pharmacological pain management. This reflects the severe lack of nurses' knowledge and skills. This participant added that hospital leadership needs to build pain management competencies.

> *'We need a pain competency' (Military, Participant 1, Nursing health education).*

Additionally, paediatric pain management education, including competencies, is lacking in the military hospital. A manager from the military hospital reported that he took continued education into consideration when he encouraged his staff to participate in seminars on various health topics, but he stated that he never thought about pain management. During the interview, he added that:

'I never consider pain management before this meeting, but I will do in the future' (Military, Participant 4, Manager).

The governmental hospital on the other hand, provides three months of orientation for new nurses. During this time, nurses learn unit specific competencies, in accordance with their departments' specialties and needs.

Question: Can I ask you… you said the nurses cannot join ICU if they did not pass one of those requirements. After they join the ICU, do they still need to update themselves about this?
Answer: 'Yes. It is not a pre-requisite; it is during the completion of three months' orientation. Once the nurses are accepted in the unit, and they will have three months' orientation as other institutions for orientation and preparation period. During the three months, the nurse should go through certain competencies; one of them is the pain assessment and applying pain management protocol' (Governmental, Participant 10, Manager).

The governmental hospital encourages paediatric nurses to improve their knowledge and skills by creating those competencies and by providing reading material to allow nurses to update their knowledge and to pass the hospital test regarding those competencies.

'We have competency he has to pass, and there are, like, self-reading materials. He has to read it and to prepare himself, and the competency is a very pure nursing practice. Pain assessment will be done in ICU or either in the ward, it should be done. It's a basic assessment even in the OBD, even in ER, you have to know how to do the assessment for the patient. You should know the different tools that you have for your patients' (Governmental, Participant 10, Manager).

In summary, the military hospital is lacking continuous education and training for paediatric nurses in non-pharmacological pain management, which is reflected in the nurses' daily practice of applying non-pharmacological pain management to control their patients' pain.

In contrast, the data suggests that the orientation, training and continuous education the paediatric nurses are receiving in the governmental hospital helps them to consider non-pharmacological pain management for their patients and not to depend only on pharmacological methods.

5.2.4 Resources

5.2.4.1 Physical resources

Another organizational factor affecting the use of non-pharmacological pain management is a lack of resources. Participants from the military hospital reported a need for various types of equipment that they could use to apply non-pharmacological pain management, such as TVs, books, and heat compresses. All participants from the military hospital reported that there are play rooms in the hospital, and some considered these to be the only choice they had for their patients, even though these rooms are only open from 7am to 4pm. Some of the staff even have to use their own phones to play music and distract children's attention during procedures.

> *Question: Do you have any of that equipment in the treatment room?*
> *Answer: 'No, but sometimes because the mobiles are available, sometimes the doctors, they are using this mobile, if they have music, they will use it to divert attention and when they are crying'*
> *(Military, Participant 6, Nursing education).*

The previous quote shows that some paediatric nurses in the military hospital rely on physicians to find ways to distract patients' attention away from painful procedures.

> *'Play therapy, this is what we have… why I am concentrating a lot in play therapy and play therapy assistance because this is what we have and use since I was here… here, we just have play therapy'*
> *(Military, Participant 12, Manager).*

The lack of other hospital resources became obvious when a head nurse in the military hospital reported that some of the patients have TVs, while others do not. In situations like this, nurses are forced to ask permission from those patients with TVs to borrow the TVs for a few hours for other patients. The quantitative data findings show that in the military hospital, more than 50% of paediatric nurses reported 'always' playing games with the children which reflects what the participants reported in the qualitative data collection. They

indicated that the hospital has play rooms for the children. Furthermore, the quantitative data shows that 50% of the paediatric nurses in the military hospital allow the children to watch TV and videos. While in the qualitative data findings, some participants reported a lack of TVs for every patient. Listening to music as a distraction method is used 'always' by only 32% of the participants (quantitative data findings) and that reflects the fact that some participants in the qualitative data collection reported that they use their own phones to play music for the children during medical procedures. Moreover, using books and magazines is applied 'always' by only 22% of the paediatric nurses in the military hospital which reflects the participants' answers about the lack of those materials in the hospital.

One participant reported that if the nurses do not have the necessary equipment, such as heat compresses, then they have to invent other solutions, which the participant considered to be time consuming. Table 4.18 in Chapter Five shows that 29.5% of the paediatric nurses in the military hospital 'always' apply heat application and about 45% of them apply it 'sometimes', whereas only 17% 'seldom' apply the same method. This finding supports what one participant during the qualitative data collection reported about the lack of heat compresses in the hospital, and nurses trying to find other ways to apply heat when the child is in pain. This finding confirms that the paediatric nurses are trying to use the available materials to create something like a hot compress for their patients.

During the quantitative data collection, some participants reported their use of TENS method. During the interviews some participants in both hospitals reported that they do not use this method, which might be because some of the participants do not have enough information about the technique.

When I was performing the data collection, a manager reported that there is a social worker in the hospital and that he is supposed to do frequent rounds to assess patients' needs for help.

Having toys to play with might fall under a patient's needs. However, the manager reported that he rarely sees the social worker. He added that when a manager from the social department asks him whether the social worker visits the department, he says, 'yes, I have seen him,' even when he has not. Furthermore, he explained that he behaves in this way because he does not want to cause any harm to the social worker by reporting his absence. The absence of a social worker's rounds in the paediatric department does not seems to stop the paediatric nurses from allowing the children to play games, as the quantitative data findings in Chapter Five, Table 4.16, shows that 53% of the paediatric nurses in the military hospital 'always' play games with the children. These findings show that other sources are providing toys for the children and this might be the families or the paediatric nurses.

It is important to highlight that some medical procedures do not require non-pharmacological resources for application. If the organization does not provide nurses with certain resources, they can simply ask a patient to imagine a pleasant place or talk to the patient about various things to distract him/her from the procedures. However, nurses in the military hospital do not show evidence of applying these methods.

From my observation, I have noticed that in the military hospital there are lots colourful drawings and child-friendly posters on the paediatric department walls and in the play rooms. I noticed that in those play rooms there would be a social worker playing with the children, while in the governmental hospital I did not see any of this. When I asked the reason behind that, I was informed that it is against hospital policy because images of 'animate beings' are not accepted for religious reasons. Furthermore, nurses' uniforms lack drawings or colours for the same reason (field notes) (see Appendix 6).

The data suggests that the social department at the governmental hospital plays an important role in the application of non-pharmacological pain management in the hospital.

'We have here in our hospital play therapy. I think it is part of the social worker department. The social workers are doing good job in this hospital. It is a very nice place to share with other kids around; those babies will forget their pain… I mentioned about the social workers, frequently they do some parties for the children. I see them sometimes; they do it in the corridors or sometimes in the lobby of the children's hospital. They do, like, a gathering for the patients: balloons, decorations, microphones. They do a small stage, and they are singing, and those things sometimes are a distraction. It is excellent, especially when the family participate with you. You see the mother come and speak with her daughter into the microphone. She will even forget that she is in the hospital. She will think that she is in one of those city games' (Governmental, Participant 10, Manager).

'We have, you see, every patient here is provided with one television, so in that TV, there is cartoon, children's movies that are going on, and this is also one way of deviating and relieving the pain of the patient' (Governmental, Participant 9, Manager).

5.2.4.2 IV team

Another important resource that seems to help paediatric nurses at the governmental hospital is having IV nurses, who carry out intravenous cannulation when it is difficult for the primary nurses to do it. The governmental hospital encourages staff nurses by providing the necessary resources, and it can be argued that having an IV team helps the primary nurses spend extra time with their patients, which can be used to apply non-pharmacological pain management.

'We have here IV nurses, and they are the ones who insert the IV cannula for the patients... those IV nurses, they are all specialized in these area' (Governmental, Participant 9, Manager).

5.2.4.3 Space

When it comes to resources, it is important to highlight the space in the paediatric departments in the hospitals. In the military hospital, participants criticized the necessity of having a large number of patients in one room. They stated that this makes the environment noisy and prevents patients from relaxing. Moreover, factors in the physical environment, such as the air conditioning, were reported to cause certain problems, which were considered to have negative effects on the patients' comfort.

'The environment, for sure, it will effect. For example, in one room, there are five patients. For sure it will annoy the child, plus the noise, the physical setup of the room… the room might be hot or cold, it might affect them also, especially during the summer, if the AC is not working' (Military, Participant 4, Manager).

It was reported that, because of the lack of space, there aren't paediatric procedure rooms in every unit. Instead, either procedures are done in the patient's room, or patients must be transferred to the procedure rooms in other paediatric departments. There are some paediatric departments alongside adult departments in the military hospital.

Question: Do you have a specific procedures room, or it's usually done in the department?
Answer: 'In some areas, we have, and some areas, not, because of the lack of space' (Military, Participant 5, Manager).

Additionally, the military hospital does not have play rooms on every floor, which makes it difficult for some patients to reach the play areas, as they have to go to a different floor. It was reported by some participants that, when a patient could not move to the play room, the nurses have to contact the social worker to bring toys or colouring books to the patient in his/her room. This solution might keep the patient isolated from other children in the hospital. The data suggests that having enough space in paediatric departments is important, not only for the patients themselves, but also for their families, who want to be close to their sick children. In ICUs, families cannot be in the same room as their children for safety reasons, instead they have to stay in the waiting area. The lack of space, thus, prevents some families from being with their children.

At the governmental hospital there is a separate children's hospital with 237 beds. This hospital is one of the biggest children's hospitals in the region. Play rooms are available for patients on every floor, and it was reported several times that these rooms are fully equipped with toys and colouring books. Furthermore, in each room, there is a staff member who carries out activities with the children. When I was collecting data, I also observed social workers carrying out activities with children and their families in the children's hospital

lobby. These observations reflect the organization's encouragement of interactions between patients, families, and health workers and of improving these relationships. Only one manager at the governmental hospital reported that they need a bigger space inside the department for patients to move and play easily. The governmental hospital also encourages families to be around their children, and the hospital provides waiting areas for this purpose. Various participants highlighted this idea, along with the need to keep families around their children and involved in their children's healthcare.

> *'We have a waiting area for the mothers, so the family all the time is here; especially for conscious patients… we always try to keep the family in the ICU, especially the mother' (Governmental, Participant 2, Manager).*

5.2.4.4 Number of paediatric nurses

The data suggests another important resource that might affect the paediatric nurses application of non-pharmacological pain management, which is the number of paediatric nurses in the hospital. It was reported that in the military hospital, there is a great deal of nurse turnover. Nursing managers at the hospital stated that 140 nurses have left the hospital and that the management department is in the process of hiring new nurses. It was not specified over what period of time those nurses left the hospital, but it was frequently reported that the hospital has a severe shortage of nurses.

During the interviews in the military hospital, I had the chance to see that the hospital has extended the PICU department and that, according to the head nurse, there are not enough paediatric nurses to work in the extended department (field notes). Another participant at the military hospital reported that high numbers of nurses are leaving the hospital, either because they experience culture shock or because they do not like the accommodation and other services provided by the hospital (field notes).

No such issues were reported by any participant at the governmental hospital. This implies that paediatric nurses working at the governmental hospital are more satisfied with their work environment. Furthermore, it might be that the hospital is better preparing and supporting new nurses to cope with Saudi culture which is unique and different from other cultures.

5.2.4.5 Paediatric pain management team/department

In the military hospital, there is a pain management team for adult patients, but not for paediatric patients. Various participants reported that the hospital established a pain management team a long time ago, but only to set up pain management policies. Most of the participants suggested re-activating that team to cover patients' needs, especially the needs of surgical patients.

> *'To reactivate the team, pain management team is very important for paediatric and for the hospital wise' (Military, Participant 5, Manager).*

When this issue has been discussed with the head of the anaesthesia department, he stated that there is a lack of staff to create a paediatric pain management team, and they need Saudi nurses to take responsibility in that department, simply because they spend a lot of time and effort educating and training non-Saudi nurses, who then leave the hospital (field notes). This issue reflects the severity of the lack of Saudi nurses in the hospital.

The head of the anaesthesia department also reported that when they use a patient-controlled analgesia (PCA) with any paediatric patient in the operating room and then wanted to transfer the patient to the department, the paediatric nurses usually refuses to receive patients with PCAs, as they do not have the background or training in their use. This forces him, as an anaesthetist, to remove the PCA, and the physicians to prescribe pain medication (field notes). Another participant suggested that the hospital could communicate with advisors or

consultants from outside the military hospital for guidance in developing a pain management team, policies, and protocols.

> *'Education and re-activate the pain management team and seeking help from outside advisers because I think the pain management team in our hospital is still in its infancy period' (Military, Participant 5, Manager).*

The previous quote illustrates the severe need in the military hospital for building an educated and trained paediatric pain management team. This participant also suggested that the hospital needs to consult with specialists from other organizations that have developed such teams in order to benefit from their experience.

The data shows that adult pain management in the military hospital is not considered an issue in the way paediatric pain management is. Participants frequently reported that the hospital needs to consider paediatric pain management because only an adult pain management team is available. In some cases, participants reported that they consult this team for paediatric patients.

> *'In paediatric, I should really say that there is no team for pain management, but they have this PCA (patient care assistant) team for adults, I suppose because they are using this machine. However, with paediatric, we do not have any team, although we should have one because we have surgical cases and sickle cell patients who really need management. For me, I really believe that there should be a team for pain management' (Military, Participant 12, Manager).*

Adult pain management in the military hospital falls to the anaesthesia department, and it is obvious from the next quote that this department holds frequent clinics to follow adult patients. However, paediatric patients are not considered.

> *'It is anaesthesia, and they have two pain nurses and a pain clinic every Wednesday. They work with women in labour and with PCA, epidural' (Military, Participant 1, Nursing health education).*

One of the participants highlighted the importance of assessing the pain management status in the military hospital to provide top management with a clear understanding of the situation, as well as gathering information regarding the number of paediatric patients that may require pain management, to fully comprehend the need to create a paediatric pain management team.

> *'I believe, as a beginning, a study or a survey should be conducted in the institution to find out the need to create a pain management team. There should be a justification of why and how intense you really need a team to exist. Top management has to be aware of the percentage or the number of patients who need to have this team, so then we can make a proposal properly. This is important in the paediatric because, normally, for adults, hospitals are taking pain management into consideration. Paediatric should not be neglected' (Military, Participant 12, Manager).*

The data shows that while there is some focus on pain management, it does not extend to consideration of what might be considered 'transient' pain associated with procedures.

> *Question: Do you have a pain management team or department in the hospital to help the nurses to manage the patients' pain, or you can refer your patient to?*
> *Answer: 'Mostly, it's a group of anaesthesia, mostly the patients in palliative or oncology, and mostly they are giving morphine infusion. Then if they are in less pain, they can give the oral medication until the patient goes home' (Military, Participant 6, Nursing education).*

The governmental hospital was reported to have a pain management team. Participants stated that paediatric nurses apply non-pharmacological pain management and that if this does not control a patient's pain they communicate with the physicians to prescribe pharmacological pain management. In some cases, they refer patients to the pain management team. This reflects the communication between primary nurses and pain management teams. The data suggest that paediatric nurses in the governmental hospital are trying to apply non-pharmacological pain management methods and in some cases they receive support by the pain management team according to the patients need.

*'We have a pain team: acute pain management. So, certain cases, we refer to them. So, they come, they monitor the patient, they relieve the pain of the patient, and they do everything. They have pain reliever protocols, like to give continuous infusion, so there is pain management, pain control analgesia, they have in certain area' (*Governmental, *Participant 11, Manager).*

Another manager reported that the hospital do not have a paediatric pain management team, but they have one for adult patients. He added that, if a paediatric patient is on PCA, they consult the adult pain management team to follow up with the patient. It was reported that only patients with chronic pain could be referred to the pain management team and that acute pain is always managed in the units.

*'I rarely see PCA in our unit because we don't have a team for paediatric; it's in adult, but not for paediatric. I have been here for eight years. I saw PCA for one or two cases who needed PCA. So, we called the adult team to be able to do it' (*Governmental*, Participant 10, Manager).*

In summary, the lack of resources and space for paediatric patients in the military hospital was reported as affecting patients' comfort and relaxation. The insufficient number of treatment rooms forces some patients to wait for longer periods for their procedures to be completed, and the limited number of play rooms makes it difficult for some patients to reach the play rooms and interact with other patients. In contrast, the organizational infrastructure at the governmental hospital seems to support the application of non-pharmacological pain management by providing sufficient space and necessary resources to allow paediatric patients to play with each other, as well as providing sufficient treatment rooms for the application of medical procedures. Furthermore, both hospitals lack a paediatric pain management team, but have one for adult patients. In the military hospital, when a paediatric patient needs to have PCA, nurses refuse to take care of him/her, and the physician is forced to choose between IV, IM, or oral pain management medications. At the governmental

hospital, in contrast, when a paediatric patient needs to have PCA, an adult pain management team follows up with him/her.

5.2.5 Support and encouragement from leadership departments

Participants reported that paediatric nurses in the military hospital need support and encouragement from management. A paediatric head nurse in the military hospital reported that nurses might resist any changes in the hospital policies, which is why it is important to prepare them for such changes first.

Participants frequently reported the need for education, training and guidelines. Furthermore, the participants reported needing somebody with whom to communicate who could solve any problems, starting with their head nurses and following the chain of command. Moreover, recognition of good work through certificates or small gifts was reported to be important in encouraging nurses to think about and apply non-pharmacological pain management.

> *'For the part of nurses, I really think they need support… you should be there if they need you, by listening to them, find solutions of what they need, what their concerns are. Supporting them starts with recognition, like we give them, like, a certificate and so-and-so to encourage them to put their mind into the non-pharmacological' (Military, Participant 12, Manager).*

Another participant reported the need for management support to improve nurses' awareness of pain management in general and of non-pharmacological pain management in particular. It was suggested that pain assessment and management should be considered as beginning with patients' admission to the hospital.

> *'It should start from admission, as soon as the patients' first step in the hospital… every child, much, much more support from the hospital, from the media, LCD displays, poster, leaflets… but nothing is happening. We need more pain awareness… more involvement of admission to make the patients more aware of it' (Military, Participant 1, Nursing health education).*

When a paediatric nursing health educator was asked how pain management could be developed in the hospital, she stated that issues concerning non-pharmacological pain management should be communicated with top management in the hospital in order to improve the current situation.

'We have to discuss it with management; this will be a big project actually, to discuss it with the management, because it will help'
(Military, Participant 6, Nursing education).

From the previous quotes, it appears that there is lack of communication and interaction between the top management members and the staff nurses in the military hospital. Participants reported a need for various forms of support and encouragement from the management, such as education and psychological support, which could include acknowledging nurses who are making efforts to develop their knowledge and skills, listening to nurses' concerns, and trying to solve nurses' problems. Some participants require further help from management with regard to including pain assessment and management in the requirements for each patient from the moment of their admission.

On the other hand, at the governmental hospital, paediatric nurses seem to have different types of support, including an emphasis by head nurses on comforting patients and frequent follow-ups from head nurses.

'We emphasize our nurses to get them to a comfortable level'
(Governmental, Participant 7, Manager).

It was reported several times that paediatric head nurses at the governmental hospital do rounds of their departments to check whether the patients are complaining of pain. They examine staff nurses' documentation to assess their care plans with regard to their patients. Moreover, head nurses communicate with paediatric nurses about their approaches to controlling patients' pain. A day care unit head nurse stated that staff nurses must always be coached by senior nurses and that she, as a senior nurse, would go around the department to

follow up with the staff nurses. However, in a critical situation, she would act quickly to save a patient's life, without encouraging nurses' critical thinking at the time. She added that, sometimes, mistakes happen, but she uses mistakes to teach her staff the right way to do things.

It appears that paediatric nurses at the governmental hospital have strong encouragement and support from their head nurses, which allows them to comfort their patients and control patients' pain.

> *'The only way to change it is to practice, supervise, reinforce, and reflect back. When mistakes happen, I use it as a teaching tool, and of course support from senior management… I think it's important to observe and correct. If you don't correct, then who is going to correct them? And this is the key of mentoring: is to managing staff. If they made mistakes, they should be corrected. They should know that they are doing mistakes, and how they can do it right? It's clinical support for them. I have not come across any situation that cannot be managed or don't know how to manage. If the clinical leadership is excellent, that can bring confidence to staff and to patients… in my position, I'm really role-modelling for my staff. I hope to improve the collaboration, working relationship' (Governmental, Participant 7, Manager).*

> *'I always tell my staff that, when you want to solve something, it should always come from your heart. If you depend on material, the resources around you, put yourself in the shoes of the patient' (Governmental, Participant 8, Manager).*

From the individual interviews in the governmental hospital, head nurses show that there is continuous follow-up with the staff nurses. They communicate with them and ask them detailed questions about patients' situations and care plans. Such actions seem to improve paediatric nurses' knowledge and skills, especially regarding pain management. The next quote presents an example of how a head nurse follows up with her staff nurse and encourages her to address patient pain in various ways (including communication with physicians). Such communication from a senior staff member seems to encourage the paediatric nurse to think critically and make good decisions regarding her patients.

'I always make a point that pain is always addressed; communicate it with the doctor, and nothing is ignored, everything is looked at. I want to see tangible action. I don't want to see written action. What are you doing? Where is the pillow for the back pain? How did you position? How frequent? Did you do it in a slow way? Or you just push the patient to position? I ask the nurses, if the patients have this much of pain, what did you do? If she said, 'I give Paracetamol, I said, 'before Paracetamol, what did you do?' If she said, 'I did not do anything', I said, 'this is what you are supposed to do'. Education is very important… mentoring, coaching' (Governmental, Participant 8, Manager).

5.2.6 Providing family education

Various participants considered Saudi culture and beliefs to be barriers that prevent the paediatric nurses from applying non-pharmacological pain management or even from being able to correctly assess patients' levels of pain. Some families ask their children from a young age to not complain of pain, especially in the case of boys, who are told to act like adult men. Forcing young children to suppress their feelings of pain was reported to prevent paediatric nurses from assessing patients' pain. The following quote illustrates this issue.

'Our culture, we teach children, especially boys, since they are five years or six years old, 'don't cry, you are a man,' which impact the child. You cannot identify, even if you are using the scale, because he is not crying, trying to be a man as how parents taught him… even though, sometimes, they are crying, the parents are asking them to stop crying because 'you are a man, you should not cry' (Military, Participant 5, Manager).

Participants consider not only Saudi culture and beliefs, but also Saudi religion to be a barrier to treatment. For example, some families ask their children to tolerate pain because they think that it is what God wants.

'Sometimes, it comes from a religious side. Tolerate pain, be patient… the family are telling the patient, especially to old children, like 13 or 15 years old. They ask them to be patient because this is what God wants... sometimes, it gives wrong evaluation; you will not be able to identify the proper pain scale because the patient is trying to be patient' (Military, Participant 5, Manager).

Some families' behaviours, such as asking nurses to not touch their children, especially when they are crying, were reported to prevent nurses from applying non-pharmacological pain management. Such barriers stop nurses from delivering the right care to their patients.

> *'They will not allow you to touch the child. Sometimes they will tell you 'do not touch my child'; especially if the child is crying and you are trying to do bathing. Sometimes they, most of them actually do not allow you' (Military, Participant 12, Manager).*

> *'Your culture, your own beliefs can come over patient care' (Military, Participant 1, Nursing health education).*

From these observations, it can be concluded that there is a severe lack of family education in the military hospital. In contrast, at the governmental hospital, even though some families in the governmental hospital demand pharmacological treatments, paediatric nurses are provided with health education about various non-pharmacological methods that could be applied to control patients' pain in cases where the pain could be managed by those methods. The next quote illustrates the lack of family knowledge about patients' crying and medication demands, and it also reflects how paediatric nurses in the governmental hospital provide family education to help those families to differentiate between crying because of pain and crying to seek attention. Even when a patient cries due to moderate pain, nurses educated families about how to use non-pharmacological methods to control the pain.

> *'Sometimes, when we see mother, when the child starts to cry, they immediately say, 'nurse, nurse, give me some pain killer', but they should try first their part. So, this is one part of our education. Also, we give them education… we also give education to the mother that, if it is only a simple pain, we educate them to do some manipulation, like turning the patient, and it can relieve pain, if the patient not comfortable or in simple pain' (Governmental, Participant 9, Manager).*

One participant reported that, when some mothers with many children come to the hospital with a sick child for a day care procedure, they do not take an active role in their child's healthcare because they have no energy and need to rest.

'Most of the mothers, when they come, they turn to sleep. The child cry, they don't bother. So, how to teach mothers how to support their child? They got five or six kids at home; do you think they have the energy? When she is here, she catches a sleep. Now, we have mothers, they sleep during the session, and at the end, they go home' (Governmental, Participant 7, Manager).

She added that the nurses need mothers to be more involved in their children's care, not only to keep the mothers close to their children, but because nurses have other responsibilities towards other patients.

'We need the mother to help; the nurse cannot be there all the time' (Governmental, Participant 7, Manager).

It was reported that families' demands for medication are higher at night. A participant explained that this is because mothers need to sleep and, thus, needed a quicker way to stop their children from crying.

'You know analgesia becomes a habit, even when it is a simple pain. The mothers are asking and asking because, sometimes, especially at night, the mothers also want to sleep. So, in every simple 'ah' in the child, the mother will call the nurses, 'sister, pain killer' (Governmental, Participant 9, Manager).

Patients' families are a major factor in whether or not non-pharmacological pain management is applied. The need for family education was reported several times by various participants from the military hospital. Family resistance to nursing care, a lack of communication with nurses, a lack of family support for and participation in their children's care, and high demands from certain families regarding medication were continually reported by participants from the military hospital.

Question: In the hospital, what sort of support do you think might encourage the nurses to use non-pharmacological pain management more consistently?
Answer: 'Educate the parents about the evidence-base and about these non-pharmacological methods' (Military, Participant 6, Nursing education).

Some families were reported to visit their children for only a few minutes and then leave the patients completely under the nurses' care.

> *'You know our patient Rana; the parents do not come. The nanny comes. So, we take care of her. I bought clothes for her as a gift, and there are some mothers who donate. So, we keep them comfortable if they have nobody. The family maybe just come to see the patient and go; they come for five minutes and go' (Military, Participant 12, Manager).*

It is clear that, in the military hospital, families need more education and that nurses need to communicate with them more actively to improve their knowledge about pain management, especially with regard to non-pharmacological methods. It was obvious from the collected observations that most patients' families do not have enough knowledge about non-pharmacological methods, which explains their frequent demands for pharmacological medication. Moreover, high family demand for medication and family preferences for pharmacological methods to treat children's pain prevents paediatric nurses from applying non-pharmacological methods.

> *'Mostly, they are asking for medication. They are always choosing the medication' (Military, Participant 6, Nursing education).*

When one of the participants was asked the reason for the absence of certain families, the answer was that some families have more than one sick child at the same time, which is why they cannot stay with the admitted children and be involved in their healthcare. It seems that those types of families are in more need of having better education and support from nurses and maybe social workers, in order to manage their time and to arrange to stay longer with their hospitalized children. Many participants highlighted the importance of the family's presence with their children.

> *'The patient's family is here in Riyadh, but they have other children with abnormalities or congenital problems' (Military, Participant 12, Manager).*

In summary, in the military hospital, family cultures, beliefs, behaviours and religion were reported several times by various participants to be factors hindering the application of non-pharmacological pain management.

Paediatric nurses at the governmental hospital showed that they try to communicate with mothers and educate them in how to comfort their children by taking part in their healthcare.

> *'Another factor, probably, the cooperation of the mother, because we are trying. For example, if we see the mother doesn't know how to cuddle, we will try to show them, but if the mother is asking the nurse to leave their baby, so we are trying to tell them, and ask the mum to do cuddling so the baby will stop crying, and if the feeding is applicable, we teach the mother how to give the feeding, not lying in bed, then do the feeding. The child sometimes cannot talk, so this feeling is one of the best emotions that they can feel' (Governmental, Participant 9, Manager).*

The availability of specific organizational factors, such as hospital policies and procedures regarding pain management especially non-pharmacological pain management methods, pain assessment tools and continued education as well as the availability of some physical resources such as an IV team and enough space in paediatric departments seems to have created a supportive environment for paediatric nurses at the governmental hospital where they are more confident in applying non-pharmacological pain management.

5.3 Relational factors

The following section presents arguments for the importance of paediatric nurses being able speak Arabic in order to communicate with their patients. It emphasizes the importance of paediatric nurses having enough time to build good relationships among themselves, as well as with their patients and their patients' families, in order to apply non-pharmacological pain management. Then it explores the relationships between nurses, patients and families and between nurses and their colleagues, and discusses how these relationship types in each hospital might encourage or prevent paediatric nurses from applying non-pharmacological pain management.

It can be argued that, if paediatric nurses are going to build good relationships with their patients and their patients' families, they need to speak their patients' language. The quantitative data analysis shows that the majority of paediatric nurses are non-Arabic speaking in both hospitals. In a situation like this, hospitals need to provide Arabic courses to allow paediatric nurses to communicate with their patients.

5.3.1 Arabic courses

Several participants reported that the military hospital does not deliver sufficient or effective Arabic courses to its nurses. They reported that the existing courses are short and insufficient for teaching them to speak with their patients. Some participants suggested having translators and dictionaries in each department to facilitate communication with patients.

Question: Is there any Arabic course in the hospital?
Answer: 'Yes, but they are short courses - one or two days. It's not enough'
Question: Do you suggest any solutions for this problem?
Answer: 'Dictionary plus interpreter in each area' (Military, Participant 5, Manager).

The quantitative data analysis showed that only 6% of the participants in the military hospital have Arabic nationalities (Saudi, Sudanese, Jordanian or Egyptian). This low percentage shows the severity of the shortage of Saudi and Arabic speaking paediatric nurses in the military hospital.

Question: Do you think language is a barrier for pain management?
Answer: 'Oh, number one. Big, big problem, but nurses try. We ask the interpreter to help us, but the nurses try very hard' (Military, Participant 1, Nursing health education).

The data shows that when the head nurse of the department is Saudi he/she usually helps in translating between patients, families and nurses.

'We Saudi nurses, we are few, but we try to inform and teach the parents that this child is still young, so, let him cry, so we can give

the proper pain killer and treatment and identify the pain' (Military, Participant 5, Manager).

Paediatric nurses misunderstanding patients' symptoms and complaints of pain due to the language barrier were reported. Nurses' lack of Arabic knowledge leads them to give pain medication when it is not needed. Participants continually reported language being a barrier to communication with patients. The issue was also said to lead to patient and family dissatisfaction regarding nurses' work and to prevent trusting relationships between nurses, patients and families. Conflicts were also reported because of misunderstandings. The military hospital does not seem to take this issue seriously or provide effective solutions to improve communication between nurses and their patients.

'New nurses, they don't know how to speak in Arabic, so there will be different interpretation. If they think that the patient is in pain, but he is not then, they just give pain reliever. Actually the patient is complaining because he wants to pee or poo. He has abdominal pain, he has some diarrhoea. So, automatic, they just give medication, they don't understand' (Military, Participant 6, Nursing education).

Some nurses depend on the Arabic speakers in their department to help them communicate with their patients, but when nurses cannot find an Arabic speaker around they try to use what Arabic they have learned to communicate with their patients, which can result in misunderstandings on the part of their patients or their patients' families. The following quote is an example of such an issue.

'In some areas, we have some Arabic speakers, so the non-Arabic speakers ask them to translate, that is the technique. Or, they try to use their broken Arabic, but, sometimes, there will be misunderstanding' (Military, Participant 5, Manager).

The quantitative data analysis shows that the percentage of Arabic nurses at the governmental hospital is also 7% only. However, this low percentage does not seem to be a barrier to non-Arabic speaking paediatric nurses communicating with their patients and their patients' families. The governmental hospital was reported to provide Arabic courses to non-Arabic

speaking nurses, and paediatric head nurses noted that they encourage their staff to attend such courses to improve their Arabic language skills.

> *'We have a lot of training in Arabic courses, and we always have a back-up Arab speaker in the unit to help them and to know deeper about the patient' (Governmental, Participant 8, Manager).*

Paediatric nurses at the governmental hospital reported that they try hard to communicate with their patients, even if they do not speak Arabic, by asking an Arabic speaker in their department (such as a physician or a ward clerk) to help. It was reported that even if a nurse cannot communicate with a patients because of the language barrier, she/he will use body language to deliver the message to the patient. Moreover, a PICU head nurse reported that he observed one of his staff members talking to a few-month-old patient in her own language (Hindi). He highlighted that the patient would not be able to understand her, but at least she was talking to him and touching his head, and that was enough to stop the patient from crying.

> *'If I cannot say it in Arabic, I do it in action. Most of the time I do it in action, especially when you are taking care of an Arabic patient. This is most of the challenging work' (Government, Participant 8, Manager).*

Some paediatric head nurses who have been working in Saudi Arabia for a long time are able to communicate with patients better than new nurses, and these head nurses noted that they help their staff to provide information to patients and their families.

> *'It's an advantage for me to be able to speak Arabic, and I am encouraging my nurses to do also. When I see the nurses are struggling to speak in Arabic, I ask them to stop, and I will be the one that will talk…. it's really an advantage. I can talk to them in their own language. I can understand. I can write numbers in Arabic. So, if the father is asking about the date of the appointment, and the nurses cannot answer, I tell her leave that for me, and I write for them in Arabic. For numbers only, I am good in Arabic' (Government, Participant 9, Manager).*

Paediatric nurses at the governmental hospital receive extra help from their Arabic speaking colleagues, such as physicians, ward clerks, social workers etc. who were reported to be available in each department.

> *'We have a healthcare assistant, and she helps with that. Even the porter we have here, she is Saudi porter… she can speak in English. I am taking too much support from her. She can write the leave of absence for the mothers if they need it, and it should be in Arabic. We cannot write in Arabic. She helps with translation as well. The plan is to have Arabic speakers on all the floors… the good things for us is we have a surgical team, doctors always in the floor, and we ask them, for example, father is talking to me and I cannot understand him, I ask him to go with me to the doctor, so I will know what he want. There is also support from the case managers. They are all Saudis, so, in any case, we are calling them also, and the social workers, and they are Saudis' (Government, Participant 9, Manager).*

The organizational context at the governmental hospital seems to help paediatric nurses build trusting relationships with their patients and their patients' families. To build these relationships especially between non-Arabic speaking nurses and Arabic speaking patients and families, the governmental hospital provides continuous Arabic courses to non-Arabic speaking paediatric nurses. In addition, the governmental hospital also provides each paediatric department with an Arabic speaking staff member to be available at all times to help nurses to communicate with patients and their families.

Nurses at the governmental hospital illustrated their desire to build good relationships with their patients to gain their trust and cooperation during the interview. The data shows that paediatric nurses in the governmental hospital are trying to use their basic Arabic language to calm and reassure the patients.

> *'He was not comfortable 'a small baby'. So, I used all my darling words to him… very much comfortable, and the child smiled at me. I told him that this is a very good nurse and will take care of you till your mum comes back' (Governmental, Participant 11, Manager).*

5.3.2 Nurses' workloads

Shortages of staff and heavy workloads, especially during night shifts, were frequently reported as barriers to paediatric nurses' application of non-pharmacological pain management. Nurses in the military hospital complained about the ratio of nurses to patients. They reported that they have lots of responsibilities towards their patients, including procedures, preparation, taking their patients to operating rooms, administering medication and dealing with patients' families' demands. They stated that, in order to handle all of these responsibilities, they have to administer pharmacological methods, which take less time than non-pharmacological methods. The participants added that applying non-pharmacological pain management meant spending half an hour with a patient, talking to him/her or providing a massage, which would prevent them from taking care of their other patients. Furthermore, when asked about the types of support needed to help paediatric nurses apply non-pharmacological pain management, some participants suggested decreasing the ratio of patients to nurses. The following quotes clearly illustrate that pharmacological therapy is the easier choice for paediatric nurses in the military hospital due to time constraints.

Question: Is there a shortage of nurses in the hospital?
Answer: 'Huge, huge. It is a big issue; honestly… it is like equation: increase workload will decrease the time the nurse spends with the patient, the more she will not use non-pharmacological methods and go directly to pharmacological methods' (Military, Participant 4, Manager).

'The shortage, the work load, the shortage will effect using non-pharmacological methods because reading a story will take how many minutes compared to analgesia?' (Military, Participant 5, Manager).
'Time is another factor, busy work schedules… if the unit's busy, give medication and walk away without stopping to think' (Military, Participant 1, Nursing health education).

The data shows that even when nurses are willing to apply non-pharmacological methods, their heavy workload prevents them from doing so, since they have other responsibilities to other patients.

> *'You can say it is easy to apply, but it is time consuming. With the shortage, sometimes we are willing to apply those techniques, but we do not have time to do it' (Military, Participant 5, Manager).*

The data suggests that paediatric nurses' responsibilities increase if a nurse is assigned to more than one patient with pain. For these nurses, the easier option is to use pharmacological methods, which were reported to be quicker at controlling patients' pain.

> *'If you have, let's say, four patients to one nurse, if all of them have pain, and the nurses need 30 minutes to sit down with them, and if they're all complaining of pain at the same time, then how can you do it?' (Military, Participant 6, Nursing education).*

> *'With the time constraint, having one nurse to four or five patients, the other activities are so limited, staying with the patient, which is really vital for caring for the patient… sometimes, it is not possible, but as much as they can to do their best' (Military, Participant 12, Manager).*

In addition, in the military hospital, management assign fewer patients to each nurse in 'very important persons' (VIP) departments. Thus, there seems to be discrimination between patients in the military hospital. One of the participants reported that, because they have fewer patients in the VIP department, nurses have more time to spend with their patients and, thus, could consider non-pharmacological pain management.

> *'Not all patients, they are VIP, so as soon as we know that a patient needs IV insertion, we will put because we have time there in VIP. We have more time there when I was there… not too much busy' (Military, Participant 3, Manager).*

In the previous quote, the participant reported that, if a patient in a VIP department needs an IV insertion, she would apply an EMLA cream as a type of pharmacological pain

management before the procedure. This could only happen because she has fewer patients and, thus, more time for each patient.

Because of the heavy workloads in the military hospital, a participant highlighted the need for an escort to help transport patients for procedures. It was reported that preparing patients for surgery and taking them to the operating room is time consuming and, thus, prevented nurses from spending time with other patients.

> *'What they really need is time to be with the patient, but, as I said, there are a lot of constraints to it because of the nurse to patient ratio and the fact that a nurse sometimes should leave for three to four hours because the patient is having a procedure… this is why there should be a nurse escort, only for escorting the patient, bringing the patient down to do a procedure' (Military, Participant 12, Manager).*

The importance of relational factors was obvious during the qualitative data collection. It was reported that communication between paediatric nurses, patients and patients' families at the governmental hospital leads to satisfaction among patients and their families as well as satisfaction among nurses about their jobs.

> *'My conciliation and my satisfaction in that duty or that career when he went out of the hospital, everywhere he will see me, he is very proud. 'I am becoming emotional.' This is very, very good experience. He was very proud to tell his family, 'This is my nurse, this is my nurse, who took care of me', and this is the satisfaction that you cannot pay, the fulfilment of the carer' (Governmental, Participant 9, Manager).*

Some participants from the governmental hospital reported the importance of providing patients with information and comforting them, especially during their first visit to the department. It was reported that, if a patient comes to the unit for a second time, he/she is more comfortable and knowledgeable about what to expect.

Some participants highlighted the significance of providing a home and a friendly environment to calm patients and gain their trust. A nursing manager reported that patients often come to the unit for the first time with fear and severe anxiety; for this reason, the staff

nurses try their best to comfort them and control their fears. She added that they reward the patients after their medical procedures by hugging them or giving them sweets. Moreover, she stated that the actions they take with their patients help them to gain their patients' trust and cooperation.

The organizational context at the governmental hospital seems to create a friendly environment between nurses, patients and families. One of the managers reported that all physicians and nurses know each other's names. Furthermore, she added that the patients who come to the department frequently to receive therapy know each other's names and that some of them began to come together as a group in order to receive therapy at the same time. This data suggests that experienced patients and families are more likely to develop a relationship with nurses. Paediatric patients at the governmental hospital seem to have a comfortable environment, in which they know their nurses, have information about what to expect, and are given the chance to build relationships with other patients.

> *'They have experience of what to expect. We have here three patients with metabolic disorders. They come every week to have some therapy. They choose their own toys, their own books… they will sit together as a group. They are three years old. They have their own group, and they know all the staff by name. We have a small unit, but everybody… they know the nurses, doctors know all the nurses by name… we have an advantage here. I manage to introduce what I know, this kind of practice' (Governmental, Participant 7, Manager).*

The relationships between nurses and paediatric patients are taken into consideration at the governmental hospital. As reported earlier, the governmental hospital has a paediatric hospital, which was described by one of the paediatric head nurses as one of the only hospitals, or the only hospital, in Riyadh City that treats children according to their age, not as adults.

'We have few children's hospitals; I think we are the only children's hospital in Riyadh to approach children as children not grownups' (Governmental, Participant 7, Manager).

In the military hospital, the actions of providing patient care, communicating with patients and their families and delivering the needed care were described by one of the participants as responding to patient and family demands. It was reported that paediatric nurses apply pharmacological methods to stop such demands.

Question: What about the role of using non-pharmacological pain management for the nurses, for the family?
Answer: 'For the nurses, of course, if the patient's pain is relieved, you will also be relieved from the demands of the patient… they don't have time to apply non-pharmacological methods, since they are very busy in the ward. Of course, they want this pain to be relieved right away. Not just the mother, but also the nurses. If this pain is not relieved right away, they will call you… they will demand for you as a nurse, they will tell you' (Military, Participant 3, Manager).

The data suggests that the paediatric nurses in the military hospital struggle to communicate with their patients and to explain the procedures or health care provided to them.

Question: What was the reaction for the patient and his/ her family?
Answer: 'For the patient, of course, they will be surprised at what you are doing if it's their first time to have this warm compress. They will ask, 'what are those nurses doing instead of giving me something to relieve the pain? What are they doing?' Of course, the family also will be surprised. They want Panadol right away. They know only Panadol can relieve their pain, so they will be surprised. You have to explain' (Military, Participant 3, Manager).

The lack of communication and collaboration among staff nurses, patients, and patients' families in the military hospital was reported to create continuous conflict.

'In paediatrics, we are not treating the patient only, but we treat his or her family also. If you treat the patients, their parents will be satisfied. Sometimes, you will face stress during your day or night shift, not because your patient is sick, but because the parents are around while he is sick. They are shouting when the patient is sick, and if the patient has less or no pain, you can see. It will reflect on the parents' (Military, Participant 5, Manager).

Some paediatric nurses in the military hospital were described as not having the right attitude or the willingness to communicate with the patients or to apply non-pharmacological pain management.

> *'Knowledge wise, I believe all the nurses have the knowledge of how to do it. They know how to do it… they have the knowledge, the skills, but the attitude plays an important role. If they are not willing, they will not do. It is not the knowledge, but the attitude' (Military, Participant 3, Manager).*

Finally, the quantitative data analysis shows that paediatric nurses working in emergency departments (ER) are less likely to apply non-pharmacological pain management than nurses in other paediatric departments. This finding supports the argument that paediatric nurses need time to build trusting relationships with their patients in order to know them better and to deliver non-pharmacological pain management methods.

The nature of work in ER is different from other departments. In ER, paediatric nurses need to quickly assess the patients' needs and triage them according to their situation. Triage is 'the assignment of degrees of urgency to wounds or illnesses to decide the order of treatment of a large number of patients or casualties' (Oxford Dictionary). Nurses in ER face the challenge of acting to save patients' lives. Triage nurses usually assess the patients' needs, then those patients can be transferred to other departments. This kind of working situation might be a barrier to paediatric nurses in ER having enough time to spend with each patient to know them better or to build a relationship with any of them.

In summary, the organizational context at the governmental hospital encourages paediatric nurses to build trusting relationships with patients and their patients' families in various ways, such as by providing Arabic courses for non-Arabic speaking nurses and by having different Arabic speaking staff members, such as physicians or ward clerks, in each department. Furthermore, the support and the cooperation that the paediatric nurses receive

from their head nurses, especially when they are busy, promotes a trusting atmosphere. Head nurses show that they become involved in the patients' care and that they provide help, especially when nurses cannot speak Arabic properly or when they have other responsibilities towards other patients. Moreover, the governmental hospital helps paediatric nurses in other ways, such as by providing IV nurses to help paediatric nurses when they cannot easily insert IVs into patients. The governmental hospital thus creates a friendly environment for patients and nurses and encourages them to communicate with each other. All of this support from the governmental hospital seems to improve the relationships between nurses, patients, and families; among nurses; between nurses and head nurses; and between nurses and other health staff members. Such relationships seem to help paediatric nurses in applying non-pharmacological pain management. In contrast, the lack of cooperation and trusting relationships among physicians, nurses, patients, and families in the military hospital seems to create a barrier to paediatric nurses' application methods of non-pharmacological pain management.

5.4 Nurses' autonomy

This section presents the different types of leadership styles in each hospital and illustrates how each might affect the application of non-pharmacological pain management. First, the leadership styles between head nurses and paediatric nurses and between physicians and paediatric nurses is presented.

At the beginning, it is worth defining nurses' autonomy. Nurses' professional autonomy is defined as having the authority to make decisions and to take actions according to the nurses' knowledge (Skar, 2009).

Non-pharmacological pain management was reported to be the first action that should be followed by physicians and paediatric nurses (except in cases of post-operative pain, when

pharmacological pain management should be used) according to the governmental hospital pain management policy and procedures.

> *'The support from the policy and procedures that the nurses need to use non-pharmacological pain management first, then they can go to pharmacological methods. In the policy; they mention the two parts for keeping the patient calm and to decrease the agitation. This is one of the policies. So, in the policy to use non-pharmacological methods for the patient then will go to the pharmacological methods. The physician, they try to go to non-pharmacological pain management first before going to sedation and using medication. They insist to use non-pharmacological methods. They start with non-pharmacological methods, give the feeding, try to let him sleep; then, if he is in pain, go to sedation or pharmacological methods' (Governmental, Participant 2, Manager).*

It was reported that physicians at the governmental hospital insist on using non-pharmacological pain management first. Such types of pain management could include feeding the patients or letting them sleep. If these methods are not working and the patient is in pain, then the healthcare team can start to consider pharmacological methods.

> *'The physicians, they try to go to non-pharmacological pain management first before going to sedation and using medication. They insist to use non-pharmacological methods' (Governmental, Participant 2, Manager).*

Even with physicians insisting on applying non-pharmacological pain management as a first step to controlling patients' pain, paediatric head nurses at the governmental hospital expect their staff nurses to understand their patients' needs and to meet them accordingly.

> *'To me, nurses should not be just quiet 'yes sir, yes sir'. They must participate and be part of the management. Advocating for the patient is very important. Paediatric are very small. They cannot speak for themselves. They cannot express their fear, cannot express anxiety. We should advocate. Teach people to advocate them. If they have pain, advocate for pain. If they follow up, you need to make sure this is done. If they need sick leave… all this is advocating for patient because they cannot speak; they cannot articulate what they need. This is very important in paediatric that the nurses recognize this' (Governmental, Participant 7, Manager).*

Paediatric head nurses at the governmental hospital expect their staff nurses to participate actively in physicians' rounds and to have their own input into physicians' decisions about patients' healthcare plans. Moreover, these expectations seem to help paediatric nurses at the governmental hospital improve their critical thinking skills by leading them to question themselves and their colleagues about health decisions related to patients while they are inside and outside the hospital. Head nurses help paediatric nurses play this important role in their patients' care.

> *'I expect from my nurses to participate. Even if we don't have a proper round in this unit, I expect them to input to the physician's decision and the management, even though if the patients are going for simple surgery and they are coming back. I expect them, during rounds, to ask, 'where is the pain management? What they are going to do for pain?' Even if the patient is for discharge, 'what can we give for pain?' (Governmental, Participant 7, Manager).*

Paediatric head nurses at the governmental hospital believe that their staff nurses have the ability to take the right action when it comes to pain assessment and management. One of the PICU head nurses at the governmental hospital reported that he did not need any support in his unit to encourage his paediatric nurses to use non-pharmacological pain management because he has confidence in his staff to assess patients' pain and to act accordingly. He added that his paediatric nurses are able to apply non-pharmacological pain management, and if this is not effective in relieving a patient's pain, they follow the hospital's policies by consulting physicians and using pharmacological methods if needed.

> *Question: Do you need any support in your unit to encourage the nurses to use non-pharmacological pain management more? Answer: 'Actually, no. The staff themselves, they will assess their patient, and if he really needs medication, and he is really in pain, and it cannot be reduced by the methods of non-pharmacological, they will go for the medication. They will consult the physician. This patient is in pain, you cannot. Even if the mother is handling him, he is still going to cry' (Governmental, Participant 2, Manager).*

Another PICU head nurse at the governmental hospital reported that the hospital is trying to build a culture that will help paediatric nurses assess and manage patients' pain. Paediatric

nurses at the governmental hospital are expected not only to have the knowledge and skills, but also to act independently to comfort their patients and control their pain. More than one participant reported 'independent nursing actions', stating that nurses are expected to apply what they have learned and not wait for physicians to give them orders.

> *'In general, in PICU we build a culture of not underestimating; we have the monitoring system, use the tool. We have a lot of training in Arabic courses, and we always have a back-up Arab speaker in the unit to help them and to know deeper about the patient' (Governmental, Participant 8, Manager).*

Some participants reported that a culture to support paediatric nurses in applying non-pharmacological methods should be created in the hospital environment and inside the hearts of the nurses (as prescribed by a PICU head nurse). At the governmental hospital, such expectations and encouragement from head nurses creates the self-confidence within paediatric nurses to use non-pharmacological pain management independently, without waiting for physicians' orders.

> *'Education is very important, mentoring, coaching, because you have to build a culture inside the heart of the nurse that pain now is the sixth vital sign. When you said vital signs, it defines the whole scenario. That is why it is a vital sign. Why did they include pain in vital signs? Why they did not include wounds? Because pain will define the whole patient, and one of the signs that this patient needs you, needs your intervention, and, as a nurse, we have independent nursing functions, and under that is non-pharmacological pain management. You don't have to ask doctor to have orders for that one, and in this way, you build respect from the parents and the doctors because you don't depend on them. So, you tell the doctor, 'I don't need your help anymore, I managed the pain' (Governmental, Participant 8, Manager).*

The data suggests that the leadership style between head nurses and staff nurses at the governmental hospital depends on encouragement. Head nurses encourage their staff to think critically, to follow up, to coach, to learn from mistakes, and to use independent nursing actions.

On the other hand, the organizational context in the military hospital does not seem to help paediatric nurses think or act independently. This was demonstrated clearly when a paediatric nursing educator stated that paediatric nurses need physicians' orders to use non-pharmacological methods, since the health educator is not sure whether such methods could cause harm to the patients.

Participants reported that paediatric nurses in the military hospital depend on pharmacological methods to control patients' pain and that they also depend on physicians' decisions and orders.

> *'So far, here, mostly we really give medication. We will just make them comfortable; that's it. We will just follow the orders. If it's helpful, why not apply it rather than using medication?'*
> *Question: Do you need an order to use non-pharmacological methods?*
> *Answer: 'Of course. We cannot execute any medication to our patient without orders, especially the simple things like hot application. We need an order. We need orders from the doctor because we don't know the side effect; maybe it will harm the patient' (Military, Participant 6, Nursing education).*

One of the participants reported that head nurses and physicians in the military hospital do not ask their paediatric nurses if they have applied non-pharmacological pain management. Instead, nurses are expected only to follow physicians' orders regarding administering pharmacological medication. This leadership style seems to make the paediatric nurses dependent on physicians, giving them no input into patients' care plans.

Furthermore, in the military hospital, paediatric nurses themselves do not know that they could provide massages to their patients; instead, they expect other services, such as the physiotherapy department, or even the families to perform such actions.

> *'For the nurses, we cannot expect the nurses to do massaging. Maybe we will teach the mother to do it. This massaging will take time to stay with the patient, but the physiotherapist, they are the one to provide massaging' (Military, Participant 6, Nursing education).*

It is clear that paediatric nurses in the military hospital do not seem to feel that they have the time to develop interactions with their patients; instead, they excuse themselves from such interactions by declaring that they are the physicians' responsibility.

In conclusion, nurse autonomy at the governmental hospital is based on trusting relationships between nurses and their head nurses. These kinds of relationships seem to improve paediatric nurses' confidence with regard to being able to participate in patients' care plans and to decide when they can apply non-pharmacological pain management. Data suggest that paediatric nurses in the governmental hospital are able to think and act independently and are expected to do so by their head nurses. On the other hand, the nursing leadership style in the military hospital seems to prevent paediatric nurses from engaging in autonomous, independent thought or action; instead, paediatric nurses depend on physicians' decisions and orders. The data shows that paediatric nurses in the military hospital are encouraged to apply pharmacological methods to their patients according to physicians' orders and that even the application of non-pharmacological pain management is based on physicians' orders.

5.5 Conclusion

This chapter presents various organizational factors, relational factors and factors related to nurses' autonomy that play an important part in the application of non-pharmacological pain management in both hospitals.

To summarize this chapter, creating a strong communication channel between the top management level and the primary nurses plays an important role in improving paediatric nurses' confidence in their practice. Trusting paediatric nurses' knowledge, critical thinking, and ability to deliver quality care to children shows its effectiveness in improving paediatric nurses' practice, and that is obvious when comparing the practices in the two hospital settings. Providing a healthy environment where nurses have continuous support to develop

their knowledge and skills, as well as their Arabic language, helps improve paediatric nurses' confidence in communicating with patients and families in order to deliver satisfactory healthcare to their patients. Furthermore, this culture is reflected in paediatric nurses' attitudes towards non-pharmacological pain management in the governmental hospital. Such a culture is missing from the military hospital where the connection between top management and primary nurses is missing. This culture encourages paediatric nurses to rely on others when it comes to basic patient care.

The data collected and analyzed from phase two helps explain the findings from phase one. Therefore we can recognize that there are some factors in the hospitals which might explain the reasons why there are differences in the paediatric nurses attitudes and practices regarding non-pharmacological pain management.

The data from phase one shows that there are significant factors including; hospital type, nurses' education level, nurses' age, nursing field and nursing position when it comes to implementing non-pharmacological pain management. The data from phase two shows that there are organizational differences in the hospitals. For example, in the governmental hospital, they have strong leadership, resources, policy and procedures about paediatric pain management, a pain management team, ongoing education and other factors which might explain why there is more non-pharmacological pain management going on there.

We also know there is a relational aspect; this might explain why staff nurses 2 which have lower education level (diploma) have more time to spend with the children. Those nurses are not allowed by hospital policy to administer medication and that is the reason why they are applying non-pharmacological pain management more than staff nurses 1.

Older paediatric nurses (51-60 years old) are more likely to apply non-pharmacological pain management methods. The qualitative data suggests that there might be different reasons for

this. Having longer years of experience in paediatric healthcare might be an explanation of this finding. Older paediatric nurses are expected to have more knowledge and skills not only in paediatric health care but those paediatric nurses who spend long years working in Saudi hospitals might have better information about the Saudi culture and they might have a better ability to communicate in Arabic, which allows them to speak with the children and their families.

Finally, paediatric nurses working in ER are less likely to apply non-pharmacological pain management methods. This might be because of the nature of ER departments which does not support the administration of such methods. Patient turnover in ER is high and this prevents paediatric nurses from building relationships with the children, which is important in applying non-pharmacological methods. Moreover, ER is a critical place where nurses need to take quick actions to save and comfort patients, and non-pharmacological pain management can be time consuming compared to pharmacological methods.

Figure 5.2 provides a summary of how phase two helps explain the findings of phase one.

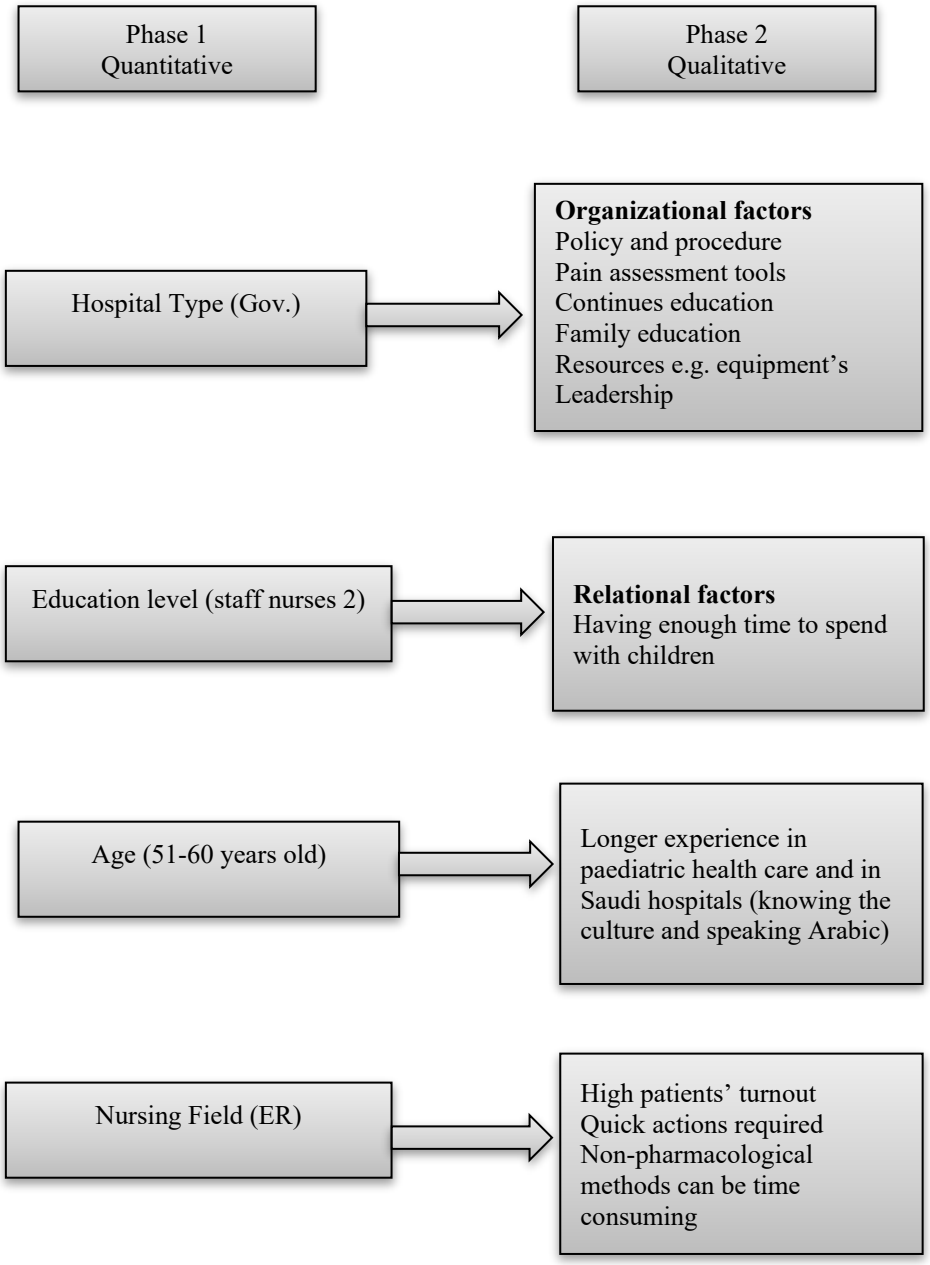

Figure 5.2: Integration between quantitative and qualitative findings

Chapter 6: Discussion and conclusion

6.1 Introduction

In Saudi Arabia, 37.2 % of the population are under the age of 15 years (MOH, 2010). These children require health services, and as a paediatric nurse, who worked in a paediatric intensive care unit where many medical procedures were carried out every day, I observed children suffering from pain, fear, and anxiety, even with the help of medication. I was also interested to know whether there were methods other than medication that could be used to decrease children's pain during medical procedures.

Several studies have considered the effectiveness of non-pharmacological pain management methods, such as distraction, preparation and relaxation, for reliving children's pain related to medical procedures (Gonzalez and Routh, 1993; French et al., 1994; Goymour et al., 2000; Lindsey et al., 1997; Gold et al., 2006; Tüfekci et al., 2009; Miller et al., 2010; Wang et al., 2008; Boivin et al., 2008; Sinha et al., 2006; Kipping et al., 2012; Kolk et al., 2000; Harrison, 1991; Schiff et al., 2001; Inal and Kelleci, 2012; Sparks et al., 2007). However, a gap in the literature was identified, as there are no previous studies applying non-pharmacological pain management to control children's pain in hospitals in Saudi Arabia.

Taking into consideration the effectiveness of applying non-pharmacological methods, I was interested to know more about the following questions.

1. How do paediatric nurses in Saudi Arabia perceive the importance of non-pharmacological pain management?
2. What types of non-pharmacological methods do paediatric nurses in Saudi Arabia use to control children's procedural pain?
3. What barriers do paediatric nurses in Saudi Arabia encounter with regard to the use of non-pharmacological methods in their daily nursing practice?

4. What advantages do paediatric nurses in Saudi Arabia perceive with regard to the use of non-pharmacological methods in their daily nursing practice?
5. Is there a relationship between the population sample's demographic data (specifically, the nurses' age, gender, nationality, religion, level of education, years of experience, country of origin and hospital type) and their use of non-pharmacological methods in Saudi Arabia?

In order to know more about non-pharmacological pain management applications in Saudi hospitals and to answer the research questions, a mixed methods research study (sequential design) was conducted. Data was collected in two phases; phase one was quantitative data collection in which questionnaires were distributed to paediatric nurses. SPSS was used to analyse the data and create questions to be asked in the second phase of data collection, which was qualitative and consisted of individual interviews. The second phase of data collection was carried out in order to understand and explain the findings arising from the quantitative data analysis.

The discussion in the current chapter are based on the research questions above, and will be presented in the broad context of the published literature. It highlights significant issues developed from the research, and considers its overall contribution to knowledge and the implications for paediatric nurses education and practice in Saudi Arabia. The current study provides a detailed picture of paediatric nurses' use of non-pharmacological pain management methods to control children's pain during medical procedures in two major hospitals in Riyadh City, Saudi Arabia. The response rate from the governmental hospital was 76% and from the military hospital was almost 79%, which indicates a good response rate. The results of the current study suggest that paediatric nurses working in the governmental hospital are applying various non-pharmacological pain management methods to control children's pain related to medical procedures; these include preparatory

information, distraction, other non-pharmacological pain management methods such as massage and providing parental guidance. It is important to note that the organizational context and culture in the governmental hospital encourages paediatric nurses in various ways to improve their knowledge, skills and confidence which is reflected in their use of non-pharmacological pain management.

On the other hand, the data showed that paediatric nurses working in the military hospital are less likely to apply non-pharmacological pain management methods compared to nurses in the governmental hospital. Furthermore, paediatric nurses in the military hospital face many challenges in applying those methods, such as a lack of policy and procedures about children's pain management, language barriers and a lack of support from the management level.

6.2 The main contribution of the current study

Hospitalized children are usually undergoing several medical procedures either to diagnose or treat their conditions. Those medical procedures are sources of pain for children. Children's acute pain can be treated by administering pharmacological or non-pharmacological methods. The current study focuses on non-pharmacological pain management methods such as; distraction, relaxation, positioning etc. which mean treating the children's pain without administering medication.

The current study provides an insight into what types of non-pharmacological methods paediatric nurses apply in their daily healthcare practice. Furthermore, it provides a full picture of the barriers and challenges facing paediatric nurses which might prevent them from applying those methods, as well as contributing to understanding how paediatric nurses can be encouraged to apply such methods. Moreover, this study shows what characteristics of paediatric nurses' affect their application of non-pharmacological methods. The current

study's findings add to the evidence-based literature about paediatric nurses' perceptions, attitudes and practice of non-pharmacological pain management to control hospitalized children's pain related to medical procedures. More importantly, it fills a gap about non-pharmacological pain management practice in Saudi Arabia.

The study helps us to understand paediatric nurses' attitudes and practices regarding children's pain management by highlighting the fact that there are differences in paediatric nurses' practice, and explaining the reasons behind those differences.

The findings of phase one of the data collection show that hospital type and some paediatric nurses' characteristic such as age, level of education, nursing position and nursing field are important factors in applying non-pharmacological pain management. Furthermore, the second phase of data collection shows that organizational factors, relational factors and nurses autonomy play an important role in encouraging or hindering paediatric nurses' use of non-pharmacological pain management.

6.3 Limitations of the study

The original survey, which was conducted by Pölkki et al. (2002), considered non-pharmacological methods in relieving children's postoperative pain, while the current study explores non-pharmacological methods in relieving children's acute procedural pain. Therefore Pölkki et al.'s (2002) survey was amended. Some questions that were designed specifically for postoperative care were amended to focus on post-procedural care such as, 'I use thermal regulation as a method of postoperative pain relief' was changed to 'I use thermal regulation as a method of post procedural pain relief'. Some questions designed specifically for postoperative care were removed, including questions regarding the type of anaesthesia (general/local anaesthesia), postoperative placement (recovery room, inpatient ward/ICU), postoperative monitoring in the ward, and pain medication after the procedure.

In Pölkki et al.'s (2002) study, the children included were school-aged children (8-12 years old), while in the current study, pre-school and school age children (3-14 years old) were included. In Saudi Arabia, pre-school is from 3-5 years old and school age is from 6-14 years old.

One of the study limitations is the potential for a social desirability bias. The quantitative data analysis shows that the participants reported a moderate percentage of 'sometimes' and a higher percentage of 'always' applying most of the non-pharmacological pain management methods. This indicates a tendency for respondents to provide answers that are more socially acceptable than their true practice. Researchers who use surveys and interviews depend on truthful answers from the participants to end up with meaningful conclusions. A socially desirable answer is one where there is a tendency for participants to show a positive image of themselves (Mortal, 2008). Participants might believe the information they present (self-deception), or might 'fake good' to follow socially acceptable values, gain social support or avoid criticism (King and Brunner, 2000; Huang et al., 1998). Huang et al. (1998) stated that social desirability bias influences the questionnaire's validity. An instrument can be considered valid if it accurately measures what it is meant to measure (Beanland et al., 1999). Pölkki et al. (2002), who created the questionnaire and used it in their study, reported that the participants acted the way they claimed to. By looking at the participants' responses in Pölkki et al.'s (2002) study, it can be concluded that there was social desirability bias. A social desirability effect in the current study may be associated with the demographic makeup of the study sample: the majority of respondents in phase one were Filipino and Indian and, as noted in 4.2.3, it is possible that concern for their contractual security may have influenced these nurses to respond to the statements in a manner that cast a positive light on their practice. These nurses must also have influenced the provision of health care as they constitute the overwhelming majority of the workforce.

Furthermore, the majority of the paediatric nurses working in the two hospitals were not Arabic speakers but when they were asked about talking to a child, telling him/her a story as a distraction method, or applying guided imagery, which depends on speaking the child's language, many of the participants reported using this type of method.

Another limitation is that the study was conducted in Riyadh, the capital of Saudi Arabia where the main health care services are located. In addition to the high population of Riyadh there are referral systems from other cities or villages. The information about paediatric nurses in Riyadh does not necessarily apply to paediatric nurses in other cities, or have relevance to outcomes in other health care sectors. Therefore, future studies are needed to include other health services and sectors in other cities where paediatric nursing practice might differ.

One of the study limitations is not interviewing paediatric nurses from ER. The reason being the heavy work-loads and busy schedules of the paediatric nurses in this department. When I went to ER to distribute the questionnaires, the nurses did not have enough time to talk to me. I had to leave the questionnaires with the nurses and come back several days later to collect the completed questionnaires. The type of care delivered to children in ER requires fast action and with the shortage of staff and lack of nurses' time, I could not conduct interviews there.

6.4 Discussing the main findings of the current study in light of the extant literature

It is important to remind the reader about the main findings of the study. The quantitative data analysis shows that the majority of paediatric nurses in both hospitals where the data was collected are female. The main nationalities are Indian and Filipino. Most of the paediatric nurses, in both hospitals are Christian and more than 40% of them are 20 to 30 years old. Paediatric nurses in the governmental hospital have longer experience; 46% of them have 6 to

10 years of work experience in paediatric nursing, and 43% of them have 6 to 10 years' experience in health care. Almost half of the paediatric nurses in the military hospital have 0 to 5 years of experience in paediatric nursing, and 29% of them have 0 to 5 years of experience in health care. More than half of the participants from both hospitals hold a baccalaureate degree in nursing.

The quantitative data analysis suggests that paediatric nurses from both hospitals apply non-pharmacological pain management to some extent. To better know what background factors can promote or hinder paediatric nurses application of non-pharmacological pain management, multiple linear regression analysis was applied. The results of the multiple linear regression analysis shows that the hospital type, paediatric nurses' age, level of education, position, nursing field and department type are all significant factors which can help or prevent paediatric nurses from using non-pharmacological pain methods in their daily practice.

Pölkki et al.'s (2002) study focused on the use non-pharmacological pain management to control postoperative pain while the current study is about acute procedural pain. Nevertheless, in Pölkki et al.'s (2002) study, 97% of nurses prepared the children by providing information. Positive reinforcement was the second most applied method (62%), and 61% distracted the child from pain. In the current study, 89.4% of paediatric nurses prepared children for medical procedures by providing information, 77.3% distracted the children from the procedures, 83.6% applied guided imagery, 95.4% used other non-pharmacological methods, and 97.1% used parental guidance.

Salanterä et al.'s (1999) study assessed paediatric nurses' knowledge of pharmacological and non-pharmacological pain management. The methods used most by the paediatric nurses were being close to the child, talking to the child, positioning, smiling at the child, rocking

and distraction. The least used methods were TENS with only 1% and hypnosis which was not used. The results of the current study show that the most frequently used non-pharmacological pain management methods are other non-pharmacological pain management methods such as breathing techniques, cold or hot application, touching and reassuring the child.

The qualitative findings present some factors that can either encourage or hinder paediatric nurses' application of non-pharmacological pain management. Those factors are presented and discussed in detail in the following sections.

6.5 Factors that encourage or hinder paediatric nurses from applying non-pharmacological pain management methods

The qualitative data analysis presents some factors that can either encourage or hinder paediatric nurses' application of non-pharmacological pain management. Organizational factors such as hospital context and culture, relationships between children and paediatric nurses', families and paediatric nurses' as well as health staff and paediatric nurses' are critical factors that can help or hinder paediatric nurses' application of non-pharmacological pain management. Furthermore, paediatric nurses' autonomy is a significant factor in facilitating or hindering paediatric nurses' application of non-pharmacological pain management methods. Those factors are presented in details as follows:

6.5.1 Organizational factors

The study findings present several barriers that can prevent paediatric nurses from applying non-pharmacological pain management in their nursing care practice. These factors include heavy work-loads, lack of time, lack of hospital policy and procedures about paediatric pain management, lack of pain assessment tools and a lack of resources such as colouring books, reading books, hot and cold compresses, TVs, and toys. These barriers were reported frequently by paediatric nursing managers and nursing health educators from both hospitals

during the qualitative data collection. Such results suggest that paediatric nurses need support from the hospital management to guide them and improve their knowledge and skills. They need help to find effective ways to communicate with children and their families and find the time to spend with the children by decreasing their work-load. Moreover, the hospital needs to provide equipment such as pain assessment tools and distraction tools such as TVs, providing clear policies and procedures to improve their confidence, knowledge and practice in relation to non-pharmacological pain management.

Literature shows that there are several organizational factors that can either promote or hinder nurses' pain management. Heavy work-loads, colleagues and other health professionals and pain management policies are factors that can affect nurses' decision-making. When nurses are working in patient oriented organizations, they will have more time to spend with patients and the organizations will support them to assess and manage pain in better ways (Abdu-Saad and Hamers, 1997; Bronckopp et al., 1998; Ely, 2001; Pederson and Harbaugh, 1995). Moreover, consulting other nurses is essential (Abdu-Saad and Hamers, 1997). Other studies (Bronckopp et al., 1998; Pederson and Harbaugh, 1995) indicate that lack of time, poor working relationships, inconsistent leadership, deteriorating morale, competing nursing tasks and lack of resources such as equipment and educational tools, are barriers to effective pain management. Helmrich et al. (2001) stated that lack of time, lack of nurses' authority, lack of hospital policy and guidelines, conflicting ability of nurses to administer non-pharmacological pain management independently and lack of resources were barriers to nurses implementing non-pharmacological pain management. Pederson and Harbaugh's (1995) descriptive exploratory study included 54 paediatric nurses and concluded that paediatric nurses used non-pharmacological methods mostly with children suffering painful procedures, although, they found that heavy work-loads and lack of time were barriers to using those methods. Pölkki et al. (2003) reported some factors that can promote nurses' use

of non-pharmacological pain management methods. These factors include nurses' competence, versatile use of pain management methods, time/workload, child's age and ability to cooperate and parental participation in the child's care. They found some additional factors that can hinder nurses' use of non-pharmacological pain management such as nurses' insecurity, lack of time/heavy workloads, nurses' beliefs related to parental roles and children's ability to express pain, limited use of pain management methods, work organizational model/patient turnover ratio, and lack of education.

These studies support the qualitative findings that a lack of hospital policy and procedures, heavy work-loads, a lack of resources and a lack of education prevent paediatric nurses' from spending enough time with children to be able to deliver quality of care by controlling pain. On the other hand, being able to consult other nurses and health professionals when having doubts helps paediatric nurses' to have better confidence in their knowledge and skills to apply various non-pharmacological pain management methods. Furthermore, 90.3% of the participants from the governmental hospital and 97.4% of the participants from the military hospital reported having a primary nursing system, which supports the literature that this type of organizational setting helps nurses to focus on patients' needs and supports them in applying non-pharmacological pain management. However the other barriers those nurses' are facing prevent some of them from applying non-pharmacological methods.

6.5.2 Relational factors

The qualitative data findings highlight the importance of the parents' presence, especially mothers, with the admitted child for many reasons such as reassuring the child, decreasing their fear and pain and, because they know their children better than paediatric nurses', this makes communication between them easier. Some participants highlighted that mothers know their children better than other people, including nurses. They stated that the presence

of mothers can help paediatric nurses' to understand the children's actions, especially crying. Some paediatric nurses' have difficulty understanding why children are crying, and they communicate with mothers to clarify if the child is crying from pain or something else. The qualitative data shows that paediatric nurses' administer medication when it is not needed because nurses' misunderstand the child crying. Other participants stated that when mothers are present, the children feel more relaxed and they get distracted by their mothers from painful procedures. It is important to highlight the language barrier, as the majority of paediatric nurses in both hospitals where the data was collected are non-Arabic speakers. This is a barrier to the paediatric nurses' communication with the children, but the presence of parents might help in communication if the parents can speak English.

The literature supports the importance of parents', especially mothers', presence with their hospitalized children. Gonzalez and Routh (1993) added insight to the role of mother-child communication in children's responses to painful medical procedures such as injections. Children included in a maternal distraction group showed significantly less distress and crying during injections compared to children in reassurance and control groups. Sparks et al. (2007) added that parental holding and positioning are successful in decreasing children's distress related to IV incretion. Other studies support the importance of parents' presence in decreasing children's distress during painful procedures (Bauchner et al., 1996). Indeed, when family members or parents play a positive part, rather than being negative restraints, this can decrease children and parents' stress and reduce the pain experience (Royal Australian College of Physicians, 2006). Paediatric nurses' communication with parents of hospitalized children is a main factor contributing to parents' views of their children's health care (Haines and Childs, 2005; Studdert et al., 2003; Pölkki, 2002). Marino and Marino (2000) surveyed a total of 3,299 families of hospitalized children and stated that the most predictive indicators of general satisfaction were questions regarding cooperation between

paediatric nurses' and parents. Satisfied parents stated that health care was adapted to their requirements and preferences (Marino & Marino, 2000). Poor communication is the most commonly reported reason for conflict between health care teams and families (Studdert et al., 2003). Moreover, Simons and Roberson (2002) found that half of the parents (n=20) included in their study showed their need for more information related to pain and pain management. Almost half of the parents (n=20) involved in Simons et al.'s (2001) study indicated that they received insufficient information, although, they stated that asking nurses for more information might be interpreted as questioning the judgment of the nurses', and they were careful during interviews to avoid criticizing nurses in relation to their feelings about the care delivered to their children.

The qualitative data findings of the current study highlight the importance of fluent communication between paediatric nurses' and their peers, paediatric nurses' and children, paediatric nurses' and head nurses, paediatric nurses and physicians, and paediatric nurses and other health specialists in supporting paediatric nurses' application of non-pharmacological pain management. Communication includes sharing information, clarifying, helping, supporting, solving problems, encouraging and coaching. Participants included in the qualitative data reported the importance of reading and sharing new information with other staff. This type of communication was considered important in improving paediatric nurses' knowledge. Moreover, the qualitative data findings of the current study suggest that coaching junior paediatric nurses can improve their skills and confidence in their nursing practice. Communication between head nurses and staff nurses in different ways, such as solving their problems and guiding them, is considered important for paediatric nurses' to feel better about their situation in the hospital. Moreover, support and help from charge nurses or head nurses to deliver health care to children especially when the primary nurses are busy with other important tasks, helps with the high ratio of patients to nurses', the shortage of paediatric

nurses and the heavy-work-loads. The qualitative data shows the negative impact of a lack of communication between health care members, departments, management and staff nurses, which raises the issue of relying on parents and other services to deliver care to children, for example massage in the military hospital. Furthermore, a lack of communication obviously affects paediatric nurses, head nurses, and managers on the issue of the existence of pain management policy and procedures for children. When I asked various staff members about the hospital policy and procedures regarding children's pain management, almost all of them had no clear answer. It can be argued that communication between staff members helps expatriate nurses to understand Saudi culture, which can be completely different from their home culture. This would help them understand children and families' beliefs, reactions and needs.

Literature supports the importance of communication between health care members and hospital services. Srouji et al. (2010) stated that it is the health care professionals' responsibility to educate their colleagues and advocate for proper pain treatment in children. The qualitative data shows that communication between paediatric nurses and children plays a key role in encouraging nurses to apply non-pharmacological pain management. Literature supports the importance of communication between nurses and children. Health care providers need to follow an individual or child centred approach when conducting pain assessment or managing pain or painful procedures. This type of approach promotes the child's right to be totally involved in the procedure, to communicate, associate, and choose. This gives children freedom to think, ask and experience as well as making them feel proud of doing things for themselves. Furthermore, children and families must be active during the procedure (Royal Australian College of Physicians, 2006).

6.5.3 Nurses' levels of education

The finding of the quantitative data analysis showed that SN2 are more likely to utilize non-pharmacological pain management methods. Furthermore, SN1 were less likely to utilize preparatory information, guided imagery and distraction methods. The qualitative data analysis showed that the hospitals prohibit those at staff nurse 2 level from administering medication which reflects the different role expectations of nurses' practicing at levels 1 and 2. The results of the current study contradict Pölkki et al.'s (2003) study which reported that nurses' with higher levels of education had more competence and less insecurity in the use of non-pharmacological pain management methods compared to less educated nurses'. Furthermore, He et al. (2005) stated that nurses' with higher levels of education prepared children more carefully compared to less educated nurses'. Salanterä et al.'s (1999) study showed that paediatric nurses' with higher levels of education applied non-pharmacological pain management more, and this result contradicts the findings of the current study in which paediatric nurses' with lower levels of education (diploma) were found to be more likely to apply those methods. The contradiction between the paediatric nurses' level of education and their use of non-pharmacological pain management of the participants included in the current study and other studies (Pölkki et al., 2002; Pölkki et al., 2003; He et al., 2005; Salanterä et al., 1999) can be explained by the availability of staff nurses' 2 in some Saudi hospitals.

The results of the current study show that there are gaps in the paediatric nurses' knowledge of non-pharmacological pain management. The qualitative data findings show that paediatric nurses' are aware of the lack of knowledge they have and they highlight the importance of continuous education. This finding is consistent with the outcomes of several other studies (He et al., 2005; Pölkki et al., 2003; Salanterä et al., 1999).

6.5.4 Working in ER

The quantitative data analysis shows that paediatric nurses' working in ER are less likely to apply non-pharmacological pain management than paediatric nurses working in other paediatric departments. The qualitative data analysis suggests several reasons such as a shortage of paediatric nurses'. First, applying non-pharmacological pain management needs paediatric nurses to build a relation with the children. This can be time consuming, which might be a barrier to paediatric nurses' using those methods. ER is usually different to other departments, as the patient turn-over in ER is usually high. Patients might come with severe pain and need quick action. Patient waiting lists for healthcare can be long. All of these factors can put pressure on paediatric nurses working in ER which prevent them from applying non-pharmacological pain management.

Kleiber et al.'s (2011) study showed that applying non-pharmacological pain management methods in ER such as imagery, distraction or controlled breathing, was 'used 100%' by only 42% of nurses. Teaching parents how to distract their children during procedures was 'used 100%' by only 46% of nurses'. Providing information about the procedure was applied more frequently with 81% of nurses using this method. Wente (2013) conducted a literature review of non-pharmacological paediatric pain management in ER. They stated that parents and child life specialists (CLS) were used in several studies to deliver interventions and increase standards of care, but they were not available in all ER departments and having them may not be viable on all shifts. These studies support the findings of the current study that not all paediatric nurses working in ER are applying non-pharmacological pain management methods.

One of the reasons for the lack of non-pharmacological pain management with children in ER could be the rapid patient turn-over in ER. Pölkki et al. (2003) supported this finding by

reporting that rapid patient turn over prevented nurses from having relationships with the children, and this hindered the choice of appropriate non-pharmacological methods for the children. Over half the participants in Pölkki et al.'s (2003) study agreed that rapid patient turnover was a barrier to them applying non-pharmacological pain management. Furthermore, a lack of time and heavy work-loads were two other major barriers to paediatric nurses' applying non-pharmacological pain management to hospitalized children. Other studies (Ely, 2001; Pederson and Harbaugh, 1995) found similar results.

Another reason for the lack of non-pharmacological pain management in ER could be the language barrier. The quantitative results of the current study show that most of the paediatric nurses working in the two hospitals are not Saudi and non-Arabic speakers (mainly from India and the Philippines), whereas most of the children are Saudis. It can be argued that for paediatric nurses to be able to apply several types of non-pharmacological methods such as distracting the child by talking about daily life or asking the child to imagine a favourite place, they need to be able to communicate with the child and to do so they need to understand each other's language. Furthermore, paediatric nurses working in Saudi hospitals' ER units might find it difficult to assess children's pain and understand their complaints. It was reported during the qualitative data collection that there are Arabic speakers in the departments who can help the non-Arabic speakers communicate with children and their families, but such a facility might not be very helpful in a situation like ER where the work-load is high and quick action is required. In Taylor et al.'s (2013) study, most of the participants highlighted that delivering care to children with poor or no English affected the time needed to deliver that care. It affected both the cost and the volume of work, for example because of the need to provide interpreters. This was also a reason for increased waiting times for other patients and it influenced target response times.

The literature shows that there are other reasons for a general lack of pain management in ER such as failure to acknowledge and assess pain, a lack of pain management guidelines, a lack of documentation, failure to assess treatment adequacy and failure to meet patients' expectations related to pain management (Motov and Khan, 2009). Busy and noisy ER departments as well as limited paediatric resources and trained staff, create challenges for the children, their families and health care provides (Wente, 2013).

6.5.5 Nurses age

The quantitative data findings show that older paediatric nurses are more likely to apply non-pharmacological pain management. Even though nurses aged between 51 and 60 years represent only 7% of participants from the governmental hospital and 15% from the military hospital, this result suggests that older paediatric nurses have better knowledge and longer experience in paediatric health care including pain management.

Pölkki et al.'s (2002) study supported this finding. The findings of their study showed that older nurses prepared the children better, compared to younger nurses. Older nurses provided more information about pain medication, information about other pain management methods and making sure that the child understood the provided information.

In 2003, Pölkki et al. conducted a study about the factors influencing paediatric nurses use of non-pharmacological pain management methods. They reported that older nurses showed less insecurity and more competence in applying non-pharmacological pain management, compared to younger nurses. Furthermore, they found that workload and time did not hinder older nurses from applying non-pharmacological pain management, which means that older nurses have a better ability to manage their time in an effective way which helped them to use those methods. Moreover, in Pollki et al.'s (2003) study, nurses' age and work experience positively influenced paediatric nurses' use of preparatory information by providing sensory

and cognitive information to the children. Older and more experienced nurses delivered information about non-pharmacological pain management methods and made sure that the children understood the provided information. Hamers et al. (1994) studied the factors influencing paediatric nurses' pain assessment and interventions. They concluded that nurses' experience is a main factor influencing their assessment and management of pain in children. Moreover, nurses used their experience to plan and determine their decisions related to various situations. He et al. (2005) also supported the findings of the current study. They reported that older nurses (aged 32-43 and 44-54) applied some non-pharmacological methods such as preparatory information, verbal rewarding, and positioning more than younger nurses.

Salanterä et al. (1999) conducted a study to assess nurses' knowledge of pharmacological and non-pharmacological pain management in children. The findings showed that nurses' knowledge varied according to their age, place of work and level of education. Nurses' years of experience had no significant relation to their knowledge of non-pharmacological pain management, while nurses aged between 46 and 55 years showed better knowledge related to non-pharmacological pain management in children. Moreover, Margolius et al. (1995) concluded that nurses' age and years of experience did not correlate with their perceptions and beliefs about children's pain. Other researchers state that paediatric nurses' beliefs affect their pain management practice (Vincent et al., 2011).

6.5.6 Nurses' autonomy

Some nurses working in the military hospital indicated that applying some non-pharmacological pain management to control children's pain during painful procedures is not their responsibility. Massaging the child is referred to the physiotherapy department or considered to be the parents' duty. The data shows that nurses working in the governmental

hospital do not claim the same thing because it is clear in the hospital policy and procedures that it is the paediatric nurses' role to apply pharmacological and non-pharmacological pain management. Furthermore, some participants from both hospitals reported that paediatric nurses are just following the physicians' orders in administering medication or applying non-pharmacological pain management. I observed a paediatric head nurse ordering the primary nurse to administer pain control medication just because a child was crying. This indicates that paediatric nurses do not have full autonomy to use critical thinking and self-decision when it comes to managing children's pain. Furthermore, paediatric nurses are not fully trusted by their managers in respect of their knowledge and skills. Paediatric nurses rely on others to apply non-pharmacological pain management methods, which indicates an urgent need to have clear policy and procedures about paediatric pain management in the military hospital. This also shows the need for educating paediatric nurses about their roles towards their patients, including non-pharmacological pain management.

Literature shows that the nurse's role in helping patients with non-pharmacological pain management during procedures is to evaluate the appropriateness of those methods, determine if the patient is well enough and ready to use those methods, educate the patient in the use of the existing options, help and support before, during and after the procedure, and finally document and evaluate the effectiveness of the methods used (Friesner et al., 2006; Gatlin and Schulmeister, 2007). Latimer et al. (2010) state that nurses' perception of autonomy means their ability to act on their clinical experience. The Institute of Medicine (IOM) Patient Safety Report (IOM, 2004) states that the efficiency of nursing care is directly associated with the level to which nurses are active decision-makers in health care.

Nurses' autonomy related to their ability to take decisions about children's care, including pain management, is lacking in both the governmental hospital and the military hospital. The

data shows that paediatric nurses are taking direct orders from physicians to apply non-pharmacological pain management before they think about pharmacological methods. In some situations, paediatric nurses receive orders from physicians or are asked by their head nurses to administer pain medication as prescribed. Paediatric nurses do not have the authority to use their own critical thinking or take decisions about the best methods to use to control the children's pain. Even though some head nurses in the governmental hospital indicated that paediatric nurses have the knowledge and ability to be active in rounds and can take positive action when it comes to planning and delivering the right care for the children, they added that paediatric nurses feel that they must follow physicians' orders. Not only do physicians force paediatric nurses to follow specific actions, but also some head nurses showed that they follow-up nurses' documentation and they question them about their decisions and care. This type of action reflects the lack of trust that paediatric nurses face, which is a barrier to them using their knowledge, critical thinking and autonomy to decide the best care possible for children. This kind of relationship between paediatric nurses and other members of staff encourages staff nurses in the military hospital to rely on others to take decisions and deliver care to children, including non-pharmacological pain management. Helmrich et al. (2001) supported this finding when they reported that help from medical officers, nursing peers and hospital administrators affects nurses' ability to apply non-pharmacological pain management. Nurses in Helmrich et al.'s (2001) study reported that they did not have confidence in themselves or their colleagues to independently integrate the therapies in their practice, wondering about their colleagues' reactions. They added that, if non-pharmacological pain management methods are not accepted by others such as physicians, nurses and hospital administration, it would be difficult for them to validate the resources and time spent applying the therapies.

Opportunity is defined as the chances available to improve knowledge and skills for better practice, including access to courses, conferences, and in-services designed to improve pain management practice. Johnston et al. (2007) assessed the influence of coaching by opinion leaders on paediatric nurses' pain management practice. They reported that the nurses' knowledge, pain assessment and use of non-pharmacological methods increased in the coaching group.

Information means data such as educational materials and the available expertise, such as a pain management team, necessary to work effectively. Organizational information can include collaboration and communication between nurses and physicians as well as the presence of a manager who is visible and available to staff. Collaboration refers to the way that nurses and physicians interact together to solve clinical problems and make decisions (Baggs et al., 1993). In Baggs and Schmidt's (1997) study, respondents reported some benefits of collaboration such as improved patient outcomes, cost control, improved job satisfaction and the promotion of nurses and physicians' learning. Higher patient satisfaction levels with the care provided and better pain care delivery are linked to good nurse-physician relationships (Wild and Mitchell, 2000). A lack of collaboration between nurses and physicians might be an indirect reason for poorer pain management because of the failure to communicate clearly or negotiate pain management methods (Latimer et al., 2010).

Resources refer to equipment, supplies and the time needed to meet work demands. This organizational feature includes adequate staff with the right expertise to accomplish the necessary work. Workload is defined as the balance between work demands and adequate resources, for example staffing and time available to plan and complete work (Koehoorn et al., 2003). Several researchers report an increase in work intensity and complexity in health

care (O'Brien-Pallas et al., 2001) and developing evidence connecting patient outcomes with nurse staffing (Aiken et al., 2004; Aiken et al., 2002; Hall and Doran, 2001; Joiner, 1996).

6.6 Implications of the results on children and paediatric nurses

The findings of the current study suggest that organizational factors play an important role in helping to establish non-pharmacological pain management. These organizational factor might include: an absence of hospital policies and procedures about paediatric pain management; a lack of education for paediatric nurses and families; a lack of Arabic courses for non-Arabic speakers and a lack of equipment. The findings from this study suggest that these might help to create a culture where paediatric nurses might be more likely to consider the need to apply non-pharmacological pain management when appropriate. These findings have implications for the two hospitals in this study in that there is now an increased understanding of the context and how this impacts upon the practice of non-pharmacological pain management. There are differences in the characteristics of the two hospitals included in the study in terms of leadership style, hierarchies of nursing job, presence and absence of pain management policies and procedures, ethnic mix, language support. Each hospital will now be in a position to consider how these organisational features impact upon such practices, specifically the implication for policy development in one of the hospitals involved.

The study also highlights the importance of relational factors when it comes to applying non-pharmacological pain management. Two specific areas of practices spring to mind here. Firstly, those nurses working in busy environments, such as ER departments, find it more difficult to develop relationships with children and their families and assess the potential for non-pharmacological pain management. Similarly, it is more likely that non-pharmacological pain management will be carried out by Staff Nurse Two compared with Staff Nurse One. Again the relational work of the former is thought to have contributed to this finding. Again

the two hospitals in the study will have the potential to benefit from these findings. The study implies that in some circumstances there may be barriers to the relational work that nurses can undertake and that this is hampered by other factors (such as task burden or time). This new knowledge can be used to both allow policy makers to make changes or to empower those nurses working within such conditions to understand how their circumstances affect the work that they do.

It has already been noted that a lack of nursing autonomy can negatively affect their confidence, knowledge, critical thinking and skills. The findings of the current study show that some paediatric nurses rely on other people and health services to deliver health care to children. The relationship between this observation and patient outcome has implications for the ways in which nurses will feel able to challenges this lack of autonomy, especially in the two hospitals involved in the study. The findings from the PhD thesis will be shared via a number of different routes and forums and the nurses from the two hospitals will benefit from these activities.

6.7 Implications for future research

My study highlights a number of areas for future research. Firstly, future studies should explore children's own experiences of procedural pain and of non-pharmacological pain management. Parental perspectives would also be valuable to explore as parents often provide informal monitoring and support for their child and may be able and willing to contribute to non-pharmacological pain management.

Secondly, while conducting data collection, I had limited opportunity to access staff nurses working in ER. Their limited time and heavy workload meant that I was unable to interview head nurses or charge nurses working there. Further research, which includes staff from ER would broaden insights into paediatric nurses' practice and their utilisation of non-pharmacological pain management methods.

Thirdly, as the results of this study show the lack of nurses' authority, further research into how nurses' can be empowered in the Saudi context is needed. Future research could address questions including; what are the barriers to empowering nurses in the Saudi hospital context? How can those barriers be overcome?

6.8 Conclusion

Saudi Arabia, officially known as the Kingdom of Saudi Arabia, is the biggest Arab state in western Asia by area, and is the second biggest country in the Arab world. The Kingdom of Saudi Arabia is the world's second biggest oil producer and the biggest exporter. The Kingdom of Saudi Arabia was a poor country before the discovery of oil. The population of Saudi Arabia is 27.1 million (MOH, 2010). The annual population growth is high, being 3.2% from 2004 to 2010. More than 67% of the population are under the age of 30 years, and around 37% are under the age of 15 years. The Saudi health care system is struggling to match the rapid population growth and demands on health care services. The Saudi Arabian government understands this, and thus they started to support the private sector to improve the situation and to cover the population's health needs. The Ministry of Health manages the health care system in the country (Yusuf, 2014).

The current study makes a unique contribution to the study of paediatric nurses' application of non-pharmacological pain management. It identifies factors that can both promote and hinder paediatric nurses' use of non-pharmacological methods in their daily clinical practice.

The findings of the current study show that paediatric nurses are to some extent applying non-pharmacological methods to control children's procedural pain. More importantly, it identifies factors that play important roles in encouraging or hindering paediatric nurses using those methods. These factors include organizational factors, relationships, and nurses' autonomy.

Organizational factors include hospital policy and procedure about paediatric pain management, equipment, shortage of staff nurses, work-loads, continuous education and providing Arabic courses and support for non-Arabic speaking staff members. The results of this study suggest that paediatric nurses need continuous support at the organizational level in hospitals to be able to communicate with children, spend time with them and know them better in order to deliver the care needed.

Relationship factors include communication and collaboration between paediatric nurses and their colleagues to support and encourage each other, as well as sharing information and skills, and building trust relationships between nurses, children and their families.

The last factor identified that can influence paediatric nurses' application of non-pharmacological pain management methods is the nurses' autonomy. As the nurses play a major role in delivering patient care, they need to have the ability to act and take decisions regarding their patients' care. The findings of the current study show that nurses in both hospitals lack the autonomy to participate in care planning and decision-making regarding patient care, and this is a barrier to them using non-pharmacological methods. Furthermore, a lack of trust between paediatric nurses and physicians might be a reason for some paediatric nurses relying on others to deliver some types of care including non-pharmacological pain management.

The results of this study suggest that paediatric nurses are in severe need of improving their knowledge and skills regarding non-pharmacological pain management to control children's procedural pain. Paediatric nurses need clear guidance and coaching from senior nurses to improve their confidence in their knowledge and skills. In addition, non-Arabic speaking paediatric nurses working in Saudi hospitals are struggling to communicate with their patients and understand their needs. These nurses represent the majority of nurses working in some

hospitals. The Ministry of Health needs to consider this issue and solve the problem in order to help children and stop their suffering. Finally, paediatric nurses need to have the authority to take action and make decisions regarding their patients' care.

6.9 Recommendations

According to the study outcomes and inferences, the following recommendation are suggested to improve paediatric nurses' practice related to non-pharmacological pain management to control procedural pain. Some of the recommendations are suggested according to the hospital.

1- The Minister of Health in Saudi Arabia needs to consider the language barrier in hospitals and the negative impacts this issue has on the health care provided for children. As a suggestion, hiring Arabic-speaking nurses (such as Jordanians or Egyptians) could be a reasonable option.

2- Hospitals need to understand the importance of communication between nurses and their peers, nurses and patients, nurses and families, nurses and management, and nurses and other health staff members.

3- Nursing schools have to consider paediatric pain management including non-pharmacological pain management in their curricula.

4- The Minister of Health in Saudi Arabia needs to establish a standard policy and procedures for paediatric pain management.

5- Hospitals need to provide continuous education for paediatric nurses on paediatric pain management including non-pharmacological pain management and improve nurses' skills through the guidance and coaching of senior nurses (e.g. by introducing competencies in all departments).

6- Some essential equipment must be provided by the hospitals such as reading and colouring materials, TVs, music, hot and cold compresses and toys.

7- Hospitals need to consider various children's health situations. Some children are not able to visit a play room. Thus, adjusting play rooms' opening hours, providing some activities for the children to distract them from pain, helping them to communicate with their families and other children, all might be helpful for them.

8- Children's departments should be made comfortable and child friendly (e.g. colourful walls, playing children's music).

9- Continuous Arabic courses for non-Arabic speakers should be provided.

10- Hospitals need to provide education for expatriate nurses about Saudi culture to help those nurses to understand and deal with children and families' demands.

11- Paediatric nurses should be encouraged and supported to take decisions about patients' care plans and health care.

12- The patient to nurse ratio should be decreased, to give paediatric nurses more time to spend with patients, which will help them apply non-pharmacological pain management.

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Appendices

Appendix 1. Approval from the author to use the questionnaire

Dear Dr. Pölkki
Hope my email finds you well.

I am Hanan Al-Harbi, a first year nursing PhD student at Sheffield University. In my PhD project I have been looking for nurses use of non-pharmacological pain management, and I have read your article ‘ Nonpharmacological methods in relieving children's postoperative pain: a survey on hospital nurses in Finland’, and I would like to use your questionnaire to measure my study variables. I would highly appreciate your permission and where I can fine the questionnaire.

Thank you very much for your time.

Dear Hanan Al-Harbi

Thank you for your interest concerning our questionnaire. As the attachment you will find the whole questionnaire. Only part of the results has been published in JAN. The questionnaire will also include the part of parental guidance.
My interest would be that I could collect the data from different countries, too. So I really would like to involve in being one of the authors, if you will develop the questionnaire and publish the results of it in any journal in the future.

3.2.2011 17:15, Hanan AL_Harbi kirjoitti:

Dear Dr. Pölkki
Hope my email finds you well

I am very interested in your work about the non-pharmacological methods in relieving children's pain.
If you allow me, I would like to make some changes in the questionnaire to make it more suitable to the Saudi environment and to answer all my research questions.

Your help is highly appreciated

It is a great pleasure to communicate with you Dr. Pölkki

Best wishes

Dear Hanan

Surely, you could make some changes in the questionnaire. As the attachment I sent you the original questionnaire developed in 1999. You could use one part of it and make some changes concerning especially the background information. I formed the questionnaire according to the earlier studies (see e.g. JAN), and the interest of the use of non-pharmacological methods has increased dramatically nowadays.

Best wishes, Tarja Pölkki

Appendix 2. Invitation for Participating in Survey

Dear colleague,

My name is Hanan Al-Harbi, a nursing PhD student at the University of Sheffield (Nrp09hfa@sheffield.ac.uk). You are being invited to voluntary participate in this research. The aim of this study is *to explore paediatric nurses' attitudes, knowledge and their use of non-pharmacological pain management therapy with paediatric patients* in Riyadh, Saudi Arabia. In addition I am aiming to explore any correlation between paediatric nurses' demographical data and the use of non-pharmacological pain management.

If you agree to participate in the study, please complete the attached survey. It will take about 15 minutes to complete this survey. Your name does not have to appear on the survey.

You have the right to withdraw from this study at any time. There are no known risks from your participation, and no direct benefit from your participation is expected.

Only me and my academic supervisor will have access to the information that you provide. Your name will not be revealed in any reports in order to ensure your confidentiality.

You can always obtain further information from me. My contact details are provided below.

Please complete the survey and return it to the designated secure box provided in the hospital before 15 April 2012. By completing the survey and return it, you are giving permission for your information to be used for research purposes.

Thank you for your time and cooperation. If you have any questions, please feel free to contact me.

Sincerely,

Hanan Al-Harbi

The University of Sheffield

School of Nursing and Midwifery

Appendix 3. Participant Information Sheet for the Questionnaire

Paediatric nurses' perceptions and the use of non-pharmacological methods to control children's procedural pain in hospitals in Riyadh (Saudi Arabia)

You are being invited to take part in a research study. Before that, it is important for you to understand why the research is being conducted and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please contact me if there is anything that is not clear or if you require any further information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the project?
The aim of this research is to assess paediatric nurses' perceptions of using non-pharmacological pain management methods to control hospitalised children's procedural pain in different Saudi health sectors in Riyadh.

Why I have been approached?
Your hospital has agreed to participate in the study. As a paediatric nurse, you are invited to take part in this study because it mainly focuses on the paediatric nurse's perceptions of using non-pharmacological pain management methods to control hospitalised children's procedural pain in different Saudi health sectors in Riyadh.

Do I have to take part?
Participation is entirely voluntary. It is up to you to decide whether or not to take part. Your consent to participate in the study will be confirmed by returning the completed questionnaire.

What will happen to me if I take part?
You are invited to complete the survey questionnaire enclosed with this information sheet. The questionnaire seeks information about paediatric nurse's perceptions of using non-pharmacological pain management methods to control hospitalised children's procedural pain in different Saudi health sectors in Riyadh. Therefore, your participation is merely enquiring about these issues.

What other information will be collected in the study?
In this study, the data will be collected by using survey questionnaire.

What are the possible disadvantages and risks of taking part?
No disadvantages or risks are anticipated as a result of completing the questionnaire.

What are the possible benefits of taking part?
It is not expected to have any direct benefits to you personally; however your contribution will provide us with valuable information about this subject that could affect the management of overall nursing practice regarding pain management in paediatric patients.

What happens if the research study stops earlier than expected?
If the study stops earlier than expected the reasons will be explained to the participant**.**

What if something goes wrong?
It is unlikely that anything will go wrong as a result of taking part in the study. If you wish to raise a complaint please contact the supervisor, contact details are given at the bottom of this sheet. If you feel your complaint has not been handled to your satisfaction you can contact the University's 'Registrar and Secretary'. Or you can withdraw from the study at any time without any accountability.

Will my taking part in this project be kept confidential?
Yes. All information obtained from the survey will be treated as confidential and not disclosed to anyone. The reports and publications arising from the study will not identify any individual who participated. All questionnaires will be kept in secure storage. The data collected will be coded so that your responses remain anonymous.

What will happen to the results of the research project?
A summary of the main findings will be provided to each participating hospital and to the research participants, if required. The research findings will also be disseminated through conference presentations and publications in both Jordan and the UK. The doctoral thesis arising from the study will available via the British Library and the University of Sheffield library for wider reference.

Who is organising and funding the project?
This research is part of a wider research programme at the University of Sheffield/United Kingdom. The research has been taken as part of a PhD study.

Who has ethically reviewed the project?
This project has to be ethically approved via the Research Ethics Committee at the University of Sheffield in the United Kingdom, the Ethics Committee in each hospital.

What if I have further questions?
You can contact the research team if you have any further questions.

Researcher

Hanan Al-Harbi, MSc, BSN, RN, Doctoral Student

School of Nursing and Midwifery. The University of Sheffield, United Kingdom

Email: nrp09hfa@sheffield.ac.uk

Research Supervisors

- Roger Watson, BSc PhD RN FFNMRCSI FHEA FRSA CBiol FSB FRCN FAAN

Nursing School of Nursing and Midwifery .The University of Sheffield – United Kingdom

- Dr. Penny Curtis, PhD MA BA RN RM

Nursing School of Nursing and Midwifery. The University of Sheffield – United Kingdom

Thank you for reading this information sheet. I hope it has answered any questions you may have.

Appendix 4: Consent Form

Paediatric nurses' perceptions of using non-pharmacological pain management methods to control hospitalised children's procedural pain in different Saudi health sectors in Riyadh, Saudi Arabia.

I have read and understood the information sheet, and I am aware that I can ask questions about the research and receive satisfactory answers.

I know that the participation is voluntary and that I can withdraw at any time without giving a reason.

I agree to take part in the interview and give my permission for tap-recording this, and for the use of quotes, without my name being disclosed.

I understand that the data might be looked at by my supervisors or peers for reviewing without my identity being revealed.

I agree to take part in the research.

Date: _____

Name of the participant: _____

Signature of the participants: _____

Appendix 5. The Questionnaire

SECTION A

Respondent's background data

1. Gender
a- Female
b- Male

2. Age:

a- 20-29 years
b- 30-39 years
c- 40-49 years
d- 50-55 years
e- 60+ years

3. Nationality.....

4. Religion:
a- Muslim
b- Non-Muslim, Please specify.....

5. Do you have children of your own?

a- Yes, how many _____
b- No (If you answer is No, please go to question number 7).

6. Have you ever been in hospital with your child/children as an inpatient?

a- No
b- Yes, how many times_____

7. Your education higher level:

a- Diploma
b- Baccalaureate
c- Master's

d- Other, please specify_____

8. Does the ward in which you work provide care for children in the following age groups (circle one or more choices):

a. 3-6 years
b. 7-10 years
c. 11-14 years.
d. All of the above

Please complete the following statements:

9. My work experience in health care is _____ years

10. My work experience in child health care is_____years

11. My work experience in my present work place is_____years

12. My current field of nursing is: (circle the appropriate choice)

a- Children's outpatient's department

b- Children's intensive care unit

c- Children's medical ward

d- Emergency department

e- Other (please specify)? _____

SECTION B

Source of knowledge:

13. Did you have any education on non-pharmacological paediatric pain management either in nursing school or during continuing education after graduation?

a- Yes
b- No (If your answer is no, please go to question number 16).

14. If you answered YES to question number 13, how many hours did you have? Please indicate.

a- 0-5 hours
b- 6-10 hours
c- 11-15 hours
d- More than 15 hours

15. If you answered YES to question number 13, where did you obtain this education?

_____
_____

16. If you answered NO to question number 13, do you wish to have education involving non-pharmacological pain management?

a) Yes
b) No

SECTION C.

Description of paediatric nursing unit

17. Which type of hospital are you currently working in?

a- Military Hospital
b- Educational Hospital
c- Governmental Hospital
d- Private Hospital

18. How is the nursing care organised in your unit?

18.1 Task-oriented nursing

- (The traditional practice of allocating different tasks to different nurses – the care of a single patient is the responsibility of several nurses).

18.2 Modular nursing

- (The unit has been divided into areas allocated to nursing teams – the care of a single patient is the responsibility of a certain number of 'module' nurses).

18.3 Primary nursing

- (The care of a single patient is the responsibility of the primary nurse appointed to him/her).

18.4 Other, please explain briefly?

_____
_____
_____
_____
_____
_____

19. How is pain management organized in your unit? (You may circle more than one alternative).

19.1 The unit has an appointed nurse specialized in pain management

a) Yes
b) No

19.2 The unit has written pain management instructions for the nursing staff concerning:

19.2.1- Pain medication
a) Yes
b) No

19.2.2 Other pain relieving interventions

a) Yes
b) No

19.3 The unit has written instructions available for the child concerning.
19.4 Pain medication
a) Yes
b) No

19.3.2- Other pain relieving interventions
a) Yes
b) No

19.5 The unit has written instructions available for the parents concerning.
19.4.1- Pain medication

a) Yes
b) No

19.4.2- Other pain relieving interventions

a) Yes
b) No

19.6 The nurse can consult others about the management of children's pain.

a) Yes
b) No

19.7 Pain management has been arranged in some other way.

a) Yes
b) No

20- Is there a pain assessment tool available for evaluating children's pain in your unit?

a) No

b) Yes, Please identify_____
(e.g. Happy-Sad-Face, Pain Colours, the Visual Analogue Scale).

21-If you answered YES to question number 20 do you use the tool (circle)?

a) Always

b) Sometimes

c) Never

==========

SECTION D

Non-pharmacological methods

The following statements pertain to the use of non-pharmacological methods in procedurals pain relief among children. In each item, circle the reply alternative that best represents your own actions. **Answer each item**, unless otherwise mentioned (e.g. if you do not use one of the listed methods, circle the alternative 1 = not at all). Also circle one of the alternatives 1 – 5 in the open-ended questions (other, what _____)

Reply alternatives

1 = Not at all
2 = very seldom
3 = Sometimes
4 = Nearly always
5 = Always

	Not at all	Very seldom	Sometimes	Nearly always	Always
Preparation of a child for a procedure					
31- I prepare a child carefully for the procedure by telling him/her about what will be done.	1	2	3	4	5
32- If you circled any of the alternatives 2 – 5 in item 31, which of the following matters do you discuss with the child before the procedure:					
32.1 what kind of procedure will be done	1	2	3	4	5
32.2 where will the procedure be done	1	2	3	4	5
32.3 by whom the procedure will be done	1	2	3	4	5
32.4 why is it important to do the procedure	1	2	3	4	5
32.5 how long the procedure will last	1	2	3	4	5
32.6 pain medication after the procedure	1	2	3	4	5
32.7 other methods of pain relief	1	2	3	4	5
32.8 other, (what)_____	1	2	3	4	5
33. I encourage the child to ask about misconceptions	1	2	3	4	5
34. When informing the patients, I use as help:					
34.1 books/ instructions folders	1	2	3	4	5
34.2 videos	1	2	3	4	5
34.3 demonstrations (e.g. showing some of the instruments needed in the procedure)	1	2	3	4	5
34.4 other, (what) _____	1	2	3	4	5
35. When preparing the child for a procedure , I discuss with him/her the following matters:					
35.1 sensation before the procedure (e.g. fear/anxiety)					
35.2 sensation during the procedure (e.g. pain)	1	2	3	4	5

35.3 sensation after the procedure (e.g. Pain, nausea)	1	2	3	4	5
36. If I notice that the child is feeling fear/anxiety, I discuss that openly with him/her	1	2	3	4	5
37. I inform the child honestly and openly.	1	2	3	4	5
38. I make sure that the child has understood the information (e.g. by asking specifying questions)	1	2	3	4	5
39. When I prepare a child for a procedure, I take into account his/her age and developmental level.	1	2	3	4	5
40. I tell older children more about the procedure than a younger child.	1	2	3	4	5

	Not at all	**Very seldom**	**Sometimes**	**Nearly always**	**Always**
Children's Procedural pain management:					
41. I encourage the child to think about/ imagine pleasant and positive matters when she/he feels pain after the procedure	1	2	3	4	5
42. If you answered any of the alternatives 2-5 in item 41, which of the following matters do you urge the child to think about					
42.1 a pleasant place	1	2	3	4	5
42.2 a nice excursion/trip	1	2	3	4	5
42.3 a favourite activity	1	2	3	4	5
42.4 other, what_____	1	2	3	4	5
43. I try to focus a child's thoughts/attention away from pain	1	2	3	4	5
44. If you answered any of the alternatives 2-5 of item 43, which of the following things do you use as distraction					
44.1 books/ magazines	1	2	3	4	5
44.2 talking about their daily lives	1	2	3	4	5
44.3 playing games	1	2	3	4	5
44.4 watching television/videos	1	2	3	4	5
44.5 listening to music	1	2	3	4	5
44.6 hobby crafts	1	2	3	4	5
44.7 humour	1	2	3	4	5
44.8 other, (what)_____	1	2	3	4	5
45. I encourage the child to relax different parts of his/her body to alleviate the sensation of pain	1	2	3	4	5
46. I teach the child the correct breathing technique to alleviate his/her pain (e.g. ask him/her to take deep and slow breaths)	1	2	3	4	5
47. When the child has pain after a painful procedure:					
47.1 I encourage the child by rewarding her/him verbally (e.g. say that she /he has done well so far)	1	2	3	4	5
47.2 I give the child a material reward, (e.g. something good to eat, magazines/books)	1	2	3	4	5
47.3 I reward the child in some other way, how	1	2	3	4	5
48. I use thermal regulation as a method of post procedure pain relief :					
48.1 I use cold application to relieve the child's pain, (what)_____ (e.g. a cold pack, cold food/drink)	1	2	3	4	5

48.2 I use heat application to relieve the child's pain, (what)_____ (e.g. a heating pad, warm bandages)	1	2	3	4	5
49. I massage the child to relieve his/her pain	1	2	3	4	5
50. I alleviate the child's post procedure pain by positioning	1	2	3	4	5
51. I use the TENS technique (= transcutaneous nerve stimulation) to relieve the child's post procedure pain	1	2	3	4	5
52. I spend time with the child when she/he feels pain	1	2	3	4	5
53. I comfort and reassure the child (e.g. speak to him/her in a calm voice or tell him/her that everything will be all right)	1	2	3	4	5
54. I use touching as a method of pain relief (e.g. stroke the child's head/hold his or her hand)	1	2	3	4	5
55. I help the child with the daily activities (e.g. washing, moving) when she/he has pain after the procedure	1	2	3	4	5
56. I try to alleviate the child's post procedure pain by making the environment comfortable for him/her	1	2	3	4	5
57. If you answer any of the alternatives 2-5 in item 56, which of the following methods do you use to make the child's environment comfortable:					
57.1 I provide a suitable room temperature and good air conditioning	1	2	3	4	5
57.2 I provide the child with a possibility to rest by minimizing noise	1	2	3	4	5
57.3 I encourage the child's parents to bring to the ward some of the child's own belongings (e.g. a teddy-bear/ doll, picture, walkman).	1	2	3	4	5
57.4 I pay attention to interior decoration of the ward (colours, lighting, furniture)	1	2	3	4	5
57.5 other, what	1	2	3	4	5
58. I ask the child to suggest ways to relieve his/her pain in the ward.	1	2	3	4	5
Parental Gaudiness					
59. I prepare the child's parents for the procedure by telling them about the following matters:					
59.1 what kind of procedure will be done	1	2	3	4	5
59.2 where the procedure will be done	1	2	3	4	5
59.3 by whom the procedure will be done	1	2	3	4	5
59.4 why is it important to do the procedure	1	2	3	4	5
59.5 how long the procedure will last	1	2	3	4	5
59.6 preparations for the procedure					
(Abstaining from food, premedication, etc.)	1	2	3	4	5
59.7 post procedure limitations (e.g. what things can/cannot be done by the child)	1	2	3	4	5
59.8 other methods of pain relief	1	2	3	4	5
59.9 other, (what)_____	1	2	3	4	5
60. I discuss with the parents in advance the child's possible sensations:					
60.1 sensations before the procedure					
(e.g. fear/anxiety)	1	2	3	4	5
60.2 sensations during the procedure (e.g. pain)	1	2	3	4	5
60.3 sensations after the procedure (e.g. pain/nausea)	1	2	3	4	5

61. If I notice that the parents are feeling fear/anxiety, I discuss that openly with them.	1	2	3	4	5
62. I involve the parents in the child's pain management.	1	2	3	4	5
63. I teach the parents ways to relieve their child's pain after the surgical procedure.	1	2	3	4	5
64. If you answered any of the alternatives 2 – 5 of item 63 , which of the following methods do you encourage the parents to use to alleviate their child's pain					
64.1 ask the child to think about/imagine pleasant and positive things	1	2	3	4	5
64.2 distract the child's thoughts away from pain (e.g. by arranging some meaningful activities)	1	2	3	4	5
64.3 encourage the child to relax different parts of his/her body	1	2	3	4	5
64.4 encourage the child to breathe deeply and slowly.	1	2	3	4	5
64.5 give the child positive reinforcement after the procedure (reward verbally/by giving a material reward).	1	2	3	4	5
64.6 distract the child's thoughts away from pain (e.g. by arranging some meaningful activities)	1	2	3	4	5
64.7 use cold or heat application	1	2	3	4	5
64.8 massage the child	1	2	3	4	5
64.9 position the child comfortably	1	2	3	4	5
64.10 give the child TENS treatment					
64.11 spend time with the child	1	2	3	4	5
64.12 comfort/reassure the child	1	2	3	4	5
64.13 use touching as a way to alleviate pain	1	2	3	4	5
64.14 help the child with the daily activities (basic care).	1	2	3	4	5
64.15 arrange a comfortable environment for the child (e.g. by bringing the child's own belongings)	1	2	3	4	5
64.16 other, (what)					
65. I guide the parents in matters related to pain medication	1	2	3	4	5

Parental guidance:

66- What other non-pharmacological therapies do you use to relieve children's procedural pain in your word?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

67- What advantages do you perceive when using non-pharmacological methods in your daily nursing practice?

_____
_____
_____
_____
_____
_____
_____

SECTION E.

Barriers to the use of non-pharmacological interventions with children:

68- What barriers do you encounter with regards to the use of non-pharmacological methods in your daily nursing practice?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____**THANK YOU FOR YOUR TIME AND EFFORT!**

Appendix 6: Pictures from some paediatric departments

Gov. (Governmental) Day Care Unit- Poster

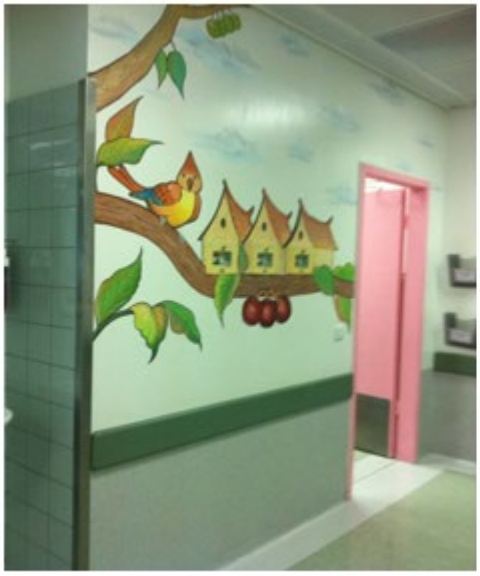
(Military) Paediatric Departments & Play Rooms

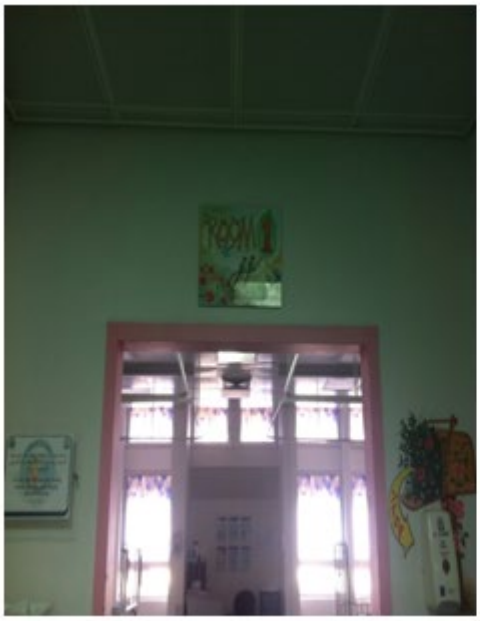
(Military) Paediatrics Department & Play Rooms

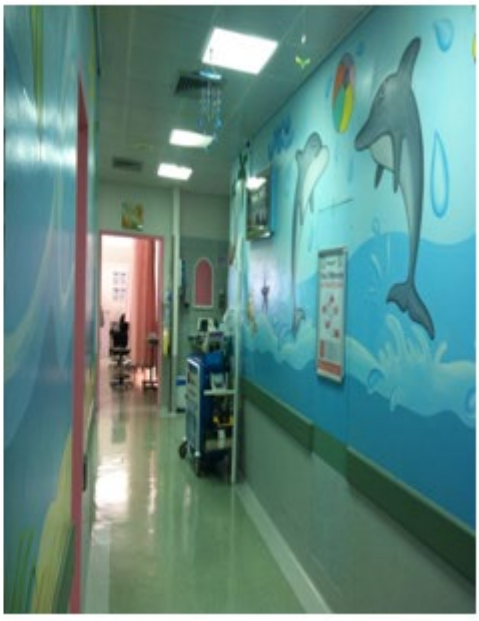
(Military) Paediatric Departments

(Military) PICU Entrance

(Military) PICU





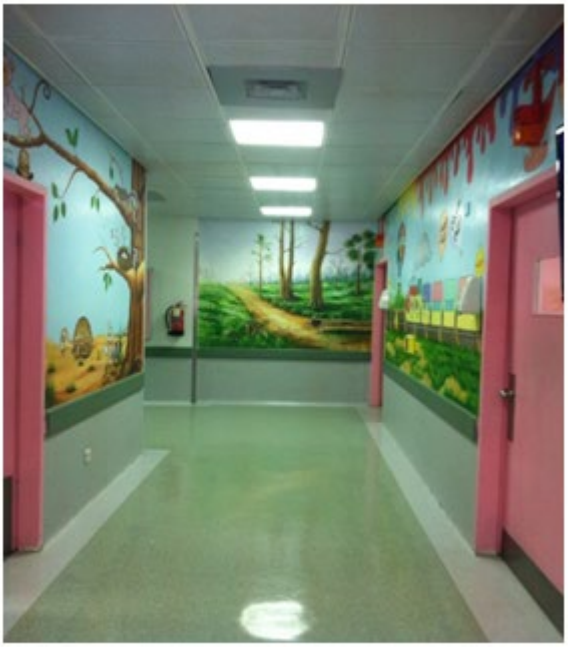


(Military) PICU




(Military) PICU

(Military) PICU Entrance



Appendix 7

The following tables present the number of the distributed questionnaires and the response rates from both hospitals. Five paediatric departments exist in the military hospital, while the governmental hospital includes a dedicated paediatric hospital. The governmental hospital includes three PICUs and different paediatric medical departments. For this reason, the paediatric departments are presented in two different ways in the tables. No nurses from the outpatient department in the military hospital were selected because those nurses work with both adult and paediatric patients.

Number of distributed questionnaires and response rate in the military hospital

Department	*Number of distributed questionnaires*	*Number of collected questionnaires*	*Response rate*
Liver department	12	9	75%
General medical	8	8	100%
General medical and surgical	26	20	77%
PICU	35	26	74%
Paediatric emergency department	18	15	83%
Total	99	78	79%

Number of distributed questionnaires and response rate in the governmental hospital

Department	*Number of distributed questionnaires*	*Number of collected questionnaires*	*Response rate*
CCTU-1	8	8	100%
CCTU-2	12	11	91.7%
Day Care Unit (DCU)	5	5	100%
OPD-1	9	6	67%
OPD-2			
OPD-3			
PDU	5	2	40%
Paediatric Emergency (PER)	22	15	68%
Paediatric Intensive Care Unit (PICU)-A	24	17	71%
PICU-B	20	12	60%
PICU-C	10	10	100%
SW-2	4	4	100%
VT	2	2	100%
W-3	4	1	25%
W-4	4	4	100%
W-5	6	6	100%
Total	135	103	76%

Appendix 8 Ethical Approvals

RIYADH MILITARY HOSPITAL
P.O. Box 7897, Riyadh 11159
Kingdom of Saudi Arabia

Research Ethics Committee

28 April 2012

MS. FATEN ABU SAMN
Director
Department of Nursing

Re: Project No. 454 – Paediatric nurses' knowledge, attitudes and use of non pharmacological methods to control children's procedural pain in hospitals in Riyadh

Dear Ms. Faten,

The abovementioned project has been submitted by Ms. Hanan Fahad Al Harbi and approved by Research Ethics Committee. As per the attached memo from the Hospital Director (copy attached) which is self explanatory, you are kindly requested to nominate one of the member of your department to supervise Ms. Al Harbi in conducting her abovementioned study.

Thank you and best regards,

[redacted]

DR. SAEED KADASAH
Chairman, Research Ethics Committee
First Floor, Building 136

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Ministry of Health
King Fahad Medical City

المملكة العربية السعودية
وزارة الصحة
مدينة الملك فهد الطبية

مدينة الملك فهد الطبية
King Fahad Medical City

IRB Registration Number with KACST, KSA: H-01-R-012
IRB Registration Number with OHRP/NIH, USA: IRB00008644
Approval Number Federal Wide Assurance NIH, USA: FWA00018744

July 2nd 2012
ERRC Number: 12-031

Dear Ms. Hanan Fahad AlHarbi,

It is my pleasure to inform you that the External Research Review Committee, a subcommittee of the Institutional Review Board, has approved your study titled: **"Pediatrics nurses' perceptions of using non-pharmacological pain management methods to control hospitalized children's procedural pain in Riyadh-Saudi Arabia".**

Please be informed that in conducting this study, you as the Principal Investigator are required to abide by the rules and regulations of the Government of Saudi Arabia and KFMC/ERRC. The approval of this proposal will automatically be suspended on **July 2nd 2013** pending the reapplication to renew the approval. You also need to notify the ERRC as soon as possible in the case of:

1. Any amendments to the project;
2. Termination of the study.

Please observe the following:

1. Personal identifying data should only be collected when necessary for research;
2. The data collected should only be used for this proposal;
3. Data should be stored securely so that only a few authorized users are permitted access to the database;
4. Secondary disclosure of personal identifiable data is not allowed.

We wish you every success in your research endeavor.

Sincerely,

[redacted]

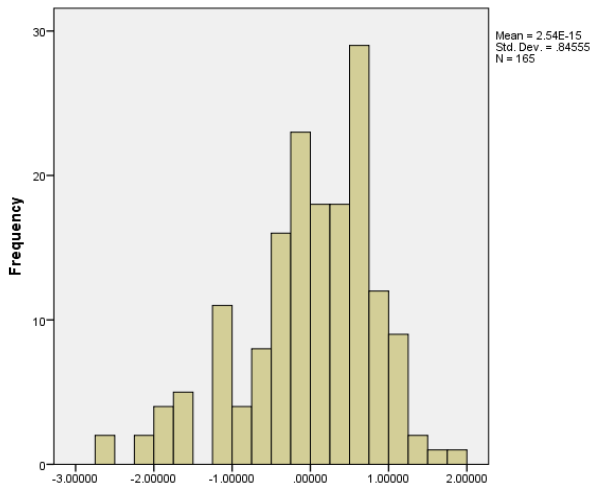
Dr. Mohamad AlTannir
Head of External Research Review Committee
Institutional Review Board
King Fahad Medical City
Riyadh, KSA

المرفقات: .....

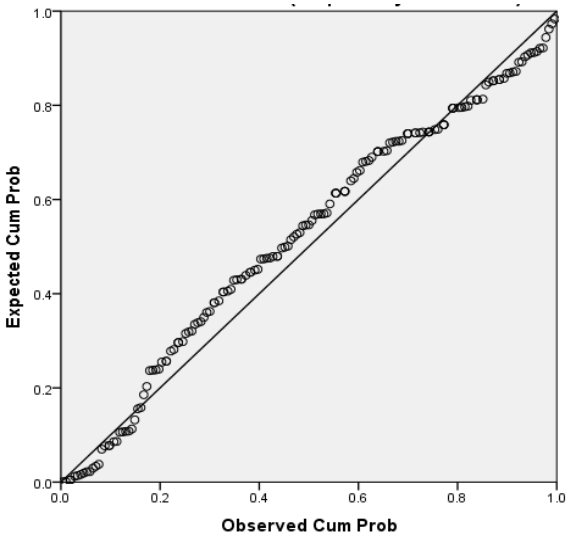
الرقم: .....

التاريخ: .....

Appendix 9 Model: Preparatory Information



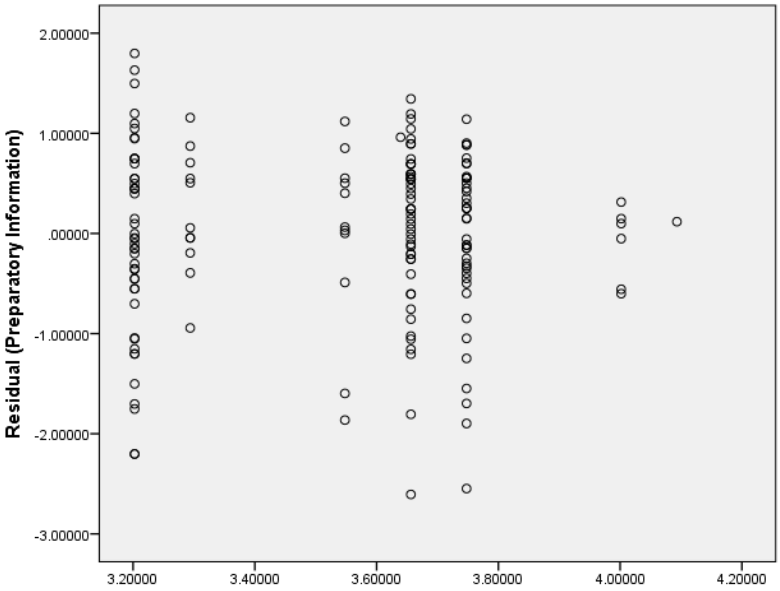
Residual (Preparatory information)



Normal P-P of Residual (preparatory information)

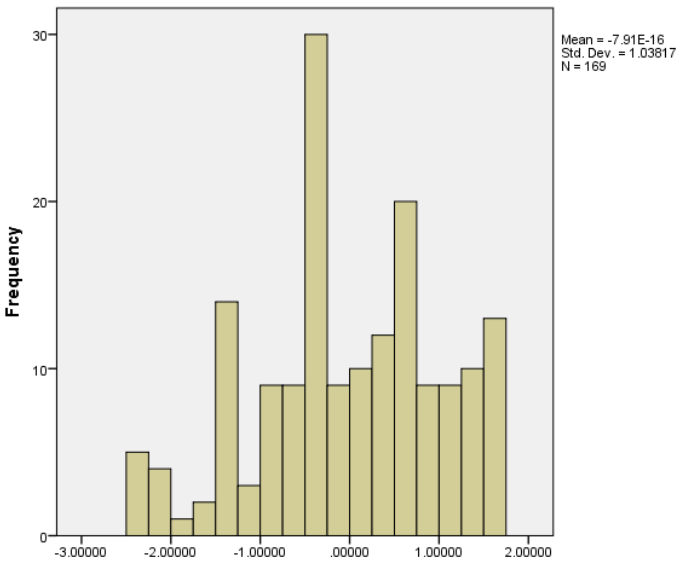
One-Sample Test/ Residual (Preparatory Information)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Residual (Preparatory Information)	.000	164	1.000	.00000000	-.1299750	.1299750

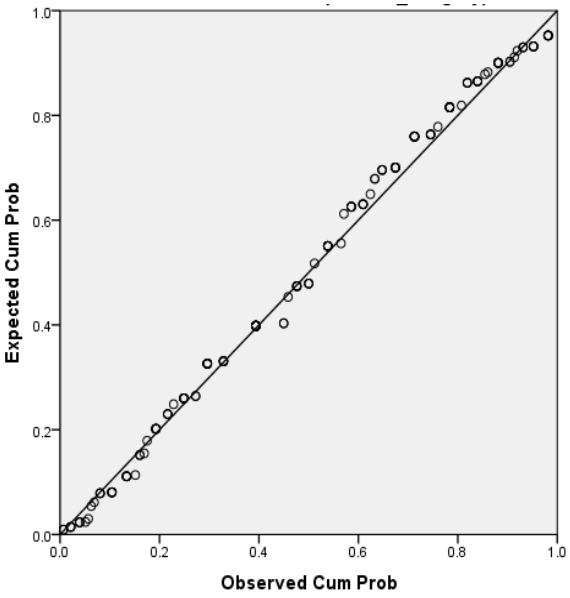


Predicted Value (Preparatory Information)

Model: Guided Imagery



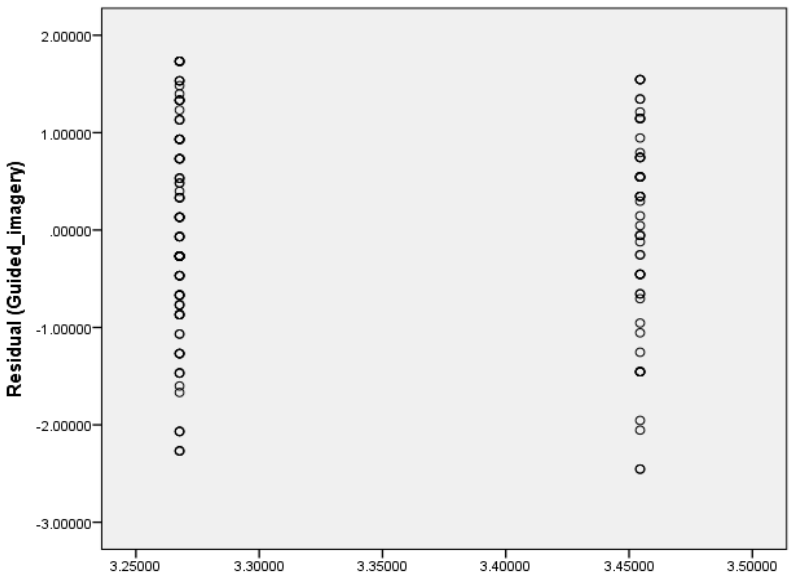
Residual (Guided- Imagery)



Normal P-P Plot of Residual (Guided-Imagery)

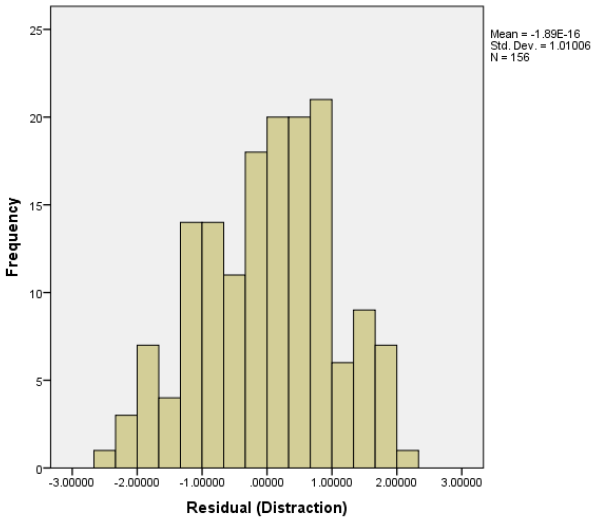
Residual (Guided imagery)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Residual (Guided imagery)	.000	168	1.000	.00000000	-.1576569	.1576569

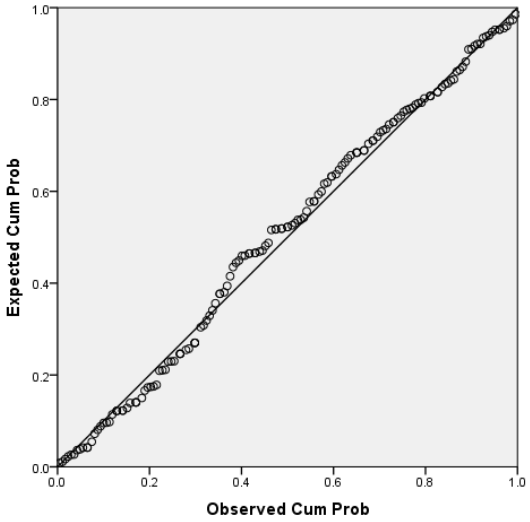


Predicted Value (Guided-Imagery)

Model: Distraction



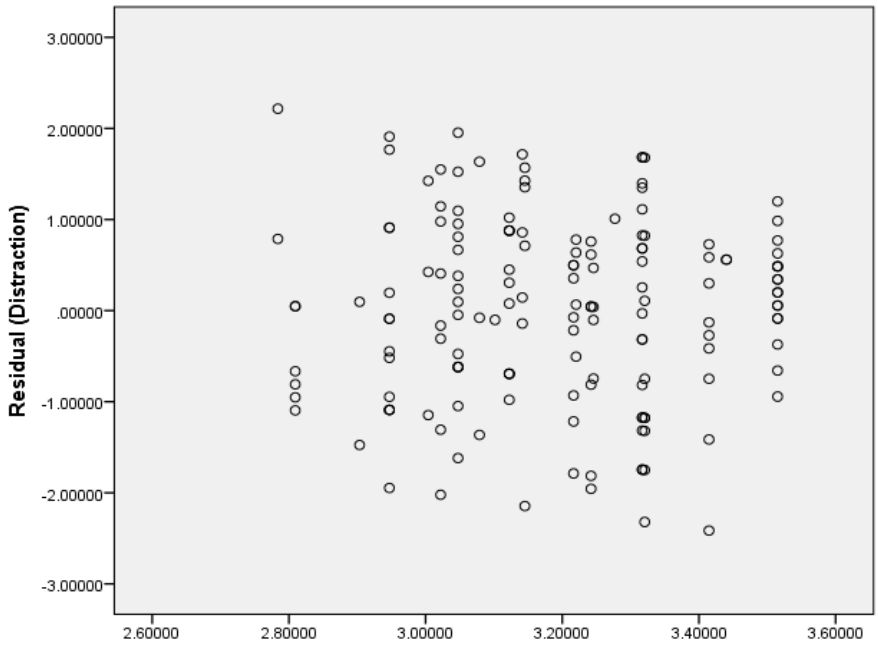
Residual (Distraction)



Normal P-P Plot of Residual (Distraction)

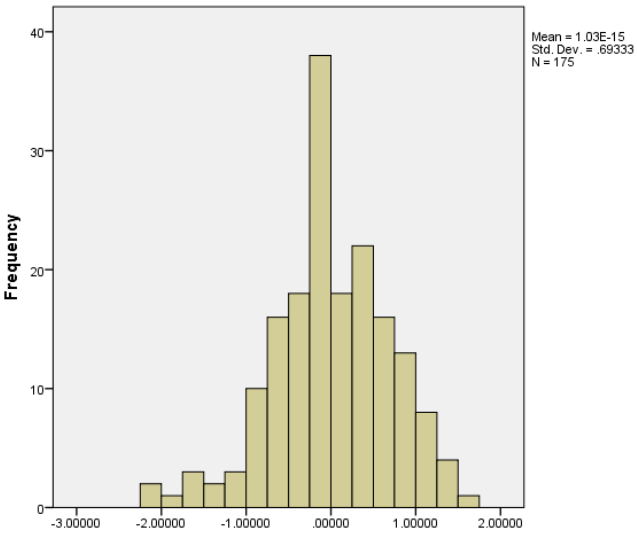
One-Sample Test/ Residual (Distraction)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Residual (Distraction)	.000	155	1.000	.00000000	-.1597480	.1597480

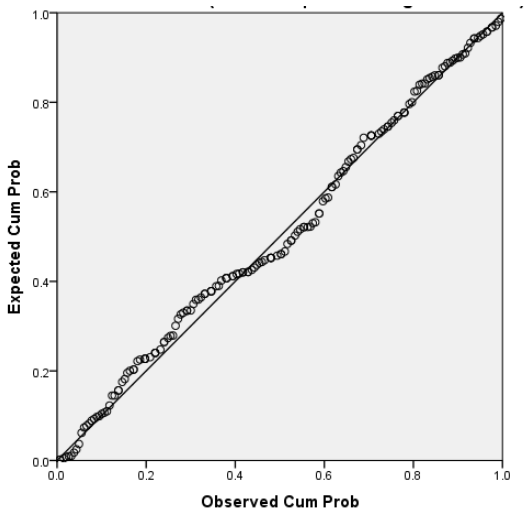


Predicted Value (Distraction)

Model: Other non-pharmacological methods



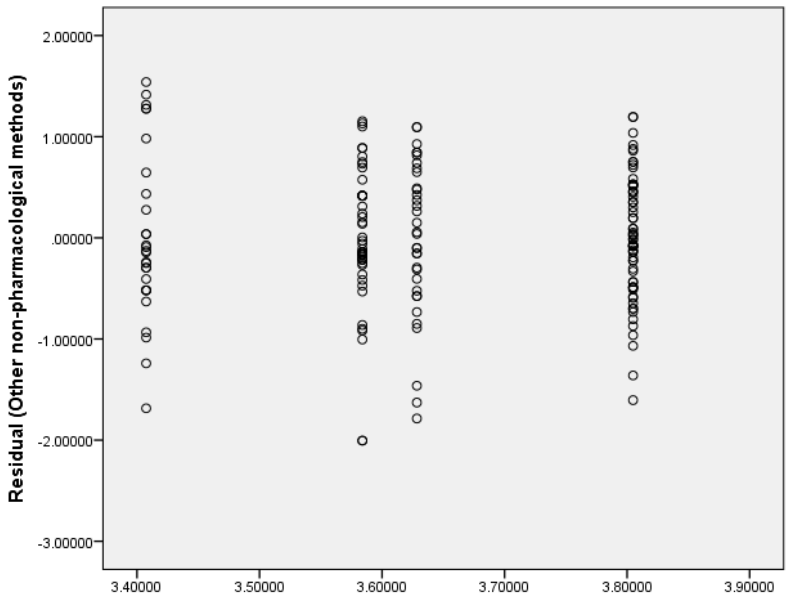
Residual (Other non-pharmacological methods)



Normal P-P Plot of Residual (Other non-pharmacological methods)

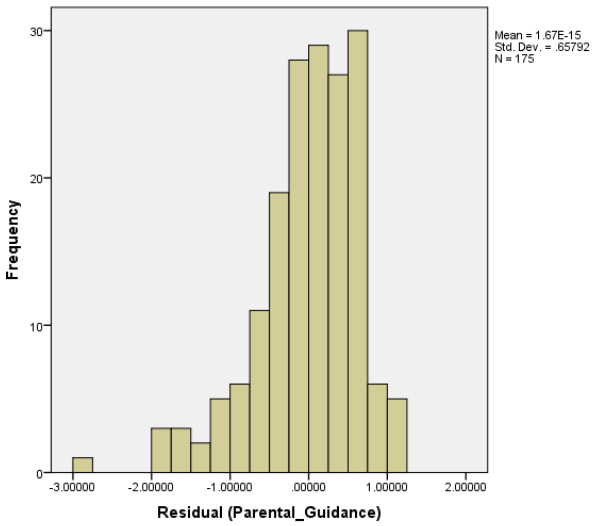
One-Sample Test/ Residual (Other non-pharmacological methods)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Residual (Other non-pharmacological methods)	.000	174	1.000	.00000000	-.1034429	.1034429

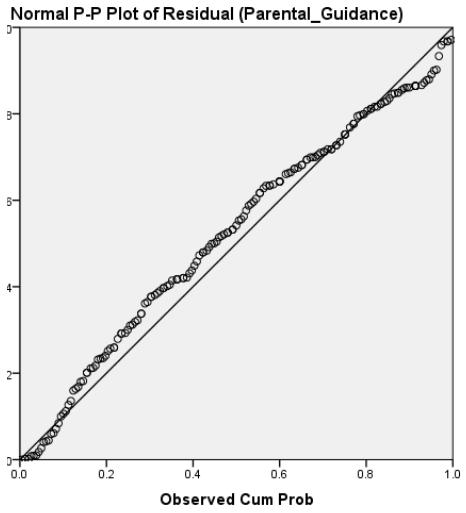


Predicted Value (Other non-pharmacological methods)

Model: Parental guidance



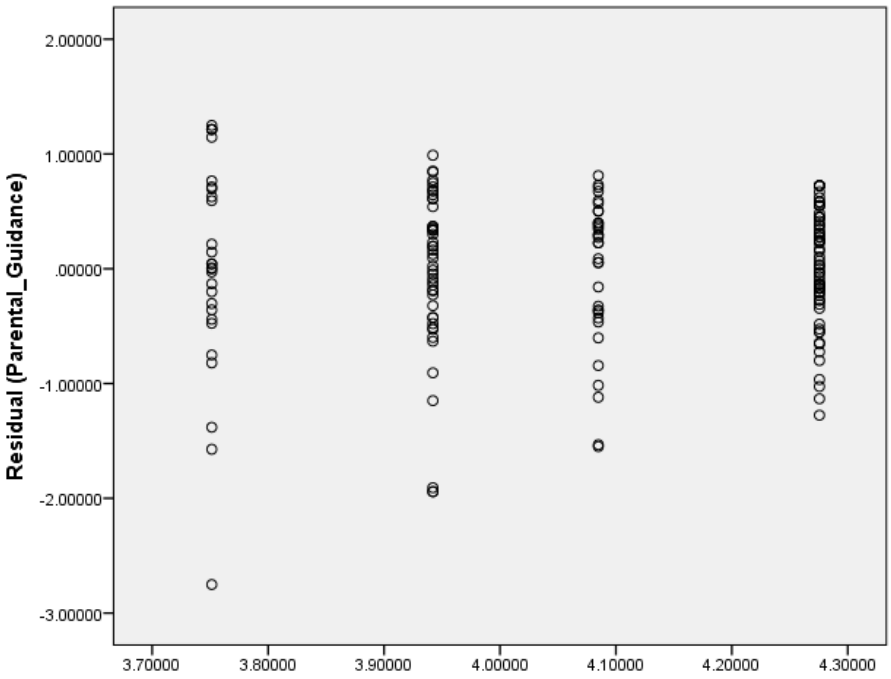
Residual (Parental-Guidance)



Normal P-P Plot of Residual (Parental-Guidance)

Residual (Parental guidance)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Residual (Parental_Guidance)	.000	174	1.000	.00000000	-.0981595	.0981595



Predicted Value (Parental-Guidance)