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NONPHARMACOLOGICAL PAIN MANAGEMENT IN PEDIATRIC NURSING

– Literature review with systematic approach.

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The purpose of this study was to explore different nonpharmacological methods of managing and alleviating pain in pediatric patients effectively. The role of the nurses is of crucial importance in the assessment and management of pain. Nurses need to understand the pathopsychological of pain and recognize that the pain management is vital in the recovery of pediatric patients. The aim of the Bachelor Thesis was to increase knowledge among pediatric nurses about the use of non-pharmacological methods in pain management. The theoretical background information for this study comprises of pain concept, classification, factors affecting pain ,pain assessment and management and non-pharmacological pain management concept for pediatric patients.

The method used in the thesis was literature review with a systematic approach. Data was searched and obtained from different databases such as EBSCO, PUBMED and SCIENCE DIRECT. Inclusion and exclusion criteria was used to choose the research articles. A total of 17 articles were reviewed. Content data analysis was used to analyze the data.

The results of the literature review showed that a variety of nonpharmacological methods are used in managing pain in pediatric nursing. These methods include psychological pain-relieving methods, physical methods, emotional support methods, helping with activities of daily living and creating a comfortable environment.

KEYWORDS:

Pain, Pain management, Pediatric Nursing and Nonpharmacological pain management.

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LÄÄKKEETÖN KIVUNHOITO LASTEN HOITOTYÖSSÄ

- Kirjallisuuskatsaus

Tämän opinnäytetyön tarkoituksena oli kartoittaa lääkkeettömiä kivunhoitomenetelmiä lastenhoitotyössä. Hoitotyöntekijöillä on tärkeä rooli kivun hoidossa sekä arvioinnissa. Heidän on ymmärrettävä kivun patofysiologia ja se, että kivunhoito on merkittävää lapsipotilaiden toipumisen kannalta. Opinnäytetyön tavoite oli tarjota hoitotyöntekijöille lisää tietoa—lääkkeettömistä kivunhoitomenetelmistä lasten hoitotyössä.

Tämän opinnäytetyön teoreettinen viitekehys koostuu kivun käsitteestä, luokittelusta, kipuun vaikuttavista tekijöistä, kivun arvioinnista ja hoidosta sekä lääkkeettömistä kivunhoidosta lastenhoitotyössä.

Käytetty tutkimusmenetelmä oli kirjallisuuskatsaus, jossa pyrittiin mahdollisimman systemaattiseen lähestymistapaan. Aineistoa etsittiin ja kerättiin useista eri tietokannoista mukaan lukien EBSCO, PUBMED ja SCIENCE DIRECT. Poissulkukriteereitä käytettiin tutkimusartikkeleiden valinnassa. Kaikkiaan 17 artikkelia valittiin katsaukseen. Analyysimenetelmänä käytettiin sisällönanalyysiä.

Kirjallisuuskatsauksen tulokset osoittivat, että erilaisia lääkkeettömiä kivunhoitomenetelmiä käytetään lasten hoitotyössä. Näitä menetelmiä ovat psykologiset kivunlievitysmenetelmät, fysikaaliset menetelmät, emotionaaliset, tukea antavat menetelmät, auttamismenetelmät päivittäisissä toiminnoissa ja miellyttävän ympäristön luominen.

ASIASANAT:

Kipu, Kivunhoito, Lasten hoitotyö, Lääkkeetön kivunhoito

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INTRODUCTION

Despite the growing evidence on pain management and the availability of evidence based clinical guidelines, pain is still inadequately treated. This can be attributed to lack of knowledge among health professionals, misconceptions among patients or lack of guidelines. (Thrane et al. 2016.) Pediatric patients' perceptions of a good pain management emphasize a holistic approach; valuing professional competence, communication and openness (Twycross et al. 2015).

Pain management in pediatric nursing can be a challenging task. Pain in these patients is often severe and not adequately treated or assessed. Study have found that in the past, children's pain experiences were unacknowledged due to the belief that children could not experience pain at the same level as adults. Pediatric patients were found to receive insufficient treatment for their pain in comparison to adults having similar procedures. (Twycross et al. 2013.) Today, extensive evidence exists in pediatric pain and research still shows that this pain frequently goes unrelieved. Pain related to procedures routinely experienced by hospitalized children who require invasive diagnostic tests and medical treatment for their illnesses, is often found undermanaged. (Twycross, Finley 2013.)

The different stages of cognitive and physical development will influence how pediatric patients respond and interpret painful experiences. It is important to deal with potentially painful situations effectively, as this may be the child's first contact with health professionals. (Twycross et al. 2013.) A positive experience in childhood may prevent fear and anxiety associated with pain being carried over into adult life (Noel 2012).

The need to understand the barriers that prevent the provision of optimal pain management for pediatric patients by nurses is of vital importance in order to eliminate unnecessary pain experienced by children. Caregivers should be made aware about different strategies in pain management. Study shows that non-pharmacological pain management methods have proven to be a success whether used alone or combined with pharmacological methods. (Baulch 2010.) The aim of the Bachelor Thesis is to increase nurses' and parents' knowledge about pain management in pediatric nursing using non-pharmacological interventions by publishing the thesis in Terveysnetti. The purpose is to do a literature review with systematic approach.

1 BACKGROUND

2.1 Concept of pain

The International association for the study of pain (2011) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in term of such damage". Pain is a conscious experience that results from brain activity in response to a noxious stimulus and engages the sensory, emotional and cognitive processes of the brain. Pain is one of the most distressing aspects of suffering related to paediatric nursing. Pain is a universal human experience and common reason why most people seek medical attention. Pain serves as a warning or protective mechanism and people with congenital analgesia, who are unable to feel pain frequently suffer from substantial tissue damage. However, unrelieved pain can lead to psychological and physical consequences. Pediatric patient's memories of pain also influence future pain. (Noel 2012.) Extensive evidence exists in paediatric pain and research still shows that this pain frequently goes unrelieved. Pain related to procedures routinely experienced by hospitalized children who require invasive diagnostic tests and medical treatment for their illnesses, is often found undermanaged. (Twycross, Finley 2013.) Pain is not entirely a body experience; It is a phenomenal that is modulated by physical, social, cultural and spiritual factors. At birth, the pain fibers are not yet myelinated and have low threshold for stimuli and connections in the dorsal horn are immature resulting in poor localized pain hence resulting in poor inhibitory coping mechanisms. (Baulch 2010.) According to previous studies, pediatric patients common source of pain comes from medical procedures such as immunization and venipunctures (Thrane et al. 2016).

2.2 Classification of pain

Classification of the pain is essential to guide assessment and management approaches. Pain can be classified in terms of its intensity (mild, moderate or severe); duration (acute or chronic); pathophysiology (nociceptive, neuropathic or mixed) or can be categorized also according to the type or syndrome. (Ebert et al. 2010.) Acute pain is defined pain of short duration with a sudden onset (Twycross et al. 2013). Acute pain is one of the most common advanced stimuli experienced by pediatrics, occurring as a result from injury, illness and medical procedure which are done routinely. It is associated with increased anxiety, somatic symptoms, avoidance and increased parent distress. Poorly managed

acute pain can lead to increased sensitivity and an increased pain response to future occurrences of procedural pain such as immunizations. (Noel 2012.)

Chronic pain in pediatrics is a significant medical condition. It is described as pain that continues beyond the expected period of healing or that continues beyond three to six months. It can be either persistent or recurrent in nature. (Ebert et al. 2010.) In children, chronic pain can present with a variety of pain conditions such as chronic headache, musculoskeletal/limb pain and abdominal pain. Early management of chronic pain is essential to minimize disability and achieve a successful treatment plan in pediatric patients. (Cupples 2013.)

Pain originating from the source maybe noceptive or neuropathic. Noceptive pain is described as pain that arises when tissue injury activates sensory neurons(nociceptors) which react to negative stimuli by sending signals to brain, triggering pain sensation (Ebert et al. 2010.) Nociceptive pain is broken down into somatic and visceral pain. Somatic describes pain associated with skin, soft tissues and bone. It is sharp, throbbing and easy to localize while visceral pain describes pain arising from internal organs. It is dull or cramping type of pain and hard to localize. Neuropathic refers to pain syndromes that result from pathological changes in peripheral or central nervous systems. (Twycross et al. 2013.)

Previous studies show that chronic pain is more common in children that previously thought. It results not only from repeated surgery and procedural occurrence but also from the development of neuropathic pain in conditions such as complex regional pain syndrome. (Baulch 2010.)

2.3 Factors affecting pain in children

Several studies have examined the effects of child's age as a key factor on their perception of pain. Children recognizes pain to be unpleasant from an early age. Pediatric patient's understanding and description of pain depend on their age and also on their level of cognitive development and past experiences of pain. (Tywycross et al.2013.) Psychological factors such as cognitive delay, emotional instabilities and fear may then interact with developmental factors, exaggerating pain and interfering with coping abilities (MaCarthy et al. 2010).

Culture is an important part of children's pain experiences in paediatric nursing. It affects or contributes to the construction for learning about pain behaviour, communication,

coping, threshold and perceptions as well as shaping conditions in which some pain responses are encouraged or others discouraged. (Kristjánsdóttir et al. 2012.) A recent systematic review of cross-cultural studies examining pediatric pain related outcomes in children, parents and/or health professionals found that cultural factors were associated with painful experiences. The review found that there cross-cultural differences were evident specifically in relation to children's pain behavior during painful procedures, coping strategies and their nonverbal expression of pain. (Kristjánsdóttir et al. 2012.)

Children often take cues from their parents' own pain behaviours, they learn how to behave by watching their parents or other members of the family. This affects how children behave in certain situations, their response to pain and their way of showing or hiding it. (Ebert et al. 2010.) A child's gender influence on how much pain they experience and how they respond to pain relief interventions. There is evidence that girls maybe more susceptible to pain than boys due to hormonal and neurobiological factors and that girls are more likely to express their pain than boys. For effective pain assessment and management, all the factors influencing pain in paediatrics must be taken into account and every experience of pain should be managed at individual level. (Tywcross et al. 2013.)

3 PAIN MANAGEMENT IN PEDIATRIC NURSING

Pain management refers to use of nursing process stage- assessment, planning, implementation and evaluation for the treatment of pain. Pain serves as a warning or protective mechanism and people with congenital analgesia, who are unable to feel pain frequently suffer from substantial tissue damage. (Noel 2012.) Pain management in paediatric nursing is a key factor. In medical dictionary, paediatric nursing is defined as the branch of nursing concerned with care of infants and children. Care begins at birth with newborn examinations and continues until after adolescence. (Mosby's Medical Dictionary 2009.)

Pain in paediatric patients can be undermanaged due to the influence of the different cognitive stages of development on the child's perception of pain and the difficulty in assessing pain accurately in pre-verbal and non-verbal infants, young children and children with complex disabilities (Sng et al. 2013). Previous studies examined whether pain was addressed during usual vaccinations and found that even though pharmacological and non-pharmacological methods were available and easy to use, these methods were not performed due to lack of knowledge (Thrane et al. 2016). Inadequate application of pain medications and non-pharmacological pain alleviation interventions remains the underlying reasons for the under treatment of pediatric patients' pain especially postoperative. It is important to explore nurses' attitudes regarding pediatric patients pain and pain management. This will help initiate attitude change for improved pain management in pediatric patients. (Sng et al. 2013.) Effective pain management has numerous benefits. This not only reduces child's pain but also leads to faster recovery, increased mobility, improved sleep, increased parental satisfaction and leads to shorter hospital stay and fewer re-admissions to hospitals. (Twycross et al. 2015.)

3.1 Assessment of pain

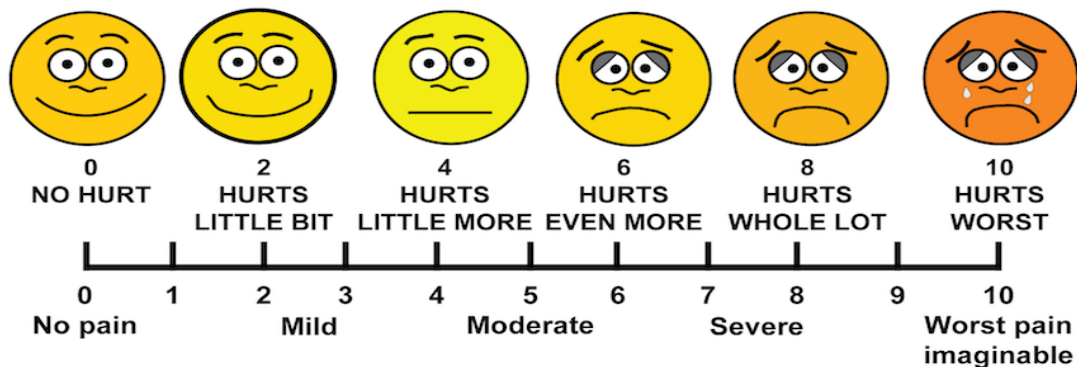
Pain assessment involves clinical judgements based on observation of the nature, significance and context of the child's pain experience. For pain to be managed effectively, ongoing assessment of the presence and severity of pain and child's response to treatment is essential. Pain can be assessed through self-reported measures, behavioural measure of pain or psychological measures. (Twycross et al 2013.) Most studies shows that even though pain assessment tools are available, nurses do not use them

consistently (Twycross et al. 2015). There are variety of pain assessment tools available in pediatric nursing. These tools rely mainly on observer reports and consider a variety of behaviours including cry,expression,movement,tone,body posture and consolability. Some assessment tools also take into account physiologic signs such as respiratory,heart rate,blood pressure or oxygenation. (Thrane et al. 2016.)

Although self-report is one of the best measure of pain, it has limitations in pediatrics as it is dependent on cognitive development and may be affected by factors such as previous experience of pain,personal beliefs and family influences. The use of pain assessment tools have been shown to reduce error or bias thus preventing misunderstanding of the meaning of self-report. (Baulch 2010.) Commonly used self-report tools for school-aged children include Verbal Rating Scale (VRS),Faces Pain Scale and Numerical Rating Scales (NRS). Behavioural tools developed to assess pain in infants and younger-children generally use behavioural indicators of pain. (Twycross et al. 2013.) In an analysis of the most specific and reliable behaviours used by health care professionals,it was found that crying,facial expression and body posture were most sensitive cue to identifying pain. During neonatal period,the analysis found that the CRIES observational tool is often used. It assesses the folowing attributes; Cry described as none,consolable,high-pitched and inconsolable, Requires oxygen to maintain a saturation of 95%, Increased vital signs, facial Expressions as no grimace,grimace or grimace and granting and Sleepless described as asleep,frequently awake or constanltly awake. (Savino 2013.)

According to Thrane (2010), FLACC (Face,Legs,Activity,Cry and Consolability) is the most popular observational pain assessment tool used in health centers. As toddlers cannot conceptualize pain in terms of location or intensity, FLACC,Children's and Infants' Postoperative Pain Scale(CHIPPS) and Children's Hospital of Eastern Ontario Pain Scales (CHEOPS) are populary used to assess pain in pediatric patients. In a prospective study involving 150 children and four observers,both FLACC and CHIPPS were found to be homogenous,have good face and construct validity,sensitivity and specific to pain. CHEOPS was not as consistent because the category of "touch" has a low scale for internal validity and reliability. (Bringuier et al. 2009.) One example of a Faces Pain Scale is shown in picture 1 below.

PAIN MEASUREMENT SCALE



PICTURE 1. Wong-Baker FACES pain rating scale (Dempster 2016)

3.2 NONPHARMACOLOGICAL PAIN MANAGEMENT

Nonpharmacological pain management refers to use of drug-free methods to relieve pain and improve wellbeing. While drugs are used to treat somatic dimension of pain, non-pharmacological methods aim to treat the affective, cognitive, behavioral and social-cultural dimensions of the pain. The nonpharmacological methods include cognitive-behavioral therapies, emotional support, psychological methods and comfortable environment. This methods will be elaborated more on this thesis. Non-pharmacological pain management have proven to work with combination of pharmacological pain management methods or when used alone. Studies shows that experienced nurses have claimed that different non-pharmacological methods have helped them create a relationship with the child, making the child more willing to cooperate during a procedure. This could make a child more accepting on a painful procedure. (Svendsen 2014.) In studies that mapped the level of knowledge on pain management, non-pharmacological methods were one of the areas that nurses had the least accurate knowledge (Svendsen 2014). A study about postoperative pain management experiences revealed that despite use of pain medication to relieve pain, most children used their own non-pharmacological methods including cognitive-behavioural methods of distraction and imagery, physical method of positioning, sleeping and drinking, seeking parents help by informing and crying. Majority of the kids who took part in the study reported significant reduction of pain by combining both pharmacological and non-pharmacological pain management methods. (Sng et al. 2013.)

4 THE PURPOSE AND RESEARCH QUESTIONS

The specific purpose of this Bachelor Thesis was to explore different methods of managing and alleviating pain in pediatric patients effectively by use of non-pharmacological pain management methods. The role of the nurses is of crucial importance in the assessment and management of pain. Nurses need to understand the pathopsychological of pain and recognize that the pain management is vital in the recovery of pediatric patients. (Stanley, Pollard 2013.) The aim of the Bachelor Thesis was to increase knowledge among pediatric nurses about use of non-pharmacological methods in pain management.

The research questions were:

1. What are the non-pharmacological pain interventions techniques in pediatric nursing?
2. What are the challenges/barriers encountered by nurses when using non-pharmacological pain management techniques?

5 LITERATURE REVIEW WITH SYSTEMATIC APPROACH

5.1 Research Method

The method for data collection was literature review with systematic approach which refers to a more detailed method which identifies comprehensively and tracks down all the available literature on a topic while describing a clear comprehensive methodology. Literature review with systematic approach uses explicit and vigorous methods to identify critically appraised and synthesized relevant studies in order to answer predefined question. (Helen Aveyard 2014.) This method for data collection involves literature search data selection, description of data and data analysis. Literature review was based on accredited articles, journals and books; Therefore, this data was collected from literature searching conformity to the study task and purpose for this study.

The characteristics for this systematic review are being objective, systematic, transparent and replicable. This involves a systematic search process to locate studies which address a particular research question, as well a systematic presentation and synthesis of the characteristic and findings of the results of this search. The principles of conducting a systematic review is done by using clear objectives and comprehensive search strategy and explicit inclusion and exclusion criteria which we will apply. This explicit approach aims to minimize bias and allows reader to review and assess the authors assumptions procedure, evidence and conclusions, rather than taking the authors conclusions.

5.2 Data Collection and review

The form of literature collection for this review was conducted as an electronic search using the main data bases available at the Turku University of Applied Sciences network. This database searches are as follows CINAHL complete, Science Direct and PubMed. The searches was conducted using the abbreviation terms: pain concept, factors affecting pain, classification of pain, pain management in children, non-pharmacological pain management in children in each database. The results were limited by the inclusion and exclusion. See table 1 below

Inclusion criteria for articles

Pediatric non-pharmacological pain management methods

Articles published after 2007 until 2017

English articles

Articles that answer our research question and purpose statement

Full text articles which open

Exclusion criteria for articles

Articles not associated with paediatric non pharmacological pain management methods

Articles published before year 2007

Articles not in English

Articles that does not answer our research question nor purpose statement.

Articles which were not full text and which did not open

The results were too wide and the search criteria had to be narrowed down further to those articles that provide a full text version or a link to a full text version.

During the elimination process thousands of articles were overviewed and then either set aside for the possibility of returning upon later or eliminated in the end, of all the hundreds of articles overviewed only 445 provided to be adequately linked to the topic and 35 were in abstract form. Some of the other responses were also proper linked to the topic but did not have a link to the full text articles nor the possibility to search through other search databases. For those others that had links to full text articles were not accessible due to the fact that they were being sold and one needed to purchase those in order to get to access.

From all the articles with full text 17 were picked and others eliminated based on it meeting the exclusion criteria.

Database	Search terms	Filters	Number of results	Chosen on ground of topic	Chosen on ground of abstract	Chosen on ground of full text
Pubmed	*Non pharmacological pain management *Pediatric	English language 2007-date Full text	286	22	22	5
Cinahl complete	*Non pharmacological pain management *Pediatric	English language 2007-date Full text	16	4	4	4
Science Direct	*Non pharmacological pain management *Pediatric	English language 2007-date Full text	1075	419	9	8

Table 1. Literature search table.

5.3 Data analysis

Data analysis is defined as a process of evidence synthesis which involves the extraction of details example, the method, setting and type of participants from original study including aggregation of original findings into categories and further into synthesis (Hannes, 2011). Content data analysis was used to analyze our data and it is defined as a process of organizing and integrating qualitative information according to emerging themes and concepts (Polit & Beck 2014). A table was created for the articles used in order to analyze the content and to make comparisons between the results and the type of studies. The table include the following information on each article, the researcher, the place and year of publication, The purpose of the research study project, the sample and data collection methods and the main findings. See table 2 below.

Title	Author, place and year of publication country	The purpose of the study	The sample	Data collection methods	The main findings	Limitations
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Turkish Nurses' use of Non pharmacological Methods for Relieving Children's Postoperative pain.	Celeioğlu A., Kücükoğlu S., Odobas oğlu, E. (2015). Turkey.	The research was conducted to investigate and analyse Turkish nurses' use of non-pharmacological methods to relieve post-operative pain in children.	Registered nurses (n=143)	Cross-sectional and descriptive statistics	Nurses used different non-pharmacological methods for postoperative pain relief. Most commonly used method for pain relief by nurses was cognitive behavioural therapy.	Total numbers of interviews was relatively small.
When "don't worry" communicates fear: Children's perceptions of parental reassurance and distraction during a painful medical procedure	* <u>McMurtry C.M.</u> , <u>Chambers C.T.</u> , <u>McGrath P.J.</u> , <u>Asp E.</u> (2010) Canada.	The purpose of the study was to systematically examine children's perceptions of adult emotion during reassurance.	Children (n=100)	This was done through a video mediate method	The results gave an understanding of the role of adult reassurance and highlighted on the vital role of parental facial expression, tone, and verbal content during painful medical procedures.	Parental behaviors were recorded during busy clinical laboratory and some of the clips were challenging to hear.
Single-session biofeedback-assisted relaxation training in children with sickle cell disease.	*Myrvik M.P., Campbell A.D., Butcher J.L. (2012). USA	The purpose of the study was to assess single-session biofeedback-assisted relaxation training (BART) for sickle cell disease pain in children	Children (n=10)	Systematic questionnaires	It was concluded that single-session BART offers a promising, complementary approach to medication management of SCD pain	Sample was small thus limits statistical analyses meaning a generalization of findings.
The use of nonpharmacological methods for children's postoperative pain relief: Singapore	*He, H., Lee, T., Jahja, R., Sinnappan, R., Vehvilinen, K., Polkki, T., Ang, E.N.K.,	The purpose of the study was to evaluate how nurses use nonpharmacological methods for school-age	Children (n=134)	Descriptive questionnaire survey	It was found that nurses who were younger, less educated, with lower designation, less work experience,	Respondents were forced to answer. Since the survey conveyed self-reported

nurses' perspectives.	(2011). Singapore	children's postoperative pain relief.			and do not have children rarely used nonpharmacological methods.	actions which certainly may not agree with actual clinical practice
Imagery-Induced Relaxation in Children's Postoperative Pain Relief: A Randomized Pilot Study.	Pölkki, T., Pietilä, a., Vehviläine n- Julkunen, K., Laukkala, h. and Kiviluoma, K., (2008). Finland	The objective of the study was to test the efficiency of imagery and relaxation in hospitalized children's postoperative pain relief	Children (n=60)	Investigator-developed questionnaire	This study showed that the children who listened to the imagery trip CD experienced less pain than the control children.	Long period of data collection may have had negative effects on the motivation of nurses.
Randomized clinical trial of musical distraction with and without headphones for adolescents' immunization pain.	*Kristján dóttir, L. and Kristjánsdóttir, G., (2011). Canada	The aim of the study were to assess the usefulness of musical distraction in reducing adolescents' immunization pain and to examine whether musical distraction techniques (with or without headphones) used influenced the pain outcome.	14 years old adolescents (n=118)	Experimental questionnaire	The results indicated that adolescents who received musical distraction were less likely to report pain compared to the control group. The results Proposed that musical distraction Intervention, implemented without headphones, gave some pain relief.	Adolescents' immunization pain intensity ratings were very low,
Acupuncture management of pain and emergence agitation in children after bilateral	Lin, Y., Tassone, R.F., Jahng, S., Rahbar, R., HolzmaN,	To investigate the consequence of acupuncture in postoperative	Children (N=60)	Randomized controlled trial observation	The study suggested that acupuncture therapy may be effective in lessening both	Not stated

myringotomy and tympanostomy tube insertion.	R.S., ZurakoWS KI, D. Sethna, N.F., (2009). USA	pain and emergence agitation in children undergoing bilateral myringotomy and tympanostomy tube (BMT) placement.			pain and emergence agitation in children after BMT insertion without adverse effects	
Using acupuncture for acute pain in hospitalized children.	* Wu, S., Sapru, A., Stewart, M. A., Milet, M. J., Hudes, M. Livermore, L. F., Flori, H. R. (2009) USA	A Clinical study conducted to determine the acceptability and feasibility of acupuncture for acute postoperative pain control in hospitalized children	Children (n=20)	Non-Randomized clinical trial observation	The results found out that acupuncture was highly accepted and well tolerated by children and parents in critically ill, postoperative pediatric patients with acute pain.	The study was limited by the small sample size and the lack of a control group
Laser acupuncture in children with headache: A double-blind, randomized, bicenter, placebocontrolled trial.	Gottschling, S., Meyer, S., Gribova, I., Distler, L., BerranG, J., Gortner, L., Graf, N., Shamdeen, M. and Pothmann, R., 2009. Germany	The study aimed at investigating whether laser acupuncture is effective in children with headache and if active laser treatment is superior to placebo laser treatment	Children (n=43)	Randomized clinical trial observation	It was concluded that laser acupuncture can offer a substantial benefit for children with headache with active laser treatment being clearly more effective than placebo laser treatment.	Not stated
Massage therapy in outpatient pediatric chronic pain patients: do they facilitate significant reductions in levels of distress, pain,	Suresh, S., Wang, S., Porfyris, S., kamasinsk i-sol, R., Steinhorn, D.M., (2008). USA	The objective was to study the efficacy of adjuvant massage therapy in children and adolescents who presented to a chronic	Children and adolescents (n=57)	Randomized trial observation	It was found that after massage therapy, patients showed a great improvement in their levels of distress, pain, tension,	Larger sample size and controlled studies are needed to confirm these findings because

tension, discomfort, and mood alterations?		pediatric pain clinic for management.			discomfort, and mood compared to their ratings before massage	the sample size was small
The effect of the facilitated tucking position in reducing vaccination-induced pain in newborns.	Kucukoglu S., Aynur, S. Aytekin, A., (2015). Turkey	The study was carried out to examine the pain perceptions of newborns during the hepatitis B (HBV) vaccinations performed in the facilitated tucking position and in the classical holding position.	Targeted group Newborns (n=30)	randomized controlled experimental observation	It was concluded that the pain perceptions of newborns held in the facilitated tucking position during HBV vaccination were lower, therefore, it was recommended as an effective and useful method for reducing pain during the procedure.	
Non-nutritive sucking and facilitated tucking relieve preterm infant pain during heel-stick procedures: A prospective, randomised crossover trial.	Liaw, J., Yang, L., Katherine Wang, K., Chen, C., Chang, Y., Yin, T., (2012). Taiwan	The study aim to compare the efficacy of two non-pharmacological pain-relief strategies with routine care on preterm infants' pain, behavioural, and physiological responses before, during, and after heel-stick procedures	Infants (n=34)	Prospective, randomized controlled crossover trial questionnaire	It was found that the non-pharmacological pain-relief strategies i.e. non-nutritive sucking and facilitated tucking successfully reduced pain scores more than routine care in heel-stick procedures. Further, non-nutritive sucking reduced PIPP pain scores more effectively than facilitated tucking	Infant behavioural responses to heel-stick procedures varied significantly at each observation

Kangaroo Care modifies preterm infant heart rate variability in response to heel stick pain: Pilot study.	Cong, X., Ludington-hoe, S.M., McCain, G. and Fu, P., 2009. USA	To determine whether kangaroo care yields improved balance in autonomic responses to heel stick pain than the standard method, incubator care.	Preterm infants (n=14)	randomized cross-over trial method	It was found that infants experienced better balance in response in kangaroo care than incubator care condition	
Effects of facilitated swaddling for controlling procedural pain in premature neonates: a randomized controlled trial.	Ho, S., Ho, L., (2012). China	The study carried out was to investigate the effect of facilitated swaddling to regulate procedural pain among premature neonates.	Neonates (n=54)	Random trial method	It was found out that facilitated swaddling was effective in controlling procedural pain of heelstick among premature neonates.	Not stated
Effectiveness of Breastfeeding on Intensity of Pain Prior to Immunizing Intramuscular Injection among Infants.	Pradhan, R., Chhotaray, A., Acharyya, S., Bhowal, G., (2016). Bhubaneswar	The aim of the study was to find out the effect of breast feeding on pain response in infants during intramuscular injection for immunization.	Infants (n= 120)	A quasi-experimental design with evaluative approach method.	The study revealed that the perception of pain intensity is not that much among infants when I.M. vaccine is administered In the course of breast feeding.	The study was limited by the small sample size.
Oral sucrose as analgesia for neonates: How effective and safe is the sweet solution? A	Campbell, Cleaver et al. (2014) London, U.K	To evaluate the safety and effectiveness of sucrose as analgesia for neonates	Neonates	Literature review	The review found that in preterm and full term neonates up to the first month of life there is evidence to suggest that oral sucrose,	Not stated

review of the literature					with or without non-nutritive sucking, is effective and safe for reducing pain responses	
Transcutaneous electric nerve stimulation (TENS) in dentistry- A review	Kasat et al (2014), USA	To provide an insight into clinical research evidence available for the analgesic and non analgesic uses of TENS in pediatric related to the field of dentistry.	Pediatrics	Literature review	The review found good evidence that Transcutaneous electric nerve stimulation (TENS) is effective in pain relief during various dental procedures.	Not stated

TABLE 2. Research table.

6 RESULTS

This review of literature explored and identified the nonpharmacological pain management methods in pediatric nursing and the barriers encountered by nurses when using nonpharmacological pain relief methods. The study revealed substantial evidence to support the use of nonpharmacological methods in providing complementary pain relief in pediatric patients by reducing emotional perception of pain, enhancing comfort and strengthening coping capabilities.

According to the reviewed articles, nonpharmacological methods can be grouped into cognitive-behavioral therapies, physical methods, emotional support, helping with activities of daily living and creating a comfortable environment. The main objectives of nonpharmacological methods from the reviewed articles included (1) to decrease children's fear, (2) to reduce their distress and (3) to give them a sense of control.

The studies also support combination of nonpharmacological methods depending on the severity and complexity of the pain. The most frequently nonpharmacological methods that nurses applied were cognitive-behavioral method, physical method such as change in child position during a procedure, touch as an emotional support method and ventilation of the room for creating a comfortable environment (He et al. 2010). The articles reviewed also showed that experienced nurses have claimed that different non-pharmacological methods have helped them create a relationship with the child, making the child more willing to cooperate during a procedure and this cooperation between child and nurse was found to be the main goal for using nonpharmacological methods (Svendsen 2014).

The barriers were also explored in this study. He et al. (2011) revealed that use of nonpharmacological methods is one of the areas that nurses had the least accurate knowledge. In a descriptive questionnaire survey conducted in 2008 with a convenience sample of 134 registered nurses (n=134) from 7 pediatric wards in Singapore indicated that nurses who were younger, less educated, less working experience and with no children of their own used nonpharmacological methods less frequently (He et al. 2011).

6.1 Methods used in nonpharmacological pain management in pediatric nursing

Nurses' experience and education can affect the use of nonpharmacological pain management methods. Nurses who are trained can effectively and independently use these methods in pediatric nursing. (Svendsen 2014.) Nonpharmacological methods used in pain management from the literature review have been examined below.

6.1.1 Psychological pain-relieving methods

Cognitive-behavioral therapy

The effects of cognitive-behavioral methods such as distraction have been well researched in previous systematic studies. Cognitive-behavioral therapy is a form of talk therapy that helps improve child's moods, anxiety and behavior. And by changing negative thoughts and behaviors, children can change their awareness of pain and develop better coping abilities. (Wente 2013.) In a cross-sectional and descriptive study in eastern Turkey, nurses (n=143) were investigated to analyze uses of nonpharmacological methods in pediatric postoperative pain relief. The methods used by nurses were examined and the results indicated that all nurses used at least 1 self-initiated pain relief method. The most frequent was cognitive-behavior method (90.2%) which involved providing verbal encouragement (Çelebioğlu et al. 2015). A systematic review investigating evidence relating to the use of psychological therapies found that cognitive-behavioural therapy is effective in reducing the severity and occurrence of recurrent abdominal pain, fibromyalgia and chronic headache in children (Eccleston 2012).

Distraction

Distraction is the most commonly nonpharmacological pain management technique used by health care practitioners and parents. Child's age and developmental stage should always be considered when choosing a relevant distraction method. (Koller, Goldman 2012.) Distraction helps children cope with painful and distressing procedures by drawing child's attention away from noxious pain stimuli. It aims to take child's mind off the procedure by concentrating on something else. Distraction can be in active form such as interactive toys, virtual reality(VR), guided imagery, controlled breathing and relaxation or is can be passive distraction which required a child to remain calm and quiet through a procedure. Types of passive distraction include auditory such as music or audiovisual techniques such as Television. (Koller, Goldman 2012.) A study by Mcmurtry (2010)

examined 100 children (40 boys, 60 girls), aged 5-10 years and the responses of their parents (86 mothers, 14 fathers) during a venipuncture. They found that when an adult provided reassurance (e.g. 'don't worry, it will be okay') this increased the child's distress, whereas distraction helped them cope with the venipuncture pain.

A randomized control trial with eighty-four children aged 3-10 years determined the effects of audiovisual distraction on pain in children during laceration repair. They found that sensory and affective pain responses were significantly lower in magnitude. Audiovisual distraction might be a helpful method to reduce children's pain during laceration repair. (Ha, Kim 2013.) Studies also show that parents can be involved in their children's pain management by use of distraction methods. They should be taught and given guidance so as to be able to select appropriate distraction technique for their children. When parents are taught how to distract their child during painful procedures, children experience less pain and anxiety. (McMurtry 2010.)

Bio-feedback

Biofeedback is a painless, non-invasive technique that trains people to control body processes which normally occurs voluntarily such as blood pressure, heart rate, skin temperature or muscle tension. Through the electrodes attached to the skin, the processes are measured and displayed on a monitor. Biofeedback is used to relieve pain, increase relaxation and reduce effects of stress. The technique should be taught to children by a skilled practitioner. (Evans et al. 2008.) In a study by Myrvik (2012) which explored the use of thermal biofeedback assisted relaxation training (BART) with children (n=10) with sickle cell anemia showed that reduction in patient-reported pain frequency were found after completing one session and some small improvements were noted in pain-related disability and general health.

Hypnosis

Hypnosis is an artificial induced altered state of consciousness, characterized by heightened suggestibility and receptive to direction. This altered state of consciousness happening within a relaxed physical state allows a trance that is different from both the normal state of being awake and any stages associated with sleep. Through hypnosis technique, children can be helped focus their attention away from pain and towards an imagined experience they view as calming, fun or safe. (Evans et al. 2008.) In Pölkki et al. (2008) randomized pilot study, the efficacy of hypnosis and relaxation in hospitalized children's postoperative pain management was tested. Children (n=60), aged 8-12 years

undergoing appendectomy were randomly assigned to listen to a hypnosis CD-ROM. Children (n=30) in the experimental group reported evidently less pain.

Relaxation

Relaxation comprises of several techniques that promotes stress reduction, the elimination of the tension throughout of the body and peaceful and calm state of mind. In younger children, relaxation may consist of being held in a comfortable well-supported position and for older children, it involves actively teaching them to engage in progressive relaxation on muscles. (Eccleston et al. 2012.) A systematic review by Eccleston et al. (2012) found good evidence that relaxation is effective in reducing severity and frequency of recurrent abdominal pain, fibromyalgia and chronic headache in children.

Music Therapy

There is evidence that music acts as a method of pain-relief. Music therapy can be in an active or passive form. In active music therapy, a music therapist is involved and music is used as a form of active communication while in passive music therapy, patients listens to music without the involvement of a music therapist. (Evans et al. 2008.) In a randomized control trial(RCT) by Kristjnsdttir (2011) with children aged 14 years undergoing a routine immunization was carried out. Participants were randomly put into three groups: musical distraction with headphones (n=38), musical distraction without headphones (n=41) and standard care (n=39). Results from the RTC showed that adolescents receiving music therapy were less likely to report pain compared to the control group. The RCT also found that listening music without headphones was the most effective.

Preparation/Education

Preparation/education involves providing information about the medical intervention as appropriate. Sensations, visuals and sounds that will occur during a procedure are explained in an age/developmentally appropriate manner. Information provision allows children to have a greater sense of control and to plan coping strategies. (Srouji et al. 2010.) He et al. (2011) descriptive study with registered nurses (n=134) investigating nurse's use of nonpharmacological methods for children's postoperative pain relief was done. Fifty-four percent of nurses reported that they always or nearly always provided preparatory information to the children. The nurses also reported that they talked openly

about fear and anxiety if they noticed that the child looked anxious or scared and this helped the child become more prepared to cope with pain.

6.1.2 Physical pain-relieving methods

Acupuncture

Acupuncture as a nonpharmacological pain relief is based on theory that energy flows through the body along channels known as meridians, which are connected by acupuncture points. If the flow is obstructed, pain results. The energy flow is restored by inserting needles at the acupuncture points along the obstructed meridians, which eliminates or reduces pain (Wu 2009). A randomized controlled trial (RCT) to evaluate effectiveness of acupuncture to control pain and agitation after bilateral myringotomy tube placement in children (n=60) found that acupuncture provided significant benefit in pain and agitation reduction (Lin, Tassone et al. 2009).

Wu (2009) examined the acceptability and feasibility of acupuncture for postoperative pain control in hospitalized children (n=20), aged 7 months to 18 years. Patients received two 10- to 15-minute sessions of acupuncture 24-48hrs apart. Acupuncture was well tolerated by patients without adverse events. In a follow up interview, 70% of patients and their parents believed acupuncture helped relieve the child's pain. There was a significant reduction of the pain scores 4 hours after the treatment. Another study by Gottschling et al. (2009), 43 children with migraine or tension-type headache were randomized to low-level laser acupuncture (one treatment per week) or placebo in the control group. The intervention group had significantly fewer headaches per month, lower headache severity and fewer monthly hours of headache compared to the control group.

Massage Therapy

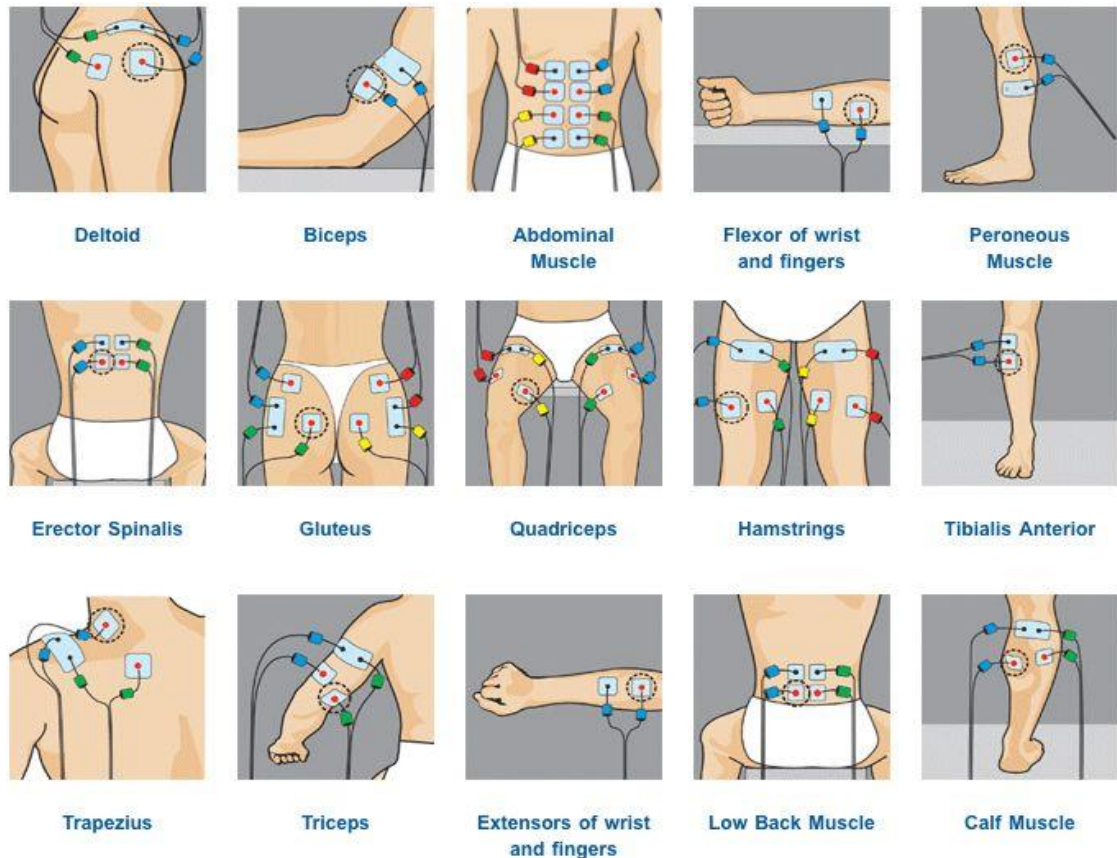
Massage therapy involves manipulation of the body by combining tactile and kinaesthetic stimulation performed in purposeful sequential application (Tsao 2007). SURESH et al. (2008) examined the efficacy of massage therapy in children (n=57) presenting to a chronic pediatric pain clinic for pain management. After massage therapy, the children reported significant improvement in their level of distress, tension, pain, mood and discomfort compared with their pre-massage ratings.

Positioning

Positioning is applied to help or support patients. Position changes prevent subsequent development of pain and also reduce acute pain by allowing proper blood flow and prevents muscles spasms and contractions. (Ward 2016.) In a cross-sectional and descriptive study by Çelebioğlu et al. (2015) with nurses (n=143) whose patients had undergone medical procedures was carried out to investigate and analyze nurses' use of nonpharmacological methods to relieve postoperative pain in children. The most physical method of pain relief used by nurses (85.3%) was changing the children's' position. Another descriptive correlational study by Chng et al. (2015) with parents (n=60) was done to examine parent's knowledge, attitudes, use of pain relief strategies and satisfaction with their children's postoperative pain management. The study showed that positioning was used by approximately half of the parents to ease their child pain and create comfortability.

Transcutaneous electric nerve stimulation(TENS)

Transcutaneous electric nerve stimulation is a method for stimulating nerves through electrodes applied to the skin. Transcutaneous electric nerve stimulation is a non-invasive and safe pain-relieving method for partially or completely blocking the pain sensation based on gate control theory. Transcutaneous decrease pain throughout nociceptive cell at presynaptic stage in the dorsal horn and restraining its essential communication. (Kasat et al. 2014.) A literature review by Kasat et al. (2014) found good evidence than Transcutaneous electric nerve stimulation(TENS) is effective in pain relief during various dental procedures. TENS(Transcutaneous electric nerve stimulation) electrode placement guide is shown in picture 2 below.



PICTURE 2. TENS(Transcutaneous electric nerve stimulation) electrode placement guide (Refisio 2017)

Heat and Cold

Heat and cold therapies involves applying topic sources of heat or cold to a painful area for pain relief or comfort (Lane et al.2009). A literature review by Lane et al.(2009) found that heat and cold therapies provide an immediate relief and are useful in multi-modal treatment of pain in children. There are contradictions on the use of heat and cold therapy. Heat and cold therapy should not be used on skin which has an absence of sensation caused by vascular disorders, burns, wounds, dermatological conditions, area treated with radiation or grafted tissue with epidural/local anesthesia, patients who are unable to move away from heat or cold sources or patients who are unable to communicate that heat or cold source has become uncomfortable (Lane et al.2009).

Facilitated tucking

Facilitated tucking involves holding a child's body so that the limbs are in close proximity to the trunk. The child is held in a flexed, side-lying position using both touch and position. (Kucukoglu 2015.) Kucukoglu (2015) conducted a randomized controlled experimental study on children (n=30) to evaluate the pain perceptions of newborns during hepatitis B(HBV) vaccinations performed in the facilitated tucking position and classical holding position, respectively. They found that the pain perceptions of the newborns held in facilitated tucking position were lower. The facilitated tucking is recommended as a useful and effective method for reducing pain during the procedure. Another randomized control trial by Liaw et al. (2012) with infants (n=34) was carried out to compare the effectiveness of non-nutritive sucking (NNS) and facilitated tucking. Both interventions reduced pain scores more than routine care during heel-stick procedures. Non-nutritive sucking reduced pain scores more that facilitated tucking. However, facilitated supported infants physiological and behavioral stability (i.e. Infants demonstrated lower-stress related behaviors and less changed in oxygen saturation and heart rate) more than in non-nutritive sucking. Picture 3 below shows an example of facilitate tucking during a procedure.



PICTURE 3. Facilitated Tucking (Murphy 2013)

Kangaroo care (Skin-to-skin)

Kangaroo care is a method of holding that involves skin-to-skin contact. The baby is held upright at a 40-60 degree angle and covered by the parent's blouse or shirt; a second covering maybe used to provide additional warmth. (Tsao, Evans et al. 2008.) Johnston et al. (2008) carried out a randomized control trial with preterm neonates (n=61) between 28 and 32 weeks' gestational age, comparing kangaroo care with remaining in an incubator swaddled in the prone position. Pain scores 90 seconds post heel-stick were significantly lower in kangaroo care group. Recovery time was also lower in the kangaroo care group.

Cong et al. (2009) also carried out a randomized control trial to determine if kangaroo care resulted in improved balance in autonomic responses(i.e. less change in infant's behavioral state, heart rate and heart rate variability) to heel-stick pain than when infants remained in the incubator. Infants (n=14) aged 30-32 weeks' gestation were included in the study. Infants experienced better autonomic balance in response to kangaroo care than remaining in the incubator.

Swaddling

Swaddling involves wrapping the child firmly in a cloth or blanket to make them feel secure (Srouji et al. 2010). Ho, Ho (2012) undertook a randomized control trial with premature neonates (n=54) between 30 to 36 weeks gestation age to investigate the effects of facilitated swaddling to control procedural pain among premature neonates undergoing heel-stick procedure. Neonates were assigned randomly into two groups (swaddling, control). Pain scores were significantly reduced in the intervention group compared to the control group.

Breast milk

A quasi-experimental study was conducted to find out the effect of breastfeeding on pain responses in infants during immunizing intramuscular injection. Infants (n=120) were randomly distributed into experimental and control group. There were statistically significance differences in facial expression, breathing pattern, cry, legs and arms state of arousal between experimental and control group. The study concluded that the perception of pain intensity is less among infants when intramuscular vaccine is administered during breastfeeding (Pradhan et al. 2016). A systematic review by Harrison (2016) showed that breastfeeding may help reduce pain during vaccinations for

infants beyond the neonatal period. Nurses should recommend breastfeeding or breastmilk if the parent is available during child's painful procedure.

Non-nutritive sucking

Non-nutritive sucking(NNS) refers to using a dummy with an infant to promote sucking without breast or infant formula (Liaw et al. 2012). A randomized control trial by Liu et al. (2010) was carried out to compare the efficacy of non-nutritive sucking and a glucose solution as a pain-relieving intervention for neonates undergoing venipuncture. Neonates (n=105) were randomly assigned into three groups (non-nutritive sucking, glucose, control). The non-nutritive and glucose groups had significantly lower pain scores than the control group during the procedure and the recovery phase. Neonates receiving non-nutritive sucking had significantly lower pain scores than those receiving glucose. Another randomized control trial by Liaw et al. (2012) with infants (n=34) was carried out to compare the effectiveness of non-nutritive sucking(NNS) and facilitated tucking. Both interventions reduced pain scores more than routine care during heel-stick procedures. Non-nutritive sucking reduced pain scores more than facilitated tucking.

Sucrose

Sucrose as a method of pain relief intervention is thought to reduce the effect of pain by providing taste stimulation to the further membrane receptors in the brain, where the endogenous opioid system is located (Campbell et al. 2014). A randomized control trial by Liu et al. (2010) was carried out to compare the efficacy of non-nutritive sucking and a glucose solution as a pain-relieving intervention for neonates undergoing venipuncture. Neonates (n=105) were randomly assigned into three groups (non-nutritive sucking, glucose, control). The non-nutritive and glucose groups had significantly lower pain scores than the control group during the procedure and the recovery phase. The study suggested that nurses can provide 2ml of 25% glucose solution through a syringe for a breast feeding infant before an invasive procedure if nipple confusion is the concern. A literature review by Campbell et al. (2014) was done to evaluate the effectiveness of sucrose as an analgesia for neonates. The study found evidence to suggest that oral sucrose with or without non-nutritive sucking is effective and safe for reducing pain responses. Information about optimum dose of glucose as well as repeated use in older infants remain inconclusive.

6.1.3 Emotional support method

Emotional support involves comforting/reassuring, touch and presence (He et al. 2010). A qualitative study using face-to-face interview with school-aged children (n=15) was done to explore their postoperative pain management experiences. The study concluded that nurse's and parent's use of nonpharmacological (e.g. emotional support) helped them cope well with postoperative pain (Sng et al. 2013). In a cross-sectional and descriptive study with nurses (n=143) whose patients had undergone medical procedures was carried out to investigate and analyze nurses' use of nonpharmacological methods to relieve postoperative pain in children. "Touch" was the most frequently used method in providing emotional support for pain relief (Çelebioğlu et al. 2015). In a feasibility pilot study by Herrington (2014) with infants (n=11) to determine the effectiveness of gentle human touch in reducing pain was done during a heel-stick procedure. The study showed that infants who did not receive a gentle touch during the procedure had decreased respiration, increased heart rate and increased cry-time while infants who received gentle touch during the procedure, did not show reduced respiratory rate, increased heart rate or increased cry time.

6.1.4 Creating a comfortable environment

Creating a comfortable environment involves paying attention to the comfort level of the hospital environment such as maintaining a comfortable temperature and air conditioning, minimizing noises, proper lightning, giving attention to the interior decoration and providing favorite belongings to the child (Abbas and Ghazali 2012) . A pilot study by Abbas and Ghazali (2012) was conducted to analyze and investigate pediatric wards status and design influence on healing process in three hospitals (n=3). The study concluded that the healing process and reduction of anxiety, pain and stress is influenced by physical environment such as interior design, ergonomics and accessibility. A descriptive study with registered nurses (n=134) was done to investigate nurses use of non-pharmacological methods for children's postoperative pain relief. Seventy-six percent reported that they always or nearly always created a comfortable environment for children postoperatively by making efforts to minimize noise and adjusting temperature and lightning of the room (He et al. 2011). Picture 4 below shows an example of an interior design and lightning in a pediatric hospital room .



PICTURE 4. Pediatric hospital room (UCSF Medical Center 2012)

6.1.5 Helping with activities of daily living

He et al. (2011) descriptive study with registered nurses (n=134) investigating nurse's use of nonpharmacological methods for children's postoperative pain relief was done. The majority (82%) reported that they always or nearly always helped with children's activities of daily living such as bathing and sponging after the procedure.

6.2 Barriers encountered by nurses when using nonpharmacological methods

Çelebioğlu and others (2015) revealed that use of nonpharmacological methods is one of the areas that nurses had the least accurate knowledge. Use of some nonpharmacological methods is affected by nurse's demographic characteristics such as age, work experience, educational level, hospitalization experiences with their own children and status as a parent. Nurses who specialized in pediatric nursing had greater knowledge regarding nonpharmacological interventions compared to other groups. (Çelebioğlu et al. 2015.) In a descriptive questionnaire survey conducted in 2008 with a convenience sample of registered nurses (n=134) from 7 pediatric wards in indicated that nurses who were younger, less educated, less working experience and with no children of their own used nonpharmacological methods less frequently (He et al. 2011). Heavy workload/lack of time and child's inability to cooperate were the most common reported reasons that limited nurses' application of nonpharmacological pain relief

methods. Other barriers highlighted from the reviewed articles include lack of resources (e.g. equipment, materials), lack of pain management policies to support and encourage the use of nonpharmacological methods (e.g. these methods are not part of routine/conventional practice), personal traditional cultural values of pain and pain relief, lack of knowledge regarding non-pharmacological methods, belief in inefficacy of nonpharmacological methods in pain relief, a task-oriented work organization model, belief that parents should take the main role in use of nonpharmacological methods, lack of parental support and cooperation in using nonpharmacological methods, belief that nurses' primary task is to administer pain medication for pain relief and nurse's lack of experience in using nonpharmacological methods (He et al. 2011; Çelebioğlu et al. 2015).

Inadequate education on pain management among health care professionals is one of the variable and factor related to the practice of nonpharmacological pain management and has been identified as one of the major barriers to effective pain relief. Education programs need to include a range of topics such as nonpharmacological nursing interventions. (He et al. 2010.) Education awareness coupled with institutional changes resulting into system-wide cultural transformations could lead to a significant increase in nurses' use of pharmacological and non-pharmacological methods hence a reduction in child suffering from pain (Thrane et al. 2016). Time is also a very important variable. Time needed to implement non-pharmacological interventions is long and therefore, discouraging most nurses. Although nurses maybe supportive of the nonpharmacological methods, their use of these interventions is countervailed by apparent restriction of time. Time constraints and heavy workload have been reported by many nurses as a limiting them from use of nonpharmacological interventions. (He et al. 2010.)

Svendsen (2014) did a qualitative exploratory study to explore experienced nurse's use of nonpharmacological pain management approaches. The nurses reported that child's expectancy of pain and their distress level affected their ability to cooperate, regardless of the level of pain through the procedure. This influenced the use and choice of non-pharmacological pain management approach by nurses. Cooperation between the child and nurse was restated throughout the study as being the main goal for using nonpharmacological methods especially during painful invasive procedures. Establishing cooperation also helped nurses avoid use of restraint when performing procedures. The use of restraint is controversial to nursing. Nurses cooperation between them and the

child can be improved by using comprehensive approaches such as encouraging, positive attitude towards the child, humor and playful atmosphere, eye to eye level when interacting, asking about topical items (e.g. games, television shows, cartoons), using non-medical language and pitching is at developmental level of the child and including parents throughout the procedures. (Svendsen 2014.) Documentation of the nonpharmacological treatments for pain has been found to be minimal or nonexistent. Nurses received the least amount information on nonpharmacological pain relief interventions and this may have prevented them from using these interventions. (Baulch 2010.)

In a cross-sectional and descriptive study, registered nurses (n=143) were investigated to analyze uses of nonpharmacological methods in pediatric postoperative. The study indicated that although the nurses who participated in the study had used nonpharmacological methods after medical surgeries, it was determined that they had initially used drug therapy when children had pain, which is suitable. On the other hand, only 37.8% nurses used nonpharmacological interventions when children expressed pain in the four hours after the primary pharmacological therapy. That finding may suggest nurses did not have sufficient knowledge and skills related to nonpharmacological methods. The study suggested that nonpharmacological pain management should be incorporated in nursing education to ensure that nurses are aware of all the available nonpharmacological methods and how to apply these methods in an age-appropriate way (Çelebioğlu et al. 2015).

7 ETHICS AND VALIDITY

There are several ethical issues which must always be considered when planning any type of data collection. Ethics can be defined as a generic term for various ways of understanding and examining the moral life (Moule and Goodman 2009, 56). According to Lynch (2014), validity is the ability for a research to prove positively the focus or question of the research topic. The research conducted in this study maintained the aspect of validity through collection of the information from sources that were of scientific origin, up to date information (2007-2017) and sources that which specifically answered to the research question. Processing of information was ethically conducted to avoid any instances of infringement of copyright and false information. According to Colepicolo (2015) critical appraisal is a systematic process employed to point out the weakness and strength of a research article with the aim of assessing the validity and usefulness of research findings while appraisal process focuses on the assessment of the appropriateness of the research selected for research question. Evaluation of key methodological features associated with the study designs employed in these articles. Consideration was taken regarding the research relevance to the study topic, appropriateness of the statistical methods employed as well as their subsequent interpretation and potential conflicts of interest. This Bachelor thesis topic was based on the previous knowledge from our topic on pain management in pediatrics nursing. Upon presentation of our topic to our counsellor at Turku University of Applied Sciences, the topic was accepted. This thesis was conducted through literature review with systematic approach meaning that there were no interviews, observation, questionnaires used as part of the methodology. There was no need for privacy and confidentiality of names and identities because there was no personal contact with the patients, children and the writers of the articles in the data collection process, but ethical considerations were taken into account while collecting and analyzing data i.e. direct quotations were accurately noted and accounted for by using correct referencing according to Turku University of Applied Sciences thesis guidelines

8 DISCUSSION

The aim of the study was to explore different nonpharmacological methods of managing and alleviating pain in pediatric nursing effectively and the barriers that limit nurses in implementing these methods. This was to increase knowledge among pediatric nurses about use of nonpharmacological methods in pain management. Nonpharmacological is inclusive of all intervention methods for pain treatment that do not involve drugs. While drugs are used to treat somatic dimension of pain, non-pharmacological methods aim to treat the affective, cognitive, behavioral and social-cultural dimensions of the pain. The results show that nurses use several nonpharmacological methods in managing pain in pediatric nursing and there is also substantial evidence to support the use of nonpharmacological methods in providing complementary pain relief in pediatric patients by reducing emotional perception of pain, enhancing comfort and strengthening coping capabilities.

The results showed that nonpharmacological methods can be grouped into psychological methods, physical methods, emotional support method, helping with activities of daily living and creating a comfortable environment. Nurses used these methods to decrease fear in children, reduce pediatric patients distress and to give pediatrics a sense of control (He et al. 2010). By actively engaging children, psychological pain-relieving methods such as cognitive-behavioral therapy, distraction, biofeedback, hypnosis, relaxation and music therapy enable them to shift their attention away from fearful and painful procedures (He et al. 2010 ; Çelebioğlu et al. 2015). The results support combination of different nonpharmacological methods depending on the severity and complexity of the pain. Child's age, culture, cognitive development type and origin of pain are some factors that help nurses choose the type of nonpharmacological method to use. The most frequently nonpharmacological methods that most nurses used were cognitive-behavioral therapy and distraction for older children and facilitated tucking and non-nutritive sucking for infants. The results suggest that parents should also be involved in use of distraction techniques. Results showed that parents can be involved in their children's pain management by use of distraction methods. They should

be taught and given guidance so as to be able to select appropriate distraction technique for their children. When parents are taught how to distract their child during painful procedures, children experience less pain and anxiety. (Mcmurtry 2010.) The results of the literature review appeared to show that nonpharmacological methods helped improve cooperation between child and nurses. Nurses claimed that different non-pharmacological methods have helped them create a relationship with the child, making the child more willing to cooperate during a procedure and this cooperation between child and nurse was found to be the main goal for using nonpharmacological methods. Establishing cooperation also helped nurses avoid use of restraint when performing procedures. The use of restraint is controversial to nursing. Nurses felt that nonpharmacological methods could contribute to change the situation from fear to cooperation during painful procedures. These methods facilitate the child's calm feelings and cooperativeness. (Svendsen 2014.)

For pain to be effectively managed, knowledge of both pharmacological and nonpharmacological methods is required and proper pain assessment should be done. Inadequate in education on pain management among health care professionals is one of the variable and factor related to the practice of nonpharmacological pain management and has been identified as one of the major barriers to effective pain relief. Education programs need to include a range of topics such as nonpharmacological nursing interventions. (He et al. 2010.) Results showed that demographic characteristics such as age, educational level, work experience, nurses status as parents and specialization in pediatric nurses affected nurses' use of non-pharmacological pain management methods (He et al. 2010 ; Svendsen 2014 ; Çelebioğlu et al. 2015). Heavy workload/lack of time and child's inability to cooperate were the most common reported barriers that limited nurses' application of nonpharmacological pain relief methods. Çelebioğlu and others (2015) study results indicated that although the nurses who participated in the study had used nonpharmacological methods after medical surgeries, it was determined that they had initially used drug therapy when children had pain, which is suitable. On the other hand, only 37.8% nurses used nonpharmacological interventions when children expressed pain in the four hours after the primary pharmacological therapy. That finding may suggest nurses did not have sufficient knowledge and skills related to nonpharmacological methods. Education awareness coupled with institutional changes resulting into system-wide cultural transformations could lead to a significant increase in nurses' use of pharmacological and non-

pharmacological methods hence a reduction in child suffering from pain (Thrane et al. 2016).

The results of the literature review imply that nonpharmacological pain management should be incorporated in nursing education to ensure that nurses are aware of all the available nonpharmacological methods and how to apply these methods in an age-appropriate way. Parents and children should also be included in pain management plan. Proper documentation of effective nonpharmacological methods should be done so as to encourage their use. The results suggest that nurses can implement nonpharmacological methods independently in pediatric nursing.

9 CONCLUSION

Pain management in pediatric nursing remains an important research topic. This literature review highlighted different nonpharmacological methods namely psychological pain-relieving methods, physical methods, emotional support methods, helping with activities of daily living and creating a comfortable environment that nurses, parents and pediatric patients themselves can use for pain relief.

(1) Nonpharmacological pain management methods are essential part of caring in pediatric nursing and should be incorporated in clinical practice in combination with pharmacological methods or alone based on the pediatrics' pain assessment.

(2) More education is needed to improve pediatric nursing pain assessment and management and use nonpharmacological pain management methods to enhance nurses' and parents' knowledge towards pain management.

(3) Further research is needed to identify barriers limiting the implementation of nonpharmacological pain management methods because this knowledge will enable nurses to effectively incorporate these methods into their care routine.

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