

Nursing Practices to Reduce Pain and Distress related to Venipuncture in Children

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Abstract

Venipuncture procedures are routine part of modern clinical practice. These are most commonly performed clinical procedure carried out on young children. Venipuncture procedures are found to be a common cause of pain and distress in children. Venipuncture pain in children may lead to long-term negative effects later in life such as future avoidance of medical care, immunizations and blood donations. The aim of this article is to identify various nursing practices to reduce pain and distress related to venipuncture in children. A thematic analysis of related literatures on nursing practices to reduce pain and distress during venipuncture was done. Three main methods are currently used to measure pain intensity in children such as Self report, Behavioral and Physiological Measures. Pain control methods can be achieved through various inexpensive, non-invasive means. Various non-pharmacological strategies such as Distraction, Regular breathing exercise, Coaching, Explanation, Local application of cold, Cutaneous stimulation and Vibration are best nursing practices to reduce pain during venipuncture. Similarly, Topical applications such as Xylocain Spray, Amethocaine Cream, and Eutectic Mixture of Local Anesthetic (EMLA) cream are effective pharmacological methods. Reduction of pain in children during venipuncture will prevent pain and anxiety in future procedures. So, pain should be reduced during venipuncture in children.

Key Words: Nursing practices, pain and distress, venipuncture, children

Introduction

Pain is defined as whatever the experiencing person says it is, existing whenever the experiencing person says it does (Berman, Snyder, Kozier & Erb, 2008). Pain can interfere with recovery from surgery or illness, prevent normal activity and affect a child's quality of life (Black, Hawks & Keene, 2005). In paediatric department, many children undergo painful procedures such as venipuncture during treatment. Although the degree of pain during common medical procedures is less than during severe illnesses and injuries. Millions of children experience these procedures which cause considerable distress (Movahedi, Rostami, Salsali, Keikhaee & Moradi, 2006). Children requiring needle sticks (injections, intravenous catheters,

blood sampling) view this procedure as frightening and a significant source of pain (Kharasch, 2003).

Venipuncture is most commonly performed clinical procedure carried out on young children which can cause pain and distress in children. Pediatric inpatients reported that IV line placement as the leading cause of procedure-related pain in the hospital, on par with post surgical pain in children (Cummings, Reid, Finley, McGrath & Ritchie, 1996). It is frightening experience in children and should not be underestimated. Venipuncture pain in children may lead to long-term negative effects later in life such as future avoidance of medical care, immunizations, and blood donations (Baxter, Cohen, McElvery, Lawson & Von-Baeyer, 2011). A significant

proportion of children undergoing venipuncture also experience moderate or severe pain and elevated levels of pre-procedural and procedural distress. Different clinical practice guidelines advocate the use of strategies to improve the pain and distress of venous access procedures in children (American Academy of Pediatrics, 2004, and Infusion Nurses Society, 2006). However, evidence to date, any guideline has not developed and practiced in Nepal.

Methodology

Electronic (PubMed and Google) searches were conducted by investigator herself. Subject headings terms included pain, pain management, procedural pain management because this review was the part of procedural pain management and key words such as pain, pain assessment, procedural pain, venipuncture, systemic review, children, neonates, pediatrics, distraction, non-pharmacological were also used to search relevant articles. All searched titles and abstracts were read thoroughly and 28 articles were selected purposively. All selected articles were critically reviewed, thematic analysis was done and conclusion was drawn.

Pain Assessment during Venipuncture in Children

Pain assessment is an ongoing and integral part of total pain management particularly in children. Alleviation of pain caused by minor invasive procedures in children is an important issue for human reasons in terms of their reactions to future painful events and acceptance of subsequent health care interventions. Moreover, unrecognized pain can become severe and difficult to control and leads to fear and stress (Roeggen, 2009).

Three main methods are currently used to measure pain intensity in children such as self report, behavioral, and physiological measures (Srouji, Ratnapalan, & Schneeweiss, 2010). Self-report measures are optimal and the most valid. Both, Verbal and nonverbal reports require a certain level of cognitive and language development for children to understand and give reliable responses. Most children aged five years and older can provide

meaningful self-reports of pain intensity if they are provided with age-appropriate tools and training (Baeyer, 2006). Behavioral measures are also called observer's report. In this method health care professionals observe child's behavior for signs of pain and injury. Specifically, they observe facial expression and body movements, and assess the qualities of child's cries. Physiological measures are measures of body changes such as increases in heart rate, breathing rate, and paleness or sweating, sometimes neuro-endocrine responses can be signs of pain (Stinson, 2009).

Nursing Practices to Reduce Pain and Distress during Venipuncture in Children

The measures used to relieve pain involve not only pharmacological interventions, but also the use of non-pharmacological interventions. Non-pharmacological interventions include behavioral methods (desensitization, positive reinforcement and relaxation), cognitive methods (preparatory information, memory change and distraction), physical methods (application of heat and cold, massage and positioning), emotional support (presence of significant person, therapeutic or emotional comfort and touch) and environmental support (minimizing unpleasant stimuli-noise, light and odors).

Pharmacological interventions are the corner stone of procedural pain and comfort management. Common pharmacologic agents for managing procedural comfort include local anesthetics, non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen, opioids, anxiolytics, and sedatives (Czarnecki, Turner, Collins, Doellman, Wrona, & Reynolds, 2011). But topical preparations are available in cream, patch, and spray formulations. Topical anesthetics should be used for needle stick procedures whenever possible particularly in infants and children (Infusion Nurses Society [INS], 2006).

Non-pharmacological Interventions

Non-pharmacological methods are used to reduce venipuncture related pain. Psychological support

and intervention, such as encouragement, therapeutic touch and guided imagery have been demonstrated to be successful (Russell & Smart, 2007). Adult's behavior is important in children's distress and coping during needle procedures. (Mahoney, Ayers & Seddon, 2010). Sikorova and Hrazdilova (2011) recommend proper preparation of each child individually through appropriate psychological interventions such as explanation, demonstration and story telling, especially for children younger than seven years and for introducing a continuous venal catheter. The use of breathing exercise was effective in reducing pain responses in school-aged children during vein puncture (Bagheriyan, Borhani, Abbaszadeh, Miri, Mohsenpour & Zafarnia, 2012). Distraction is a non-pharmacological technique that draws attention of the child away from the pain. Distraction is one of the easiest and least costly methods of non-pharmacological pain relief. Interactive distraction technique has a positive pain relieve effect. Cutaneous stimulation is an independent nursing intervention that advocated relieving pain. But interactive distraction technique is better than cutaneous stimulation in relieving children's pain during vein-puncture. (Gawad & Isayed, 2015). Animated cartoons on pleasant topics have been demonstrated to be an effective focus interesting most children and seem a safe and easy to administer stimulus for distraction therapy (Bellieni, Cordelli, Raffaelli, Ricci, Morgese & Buonocore, 2006). He surveyed 69 children aged 7–12 years undergoing TV watching (i.e. watching an age appropriate cartoon on TV) was more effective than active distraction performed by their mothers.

Movahedi, et, al. (2006) conducted research on the effect of local refrigeration prior to venipuncture on pain related responses in children aged 6-12 years and found that local application of ice is effective for relieving the pain associated with venipuncture. External cold and vibration significantly reduced pain and anxiety in children ages 4-18 years old versus standard care (Baxter, Cohen, McElvery, Lawson, & Baeyer, 2011). The presence of dogs during venipuncture reduces fear and distress in children and improves physical, social, emotional, and

cognitive functioning. (Vagnoli, Caprilli, Vernucci, Zagni, Mugnai & Messeri, 2015). Chambers et al. (2009) found that parent coaching is effective in reducing observer-rated distress, but not other measures of pain or distress during immunizations.

Pacifiers are effective agents for analgesia among infants zero to three months undergoing venipuncture (Curtis, Jou, Ali, Vandermeer, & Klassen, 2007). Expressed breast milk as the safest, more effective, and inexpensive method for analgesia in neonates (Sabety, Yaghoobi, Torabizadeh, Javaherizadeh, Haghhighizadeh & Mohammadian, 2013). Administration of sucrose before vein puncture is effective among infants in reducing the pain during vein puncture (Rouben, Kaur & Rao, 2013). Sucrose has been largely reported to be effective at soothing procedural pain in preterm and term neonates and its use is currently recommended by many scientific societies (Stevens, Yamada & Ohlsson, 2010). Sweet-tasting solutions significantly reduce pain of vein puncture in infants less than 1 year of age (Harrison et al., 2011).

Topical Pharmacological Interventions

Davies and Molloy (2006) found that ethyl vinyl chloride offered a significant reduction of pain in children aged 5-13 years who required repeated needle procedures. But, Costello, Ramundo, and Christopher (2006) found that ethyl vinyl chloride vapocoolant spray failed to measurably reduce pain associated with IV cannulation in children ages 9-18 years. EMLA (eutectic mixture of local anesthetics) cream for minimizing pain during venipuncture could be recommended for premature infants. (Chen et al., 2013). Recently, many studies demonstrated that EMLA cream is safe and effective in reducing pain during venous puncture in children (Rogers, 2004). Topical amethocaine provides effective pain relief during venipuncture in the newborn (Jain & Rutter, 2000). The combination of sucrose and EMLA cream revealed a higher analgesic effect than sucrose alone during venipuncture in these preterm infants (Biran, Gourrier, Cimerman, Nicolet, Mitanchez & Carbajal, 2011). Amethocaine cream provided significant pain relief of venipuncture compared to

EMLA cream in children 3 months - 15 years old (Lander & Weltman, 2006). Xylocaine topical spray significantly reduced pain of venipuncture in neonates less than 34 weeks gestation in addition to standard care (Chen, Tzeng, Liu, Huang, & Chen, 2006).

Conclusion and Recommendation

It is concluded that venipuncture is common cause of pain and distress in children. Reduction of pain during venipuncture will help the children to prevent fear, distress and anxiety in future procedure. Without invasive procedure, pain can be reduced. Pharmacological as well as non-pharmacological methods are effective during vein puncture in children. Non-pharmacological intervention such as developmentally appropriate distraction, coaching with distraction, cognitive behavioral therapy hypnosis and breathing exercises in reducing pain and distress which is highly recommended to practice for nurses. Use of Pacifiers, Oral Sucrose, and breast milk are effective analgesia for infants 0 to 3 months of age undergoing venipuncture. Local application of EMLA cream is effective for term and preterm infant. The application of a topical Lidocaine/Tetracaine patch, Xylocain Topical Spray and Ethyl vinyl chloride are also effective in relieving pain associated with venipuncture in children. It is recommended that pain, anxiety and distress related to venipuncture should be reduced. Clinical protocol on pain management strategies related to venipuncture in children should be developed and implemented in our context.

References

- Abd, E.I, Gawad, S. M. & Isayed, L.A. (2015). Effect of interactive distraction versus cutaneous stimulation for venipuncture pain relief in school age children. *Journal of Nursing Education and Practice*, 5(4). Retrieved from <http://www.sciedu.ca/journal/index.php/jnep/article/view/5816>
- Baxter, A., Cohen, L., McElvery, H., Lawson, M., & Baeyer, C. (2011). An integration of vibration and cold relieves venipuncture pain in a pediatric emergency department. *Pediatric Emergency Care*, 27(12), 1151-1156.
- Retrieved from www.researchgate.net/.../2629
- Bagheriyan, S., Borhani, F., Abbaszadeh, A. Miri, S. Mohsenpour, M & Zafarnia, N., (2012). Analgesic Effect of Regular Breathing Exercises with the Aim of Distraction during Venipuncture in School-aged Thalassaemic Children. *Iranian Journal of Pediatric Hematology Oncology*, 2 (3). Retrieved from http://ijpho.ssu.ac.ir/files/site1/user_files_d9936d/eng/admin-A-10-1-54-7ff39fd.pdf
- Belliemi, C.V., Cordelli, D.M., Raffaelli, M., Ricci, B. & Morgese, G., (2006). Analgesic effect of watching TV during venipuncture. *Archives of Disease in Childhood*, 91(12). Retrieved from www.ncbi.nlm.nih.gov/pmc/articles/PMC2082989
- Biran, V., Gourrier, E., Cimerman, P., Nicolet, E.W. Mitanchez, D. & Carbajal. (2011). Analgesic Effects of EMLA Cream and Oral Sucrose During Venipuncture in Preterm Infants. *Pediatrics*. 128(1). Retrieved from <http://pediatrics.aappublications.org/content/128/1/e63.full>
- Burke, S.D., Vercler, S.J., Ra, Bye, R.O., Desmond, P.C & Rees, Y. W. (2011). Local anesthesia before IV catheterization. *American Nursing Journal*, 111(2). Retrieved from www.jopan.org/article/S1089.../references
- Chen, H., Tzeng, C., Liu, W., Huang, Y., & Chen, Y. (2006). Topical xylocaine spray for reducing the pain of venipuncture in neonates. *Clinical Neonatology*, 13(2).
- Chen, H. et al. (2013). The effect of EMLA cream on minimizing pain during venipuncture in premature infants. *Journal of Tropical Pediatric*, 59(1). Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22961215>
- Costello, M., Ramundo, M., Christopher, N.C., & Powell, K.R. (2006). Ethyl vinyl chloride vapocoolant spray fails to decrease pain associated with intravenous cannulation in children.

- Clinical Pediatrics, 45, 628-632. Retrieved from cpj.sagepub.com/content/45/7/628.abstract
- Curtis, S.J., Jou, H., Ali, S., Vandermeer, B., & Klassen, T. (2007). A randomized controlled trial of sucrose and/or pacifier as analgesia for infants receiving venipuncture in a pediatric emergency department. *Pediatrics*, 7, 27. Retrieved from <http://www.biomedcentral.com/147-2431-7-27>.
- Davies E. H. & Molloy, A. (2006). Comparison of ethyl chloride spray with topical anaesthetic in children experiencing venepuncture. *Pediatric Nursing*, 18(3). Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/16634384>
- Harrison, D., Yamada, J., Adam-Webber, T., Ohlsson, A., Beyene, J., & Stevens, B. (2011). Sweet tasting solutions for reduction of needle-related procedural pain in children aged one to 16 years. *Cochrane Review*, 10. Retrieved from <http://www.update-software.com/BCP/WileyPDF/EN/CD008408.pdf>
- Infusion Nurses Society. (2011). Infusion nursing standards of practice: Infusion nursing standards of practice: local anesthesia. *Journal of Infusion Nursing*, 29(1). Retrieved from www.journalofinfusionnursing.com
- Lander, J.A., Weltman, B.J. & So, S.S. (2006). EMLA and Amethocaine for reduction of children's pain associated with needle insertion. *Cochrane Database of Systematic Reviews*, 3. Art. No.: CD004236. DOI: 10.1002/14651858.CD004236.pub2
- Mahoney, L., Ayers, S., & Seddon, P. (2010). The Association Between Parent's and Healthcare Professional's Behavior and Children's Coping and Distress During venipuncture. *Journal of Pediatric Psychology*, 35 (9). Retrieved from <http://jpepsy.oxfordjournals.org/content/35/9/985.full>
- Movahedi, A.F., Rostami, S., Salsali, M. Keikhee, B. & See comment in PubMed Commons below Moradi, A. (2006). Effect of local refrigeration prior to venipuncture on pain related responses in school age children. *Australian Journal of Advance Nursing*, 24 (2). Retrieved from <http://www.ajan.com.au/Vol24/Vol24.2-8.pdf>
- Rogers, T.L. & Ostrow, C.L. (2004). The use of EMLA cream to decrease venepuncture pain in children. *Journal of Pediatric Nursing*, 19(1). Retrieved from [www.pediatricnursing.org/article/S0882-5963\(03\)00205-7/abstract](http://www.pediatricnursing.org/article/S0882-5963(03)00205-7/abstract)
- Rouben, N., Kaur, R. & K.L.N Rao, K.L. (2013). Effect of sucrose in pain relief during venipuncture in infants. *Nursing and Midwifery Research Journal*, (9), 4. Retrieved from http://www.sucrose.eu/upload/oral_sucrose_and_pain_relief_for_preterm_infants_153.pdf
- Russell, C., & Smart, S. (2007). Guided imagery and distraction therapy in paediatric hospice care. *Paediatric Nursing*, 19(2):24-5. Retrieved from www.ncbi.nlm.nih.gov/pubmed/17425126
- Sabety, F., Yaghoobi, M., Torabizadeh, M., Javaherizadeh, H., Haghhighizadeh, M.H. & Mohammadian, F. (2013). Which is Better for Pain Reduction before Venipuncture: Glucose, Lidocaine or Expressed Breast Milk? *HK Journal of Paediatric (new series)* 18. Retrieved from <http://www.hkjaed.org/pdf/>
- Stevens, B., Yamada, J. & Ohlsson, A. (2010). Sucrose for analgesia in newborn infants undergoing painful procedures. *Cochrane Database Systemic Review* (1). Retrieved from www.ncbi.nlm.nih.gov/pubmed/15266438
- Vagnoli, L., Caprilli, S., Vernucci, C., Zagni, S., Mugnai, F. & Messeri, A. (2015). Can Presence of a Dog Reduce Pain and Distress in Children During Venipuncture? *Pain Management Nursing*, 16(2). Retrieved from http://www.medscape.com/viewarticle/842138_6