EFFECTIVENESS OF ICE GEL IN REDUCING PAIN SCALE DURING VENIPUNCTURE IN PEDIATRIC PATIENTS

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ABSTRACT

Background: Pain due to injection needles is one of the painful experiences for children. Ignoring pain due to injection needles in children can cause several psychological effects such as anxiety, phobia, and can increase pain perception in the future. This study aims to reduce the level of pain in children due venipuncture using non-pharmacological therapy (ice gel), so that it can increase children's comfort, **Methods:** This research method uses a quasi-experimental design with a one group pre-test and post-test to evaluate of pain scale in children. The sample used was children aged 4 month to 18 years who are treated in the infection ward. Measuring pain scale in children using Face, Legs, Activity, Cry, Consolability scale (FLACC) instrument in children aged 4 months to 4 years, the Wong Baker face pain scale instrument for children aged 5 to 12 years and the numeric rating scale for children aged 6 to 18 years. Data analysis using the wilcoxon Test to assess the pain scale before and after administration of ice gel during venipunture. **Results:** Giving ice gel during venipuncture has been proven to be effective in reducing the pain scale in children aged 4 months to 18 years with a p value <0.005 (p= 0.001). **Conclusions:** The pain felt by children during venipuncture is reduced and increases the satisfaction of children and parents, so that giving ice gel is effective in reducing children's pain during venipuncture so that it can improve the quality of nursing services for children in the infection room.

Keywords: Children, Ice Gel, Pain, Venipunture.

Introduction

Pain is an unpleasant sensory and emotional experience for children. In particular, The pain of a needle stick is one of the most stressful things for children. Neglecting needle stick pain prevention can lead to several psychological effects such as anxiety, phobia, and can increase pain perception in the future. A study showed that 30% of people who experience needle phobia are associated with past experiences of needle sticks, without any pain-reducing interventions from the healthcare team (Susam et al., 2018). Negative attitudes that can develop in children can lead to

avoidance of medical care especially needle-related interventions in the future (Semerci et al., 2022).

A series of interventions to eliminate or reduce the physical and psychological suffering experienced by children and their families in health services is the concept of atraumatic care. The three main principles are avoiding separation of children from parents, increasing parents' ability to control child care, preventing or minimising pain in children (Handayani et al., 2020). Pain is often associated with fear, anxiety, and stress, reducing pain is an action that must be taken in paediatric nursing. The pain reduction process often cannot be eliminated but can be reduced through pharmacological techniques and non-pharmacological techniques (Mansur, 2019).

The use of non-pharmacological methods is very important in the management of pain, anxiety and fear due to needle intervention in children (Binay et al., 2019). The cool ice method provides short-term effects such as reducing pain, anxiety and fear in children during needle intervention (Cetin & Cevik, 2019). Ice application to the skin has been used for a long time as a topical pain reliever. This intervention is natural, cost-effective and readily available. Ice can be used as a skin anaesthetic and has no adverse effects and is ideal for reducing pain in children. Ice works through certain mechanisms such as reduction of peripheral nervous system conduction and reducing nociceptive mediators. Although ice is not widely used to reduce procedural pain, it has been used as an anaesthetic agent for subcutaneous and intramuscular injections (Gaikwad et al., 2017).

Preliminary observations in November 2023 indicated that IV catheter insertions in pediatric patients were commonly performed with parental presence to reduce anxiety. However, no specific or standardized interventions were employed to minimize the procedural pain experienced by the children. This identified gap informed the present study, which aims to evaluate the effectiveness of ice gel to reduce pain scale during venipuncture in pediatric care.

Methods

This research method uses a quasy experiment design with a one group pre-test and post-test design. The population in this study were pediatric patients aged 4 months to 18 years who would be installed with IV catheters using total sampling that met the inclusion and exclusion criteria (Sugiyono, 2019). The inclusion criteria of the sample in the innovation project include pediatric patients aged 4 months to 18 years, patients who will be installed IV catheters, not in critical condition (decreased consciousness), cooperative patients.

Furthermore, the exclusion criteria is children with special needs (Down syndrome and ADHD) and children who are installed with IV catheters as well as taking blood for laboratory tests. The application of ice gel in this study is 5 minutes before the intervention with a distance of 2 cm in the puncture area and

the ice gel is taken when the puncture will be carried out.

Results

Table 1. Characteristics Respondent

No	Variable	N	%
1.	**Gender**		
	Man	7	41.2
	Women	10	58.8
2.	**Children age**		
	< 1 years	3	17.6
	1- 3 years	3	17.6
	4- 6 years	4	23.5
	7-12 years	3	17.6
	13-18 years	4	23.5
3.	**Number IV Kateter**		
	24 G	14	82.4
	22 G	3	17.6
4.	**Diagnosis of disease**		
	Respiratory System	5	29.4
	Cardiovascular System	3	17.6
	Gastrointestinal System	8	47.1
	Endocrine System or others	1	5.9

The results of the analysis of the characteristics of respondents in pediatric patients based on table 1, the majority of children are female, aged between 4-6 years and 13-18 years, with the most diagnoses of diseases in the gastrointestinal system and most children when installing IV catheters use size 24 G.

Table 2. Characteristics of Children's Age and Pain Scores Pre and Post Ice Gel Application

No	Variable	Pre-intervention Pain Scoring			Total
		Mild Pain	Medium pain	Severe Pain	
	Child Age				
1.	< 1 years	0	0	3	3
	1- 3 years	0	2	3	5
	4- 6 years	0	2	2	4
	7-12 years	0	1	2	3
	13-18 years	0	2	0	2
	Total responden	0	7	10	17
	Variabel	**Post-intervention Pain Scoring**			**Total**
		Mild Pain	Mediu m pain	Severe Pain	
2.	**Child Age**				
	< 1 years	0	2	1	3
	1- 3 years	2	1	2	5
	4- 6 years	3	1	0	4
	7-12 years	3	0	0	3
	13-18 years	0	2	0	2
Total Responden		8	6	3	17

The results of the analysis of the characteristics of respondents and pain scoring before giving ice gel to paediatric patients based on the table are most children experiencing moderate pain and in severe pain most children aged 1 to 6 years. Furthermore, pain scoring after the administration of ice gel in pediatric patients based on most children experiencing mild pain, the average

moderate pain experienced in children aged <1 year and 13 to 18 years. In severe pain most children aged 1 to 3 years.

Table 3. results of pain levels in children before an after using ice gel during venipuncture

Variable	n	Pre test		Post test		P Value
		Mean	SD	Mean	SD	
Pain score	17	7.24	2.33	4.12	1.86	0.001*

**Wilcoxon*

The results in table 3. show that there is a decrease in the level of pain in children after giving ice gel during venapunture with a p value <0.005 (p=0.001)

Discussion

Pain sensations during routine medical procedures such as blood sampling, IV catheter insertion, and during vaccination cause fear, anxiety, pain, and stress in children. A study conducted at Cipto Mangunkusumo Hospital found that pain scores in children aged <1-18 years during IV catheter insertion had an average pain score of 7 (severe pain). In this context, it is highly recommended to use non-pharmacological applications to reduce the pain level of IV catheter insertion by using ice gel. The use of ice gel can reduce pain levels in children aged <1 to 18 years with an average score of 4 (moderate pain). The results of the study were supported by Celik et al (2023) who stated that the pain and fear scores of children in the control group (no intervention) were higher than the scores in the cooling spray and ice groups (P<.001) in children aged 7 to 15 years during venipuncture. The results of another study according to Kurian et al (2019) stated that the pain scale in the intervention group (ice cubes) was lower than the control group (without intervention) in children aged 6-12 years during venipuncture. Simoncini et al's research (2023) on assessing the pain scale during venipuncture in children aged 1 to 18 years found that the Buzzy tool (there is ice gel administration) effectively reduces pain due to venipuncture in children in different age groups. Buzzy administration can not only be used for IV catheter insertion or blood sampling, research by Bilsin et al (2019), buzzy (external cold and fibration) has a significant effect in reducing children's pain during local anaesthetic injection for dental treatment placed on the mandible 2 minutes before anaesthetic injection

Fear and a history of previous puncture in children, especially children <1 year old, can increase pain perception, causing emotional changes that lead to longer crying in children. The results of the study at the time of IV catheter insertion in children aged <1 year before and after being given ice gel, the results of pain scoring were not very significant, but during observation and interviews with parents there was satisfaction and a decrease in the duration of crying in children after IV catheter insertion (crying duration before ice gel >5 minutes and after ice gel <3 minutes).

According to Susam et al (2018), assessing parental satisfaction with the buzzy system found that most parents

71.9% said they would use Buzzy again at the time of venipuncture, while 46.9% of parents said it was a positive and novel experience. There were no negative opinions from parents regarding buzzy. This is based on the importance of considering the child's relationship with the parents, not just the child's own experience. Reducing the child's anxiety goes hand in hand with calming the parents' anxiety. Providing opportunities for parents to play an active role as a form of distraction in its capacity to soothe the child's pain.

Conclusion

The use of ice gel during venipuncture in children aged <1 to 18 years is effective in reducing pain levels in infection ward so that it can be applied by nurses and other medical personals in the treatment rooms to reduce the level of pain during IV catheter insertion in children aged <1 to 18 years.

References

Bilsin, E., Güngörmüş, Z., & Güngörmüş, M. (2020). The efficacy of external cooling and vibration on decreasing the pain of local anesthesia injections during dental treatment in children: a randomized controlled study. *Journal of PeriAnesthesia Nursing*, *35*(1), 44-47.

Bergomi, P., Scudeller, L., Pintaldi, S., & Dal Molin, A. (2018). Efficacy of non-pharmacological methods of pain management in children undergoing venipuncture in a pediatric outpatient clinic: a randomized controlled trial of audiovisual distraction and external cold and vibration. *Journal of pediatric nursing*, *42*, e66-e72.

Binay, Ş., Bilsin, E., Gerçeker, G.Ö., Kahraman, A., & Bal-Yılmaz, H. (2019). Comparison of the effectiveness of two different methods of decreasing pain during phlebotomy in children: A randomized controlled trial. Journal of Perianesthesia Nursing, 34(4), 749–756. https://doi.org/10.1016/j.jopan.2018.11.010

Çelik, E. G., & Düzkaya, D. S. (2023). The Impact of Cold Spray and Ice Application During Intravenous Access on Pain and Fear in Pediatric Emergency Unit: A Randomized Controlled Trial. *Journal of Emergency Nursing*

Çetin, S. P., & Çevik, K. (2019). Effects of vibration and cold application on pain and anx iety during intravenous catheterization. Journal of Perianesthesia Nursing, 34(4), 701–709. https://doi.org/10.1016/j.jopan.2018.12.005

Dahlan, M. Sopiyudin. (2011). *Statistik Untuk Kedokteran dan Kesehatan* 5th edition. Jakarta: Salemba Medika.

Gaikwad, N. S., Naregal, P. M., Mohite, V. R., & Karale, R. B. (2017). A study to assess the effectiveness of ice application on pain response prior to intravenous procedures among children at tertiary care hospital. *Asian journal of pharmaceutical research and health care*, 167-173.

Hockenberry, M. J. & Wilson, D. (2014). Wong - Enfermagem da criança e do adolescente (9ºed). Lusociência

Hockenberry J. M., & W. D. (2017). Wong's nursing care of infants and children (10th ed.). In *Elsevier* (Vol. 10). https://doi.org/10.1016/0260-6917(87)90137-7

Kurian & Sarojini. (2019). Effect of Local Cold Application on Venipuncture Site in Reducing Pain among School Age Children. *International Journal of Research & Review*. Vol.6; Issue: 8

Mansur, A. (2019). *Aplikasi Atraumatic Care.* Padang: Andalas University Press.

Pandey, P., & Pandey, M. M. (2015). Research methodology: Tools and techniques. Romania: Bridge Center

Polit, D. F., & Beck, C. T. (2017). Essentials of Nursing Research Seventh Edition Appraising Evidence for Nursing Practice. In *Lippincott Williams & Wilkins*.

Setiadi. 2013. Konsep dan Praktik Penulisan Riset Kepeawatan Edisi 2. Yogyakarta: Graha Ilmu

Semerci, R., Akarsu, Ö., & Kılıç, D. (2023). The effect of buzzy and cold spray on pain, anxiety, and fear of children during venipuncture in pediatric emergency department in Turkey; A randomized controlled study. *Journal of Pediatric Nursing*, *68*, e1-e7.

Simoncini, E., Stiaccini, G., Morelli, E., Trentini, E., Peroni, D. G., & Di Cicco, M. (2023). The Effectiveness of the Buzzy Device in Reducing Pain in Children Undergoing Venipuncture: A Single-Center Experience. *Pediatric Emergency Care*, *39*(10), 760-765.

Susam, V., Friedel, M., Basile, P., Ferri, P., & Bonetti, L. (2018). Efficacy of the Buzzy System for pain relief during venipuncture in children: a randomized controlled trial. *Acta Bio Medica: Atenei Parmensis*, *89*(Suppl 6), 6.

Sugiyono (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alphabet.