

The Effectiveness of *Ice pack* to Reduce Pain in School Age Children with Venous Functioning

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Abstract - *At the time of fever children need more fluids because of an increase in evaporation. Venous puncture is one of the measures to meet the patient's fluid needs. Installation of infusion and blood collection in children is not easy because the child has a small and fragile vein, so frequent intravenous infusion and blood collection are often found because of failed intravenous cannulation. In children who are treated in the infection room also often do blood draws for diagnostic tests. The procedure gives rise to the experience of pain in children. One thing nurses can do is to apply pain reduction methods. Ice pack application is a simple, safe, effective and can be used to reduce pain. The purpose of this study was to determine the effectiveness of administration of icepack before venous puncture was performed in school-age children. This research is a type of quantitative research with a quasi-experimental method post test only nonequivalent control group. The sampling technique uses purposive sampling with a sample of 32 people divided into 2 groups: the control group and the intervention group. Data collection tools use observation sheets to measure the level of child pain using the Wong Baker Pain Rating Scale. Data analysis using the Mann Withney Test. The results showed that the pain level in the control group mostly experienced 68.8% more pain. The pain level in the intervention group mostly experienced a slight pain of 43.8%. The difference in pain level was known to be lower than the control group's pain level 1.50 compared to the control group. Mann Withney Test*

results obtained p value of 0,000 means that there are significant differences between children who get icepack before venous puncture and children who do not get aice pack before venous puncture.

Keywords: *ice pack, school-age children, pain, venous puncture*

INTRODUCTION

Disease and treatment of children in hospitals (hospitalization) is often the first crisis that must be faced by children because it causes stress on children. Infectious disease is a major cause of morbidity and death that occurs in infants and children, especially in developing countries including Indonesia. Data from the World Health Organization (WHO) in 2008 showed that more than 64% of under-five deaths were caused by infectious diseases. An increase in body temperature can occur as a reaction to an infection. Infection can affect the whole body or certain body parts (local infection). In children, an increase in body temperature can cause discomfort fulfillment, one of which is fever. Fever itself plays a role in helping the body to fight the attack of viral or bacterial infections. Increased temperature can sometimes be a sign of more serious illness such as respiratory infections, diarrhea, meningitis or febrile seizures (Hockenberry & Wilson, 2009).

At the time of fever children need more fluids because of an increase in evaporation. Installation of infusion is one of the

measures in meeting the fluid needs of patients. Installation of infusion and blood collection in children is not easy because the child has a small and fragile vein, so frequent intravenous infusion and blood collection are often found because of failed intravenous cannulation. In children who are treated in the infection room also often do blood draws for diagnostic tests. The procedure gives rise to experiences of pain in children. One thing nurses can do is to apply the method of reducing pain. Ice pack application is a simple, safe, effective and can be used to reduce pain. This method is a non-pharmacological method that is intended to reduce pain when children get invasive procedures such as blood collection and infusion. The mechanism of analgesic effects on ice packs is by slowing down conduction in the delta A and C nerve fibers, decreasing inflammation, and mediating nociception.

METHODS

This research is a quantitative study with a quasi experimental design post test only nonequivalent control group. This study involved 2 groups: a group of school-age children who received icepack compresses before venous puncture measures as an intervention group and groups that were not given ice pack compresses as a control group that received standard treatment in the form of therapeutic communication. The sampling technique used purposive sampling with a total of 32 people consisting of 16 people as the control group and 16 people as the intervention group. The inclusion criteria in this study: children aged 6-12 years, children can communicate verbally and non-verbally, parents are willing their children to be respondents. Data collection instruments using instruments in this study used instruments to measure the level of pain in children using the Wong Baker Pain Rating Scale. Each parameter has a different score: 0: no pain, 1 = pain little bit, 2: pain little more, 3: pain even more, 4: Pain whole lot, 5: pain worst.

Assessment of pain score will be done using video footage at the time of procedure.

Data analysis uses univariate and bivariate tests. Bivariate analysis was performed to prove whether there were differences in average pain scores between respondents in the control group and the intervention group. The test used is the Mann Withney test.

RESULT

1) Characteristics of respondents

Characteristics of Respondents identified in this study are age, gender and previous infusion experience which can be seen in Table 1

Table 1. Characteristics of Respondents based on Age, Gender and Previous Venous Functioning Experience

Characteristics	Intervention Group (n=16)		Control Group (n=16)	
	n	%	n	%
Age				
6 years	3	18,8	3	18,8
7 years	3	18,8	2	12,5
8 years	3	18,8	3	18,8
9 years	3	18,8	0	0
10 years	1	6,3	3	18,8
11 years	1	6,3	2	12,5
12 years	2	12,5	3	18,8
	16	100	16	100
Sex				
Female	9	56,2	8	50
Male	7	43,8	8	50
	16	100	16	100
Previous experience of venipuncture				
Ever	13	81,2	8	50
Never	3	18,8	8	50
	16	100	16	100

Table 1 showed the characteristics of respondents based on age showed that the majority of the age of respondents in the intervention group aged 6, 7, 8 and 9 years by 18.8%, while in the control group the majority of respondents aged 6, 8, 10 and 12 years amounted to 18.8% . The majority of respondents in the intervention group were women by 56.2%, while in the

control group the sexes of men and women were equal at 50%. Distribution of Respondents based on previous venous puncture experience in the majority of the intervention group had experienced venous puncture previously by 81.2%, whereas in the control group the experience of previous venous puncture experience was between 50% and never.

2) Pain Level Intervention Group and Control group

Table 2. Pain Level Distribution Intervention and Control Groups

Pain Level	Intervention Group (n=16)		Control Group (n=16)	
	n	%	n	%
No pain	0	0	0	0
Pain little bit	7	43,8	0	0
Pain little more	5	31,3	0	0
Pain even more	4	25,0	11	68,8
Pain whole lot	0	0	5	31,3
Pain worst	0	0	0	0
	16	100	16	100

Table 2 showed that the majority of respondents in the intervention group felt less pain by 43.8%, while in the control group the majority of respondents felt more pain by 68.8%.

3) Difference Average pain level of the intervention and control group

Table 3. Difference Average pain level of the intervention and control group

Group	n	Mean	SD	Average difference
Intervension	16	1,81	0,834	
Control	16	3,31	0,479	1,50

Table 3 showed that the average score of pain levels of school-age children during venous puncture in the intervention group was 1.81, while the pain level score in the control group was 3.31. The results of the average difference in the level of pain of school- age children who were given ice pack compresses were lower by 1.50 compared with the pain level of school- age children who were not given ice pack compresses.

4) Difference in Average Pain Levels Based on Gender and Previous experience venipuncture

Table 4. Difference in Average Pain Levels Based on Gender and Previous Infusion Experience

Characteristic	n	Mean	SD	Average difference
Sex				
Female	17	16,24	0,512	
Male	15	16,80	0,50	0,56
Previous experience of venipuncture				
Ever	21	14,00	0,81	
Never	11	21,27	0,50	7,27

Table 4 showed that the pain level score of respondents who are male is 0.56 compared to respondents who are female. The level of pain of respondents based on previous venous puncture experience showed that the level of pain of respondents who had never experienced venous puncture was higher than 7.27 compared to those who had previously experienced venous puncture.

5) The Effects of Ice Pack Compresses on the Pain Level of School-Age Children During Venous Puncture

Table 5: Analysis of the Effect of Ice Pack Compress on Pain Level

Group	n	Mean Rank	P. Value
Intervention	16	9,88	
Control	16	23,13	0.000

Table 5 it can be seen that the results of statistical tests using the Mann Withney Test showed that there are differences in the score of the pain levels of the intervention group and the control group, thus it can be said there is an influence of ice pack compresses on the reduction of pain scores in school-age children when venous puncture measures with a p value of 0,000.

DISCUSSION

The age of the children who were respondents in this study had been determined in the inclusion criteria, namely school age children (6-12 years old. Even though the age of the respondents at the same developmental stage, the results of the analysis showed that there was no relationship between age and pain level. According to Hockenberry & Wilson (2009) school-age children are able to understand the need for pain when a procedure or action is carried out, at this stage of age the child is also able to demonstrate coping methods in dealing with stress due to pain that is incurred from the procedure, the child has also been able to communicate discomfort through Verbal or non-verbal language. According to Hockenberry and Wilson (2009) school-age children are able to relate an event to describe their feelings through verbal or symbolic expressions School-age children have also begun to turn to the thought process that allows children to see from the perspective of others so the child can accept

ima explanation and be able to analyze the events they experienced.

Female sex characteristics were more in the intervention group, whereas in the control group the sex between men and women was 50% each. The pain level of male respondents was 0.56 higher than the pain level of female respondents. According to Gill (1990) explained that men and women did not differ significantly in response to pain. Cultivated culture can be one of the factors that influence an individual's response to pain.

The pain level of respondents who had never experienced venous puncture experience had a higher pain of 7.27 compared to respondents who had experienced venous puncture. According to Potter and Perry (2005) explain if someone does not or has never felt pain, then the first perception of pain can interfere with coping with pain, but the experience of pain that has been experienced before is not the basis that a person will receive pain in the future. If the individual often experiences a series of episodes of pain that never go away eating fear or anxiety can occur. In contrast to the opinion of Bill and Blinder (2003) the experience of previous pain will affect individual perceptions about pain that will trigger feelings of anxiety or fear when facing an action that also causes pain in the future.

The level of pain in the intervention group mostly experienced less pain, in the intervention group there was no pain level with a very painful scale, this result was different from the control group where most respondents felt pain with a more painful scale, this was due to the pain impulse being inhibited by endogenous opiates so that pain is not transmitted to the brain. Pain is one of the main stressors of hospitalization in children which will cause trauma (Hockenberry & Wilson, 2009). Therefore children need to be prepared in facing the experience of hospitalization and various

procedures that cause pain so that children are able to direct their energy to deal with stress due to inevitable hospitalization (Hockenberry & Wilson, 2009). The IV infusion procedure is an invasive procedure that is often performed in pediatric care in a hospital. The presence of venous puncture procedures in infusion can cause anxiety, fear and pain in children (Wang, Sun, & Chen, 2008). When a venous puncture (needle piercing the skin) will cause disturbing stimulation that will activate the pain nociceptors. Pain nociceptors will stimulate the afferent nerve endings to release substance P. The substance P released will affect the nociceptors outside the area of trauma which will cause a wider circle of pain. Pain impulses are transmitted to the spinal cord through the ascending pathway. When a pain impulse enters the posterior horn of the spinal cord, interaction will occur between the endogenous analgesia system produced by the body. If pain is not inhibited in this process, the pain will be felt longer and more widespread.

Some of therapy pharmacological and pharmacological techniques can be used to reduce pain in children such as analgesic therapy, anesthetic cream, distraction, relaxation and cutaneous stimulation that can help reduce pain perception (Wang, Sun, & Chen, 2008). Cold compresses are skin stimulation using ice bags to reduce pain. Giving cold compresses will induce proper numbness used as a local anesthetic to relieve pain (Wong, 2009). Besides cold compresses can also reduce nerve sensitivity due to venous puncture procedures / actions that cause pain (Fauzi & Handayani, 2013). Ice pack application is a form of cold compress that is simple, safe, effective and can be used to reduce pain. This method is a non-pharmacological method that is intended to reduce pain when children get invasive procedures such as blood collection and infusion.

The results of statistical tests obtained differences in the level of pain between the intervention group and the control group. From the Mann Withney test results obtained $p \text{ value} > 0.005$ so there is a difference between the intervention group and the control group. Based on statistical tests, the hypothesis in this study was accepted that there was an influence of the use of ice packs to reduce pain in school-age children with venous puncture measures with a mean difference of 1.50. The mean difference in the two groups showed that respondents who were given ice pack compresses were more effective than those who did not get ice pack compresses. The mechanism of analgesic effects on ice packs is by slowing down conduction in the delta A and C nerve fibers, decreasing inflammation, and mediating nociception. The ice pack application is applied for 3 minutes before taking blood or infusion (Kiran, Kaur & Marwaha, 2013; Cambulat, Ayban, & Inal, 2014). According to Fauzi and Hendayani (2013) the use of ice packs for less than 15 minutes does not cause venous vasoconstriction and blood vessels still flow so that ice packs can be used as compresses to reduce pain during invasive procedures.

Similar research conducted by Kiran, Kaur and Marwaha (2013), there was a significant decrease in pain intensity in children aged 3-7 years when taking blood using ice pack interventions. Other research is supported by Ramdhani's study (2013) which recommends the use of cold compresses to reduce pain during venous puncture in children.

CONCLUSION

Based on the results of this study concluded that

1. There is a significant difference between the groups given ice pack compresses and those who do not

compress ice packs with a mean difference of 1.50.

2. The effects of ice pack compresses on the level of pain of school-age children during infusion with a p value of 0,000

RECOMMENDATION

Researchers recommend giving ice pack compresses to school-age children before venous puncture is performed

REFERENCES

- Ball, J.W. & Blinder, R.C. (2003). *Pediatric care of children: Principle & practice (3th Ed)*. St. Louis: Saunders Elsevier
- Ball, J. W., Blinder, R. C., & Cowen, K. J. (2010). *Child health nursing: Partnering children & families* (2th ed). New Jersey: Pearson.
- Bowden, V.R., & Greenberg, C.S. (2010). *Children and their families: The continuum of care* (2th ed). Philadelphia: Lippincott Williams & Wilkins.
- Combulat, H., Ayban, F., & Inal, S. (2014). Effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous cannulation in pediatric patients. *Pain Management Nursing*, 2014 (3), 1-7.
- Fauzi, I., & Hendayani, N. (2013). Pengaruh kompres dingin terhadap tingkat nyeri pada prosedur invasif pemasangan infus anak usia sekolah di RSUD Bendan Kota Pekalongan tahun 2013. *Skripsi*. Tidak dipublikasikan.
- Hockenberry, M., Wilson, D. (2009). *Essentials of pediatric nursing* (8th ed.). St. Louis: Mosby Elsevier.
- Kiran, N., Kaur, S., & Marwaha, R. K. (2013). Effect of ice pack application at the prior site to vernipuncture on intensity of pain among children. *Nursing and Midwifery Research Journal*, 9 (14), 160-167.
- Potter, P.A & Perry, A.G. (2013). *Fundamental of Nursing*. Eight Edition. Canada: Mosby
- Sastroasmoro, S., & Ismael, S. (2011). *Dasar-dasar metodologi penelitian klinis* (edisi keempat). Jakarta: CV. Sagung Seto.
- Wang, Z.X., Sun, L.H., & Chen, A.P. (2008). *The efficacy of non-harmacological methods of pain management in school age children receiving venapuncture in a paediatric department: A randomized controlled trial of audiovisual distractin and routine psychological intervention*. *Swiss Med*, 138(39-40), 579-84.
- Wong, D.L., Eaton, M.H., Wilson, D., Winkelstein, M.L., & Schwart, P. (2009). *Buku ajar keperawatan pediatrik volume 2* (6th ed). Jakarta: EGC.
- Wilson, D., & Hockenberry, M. J. (2012). *Wong's clinical manual of pediatric nursing*. St. Louis Missouri: Mosby Elsevier.