

## Touch, Look, Compare, Compress (TLCC) Based On Family Centered Care (FCC) Reducing Phlebitis in Children with Intravenous Therapy

Ely Mawaddah<sup>1</sup>, Mira Utami Ningsih<sup>2</sup>, Dewi Purnamawati<sup>3</sup>, Lale Wisnu Andrayani<sup>4</sup>

<sup>1,2,3,4</sup> Jurusan Keperawatan Poltekkes Kemenkes Mataram, Indonesia

### *Abstract*

The incidence of phlebitis is an indicator of hospital performance and requires the percentage of phlebitis to be less than 5%. Intensive monitoring of patients who receiving intravenous therapy can reduce complications from phlebitis and improve service to patients. This study aims to determine the effect of the intervention package Touch, Look, Compare, Compress (TLCC) on the incidence of phlebitis in pediatric patients who are infused. This research is an experimental study with a quasi-experimental design, respondents will be divided into 2 groups: The group given the TLCC flyer intervention and the control group given the intervention according to hospital procedures. The measurement of phlebitis uses a phlebitis degree table instrument developed by the Infusion Nurses Society (INS). Measurements were taken on day 1, day 2 and day 3. The results showed an increase in the mean of patients who had phlebitis on day 3 in the control group. There were significant differences in the degree of phlebitis on days 1, 2 and 3 ( $p$  value = 0,000) in the control group. In the intervention group there was no significant difference in the degree of phlebitis on days 1, 2 and 3 ( $p$  value = 0.368). Statistical test results using Mann Whitney showed no significant difference in the degree of phlebitis in the two groups on day 1 ( $p$  = 1.00), while on days 2 and 3 there was a significant difference ( $p$  = 0,000). Monitoring pediatric patients with intravenous therapy through TLCC interventions can prevent phlebitis.

**Keywords:** Intravenous; pediatric patients; touch; look; compare; compress; phlebitis

### **BACKGROUND**

Mortality of infants and toddlers is influenced by the level of morbidity in children. Various diseases both chronic and acute contribute to the level of child morbidity (UNICEF, 2013). High levels of morbidity will increase hospitalization in children, most of the diseases being treated are diarrhea, respiratory diseases, fever, anemia and malnutrition. Population of children treated in hospitals experienced a dramatic increase (Wong, 2009). Disease and treatment in hospitals often become a crisis that must be faced by children (Hockenberry & Wilson, 2011). This crisis is related to various invasive procedures, separation from family and friends, feelings of isolation, fear of the unknown, things that are foreign in the hospital and the experience of pain (Brykczynska & Simons, 2011). Various invasive procedures during treatment cause recurring pain and cause the child to feel fear and regard it as a threatening thing, the child feels worried and afraid to experience it again (Price & Gwin,

2008). One of the invasive procedures that is often done when a child is hospitalized is intravenous therapy.

The infusion procedure often causes acute pain conditions for children (Nilsson, Finnström, Kokinsky, & Enskär, 2009). Infusion is performed in 70-80% of patients who are hospitalized (Pasalioglu & Rich, 2014). Complication of infusion that is common in children is phlebitis (Arias-Fernández, Suárez-Mier, Martínez-Ortega, & Lana, 2016). Phlebitis can occur in blood vessels near the skin or in the deepest tissues of the body. Signs of phlebitis are inflammation of the tunica intima vein which is a complication of intravenous (IV) therapy and is characterized by typical symptoms of inflammation including, swelling, redness along the veins, pain, increased temperature in the area of insertion of the cannula and decreased speed of infusion droplets (Royal Collage Nursing, 2010). The incidence of phlebitis is one indicator of hospital performance. Phlebitis is the most common complication as an intravenous complication, almost 50% experience phlebitis after 96 hours of infusion (Tripathi, Kaushik, & Singh, 2008). Prevention of phlebitis is the responsibility of the nurse. Nurses must be able to identify patients at risk for phlebitis and prevent the incidence of phlebitis with appropriate interventions. Intensive monitoring of patients receiving intravenous therapy can reduce complications from phlebitis and improve service to patients (Richard, et al, 2010).

Intensive monitoring of patients with intravena therapy includes the date of insertion of the infusion, whether skin development is felt warm, redness and palpation of veins (Saji, et al, 2015). Intensive monitoring can prevent a child from complications from infusion. Children who are being given intravenous therapy are touched in the area around the infusion whether it feels warm, dry and pain-free, then seen every 60 minutes whether the IV line is still intensified, dry and without redness, the next step is to compare with the part that is not attached to the infusion whether the size is the same size and without swelling. Many attempts have been made to reduce the discomfort that is often associated with plebitis and speed up the healing process, such as applying warm or cold compresses to areas that have plebitis (Gauttam & Vati, 2016). Compress is used because it can provide a moist environment in the area of inflammation, which might accelerate the wound healing process (Bryant & Nix, 2015). In addition, warm compresses can provide comfort to the affected area, while cold compresses can stimulate narrowing of the arteries, which can reduce edema (Gauttam & Vati, 2016).

One philosophy of child nursing is Family-Centered Care. The concept of Family-Centered Care as a philosophy in providing nursing services in hospitals is an approach that

can be done because in this approach there is a reciprocal relationship between service providers, patients and families so that it will minimize conflicts that have arisen as a result of lack of information and communication. Families as the intensivest people to children can contribute to child care, one of which is through intensive monitoring of children who are installed intravenously to prevent phlebitis. This research develops an intervention package for families to play a role in monitoring children who are infused. The intervention package is touch, look, compare, compress abbreviated TLCC. This intervention provides a guide for parents to play a role in monitoring children who are infused to prevent phlebitis created in the form of a flyer.

## **METHODS**

This research is an experimental research design with a quasi-experimental post-test non equivalent control group design which involves two groups. The selection of respondents is done by purposive sampling technique with inclusion criteria: Composentis, children get drug therapy through intravenous and children whose parents are willing to be respondents and can communicate well. The exclusion criteria in this study were children with critical conditions, children who had blood vessel abnormalities, children who experienced abrasion or injury to the extremities, children who received seizure treatment through intravenous and children who received TPN (Total Parenteral Nutrition). The sample of this study is children aged 0-12 years consisting of 40 respondents in the control group and 40 respondents in the intervention group. Data collection tools in this study are observation sheets.

The process of selecting respondents begins when the researcher or research assistant builds a relationship of trust and anamnesis, if the respondent is included in the inclusion criteria then the researcher or research assistant will ask the respondent in this case represented by his parents to participate. Then the researchers filled out a questionnaire regarding the child's age, medical diagnosis, type of fluid/drug, previous hospitalization experience. Researchers also provide an explanation to parents about infusion and complications of infusion in children. Next, the researchers gave the TLCC flyer, explaining about TLCC and the mechanism of compresses. Researchers give towels and waskom to compress and ask parents to note if there is redness and swelling in the insertion area and around the infusion. Evaluation is carried out on Day 1, Day 2 and Day 3 by research assistant. Phlebitis prevention for the control group is carried out according to hospital procedures. This research has obtained ethical clearance from the ethics committee Poltekkes

Kemenkes Mataram. The ethics of this study provided informed consent to respondents or parents including research explanations.

## RESULTS

Characteristics of respondents examined in this study were age, previous hospitalization experience, type of disease and type of fluid/drug. Mean of age children in the control group was 3.15 years (0-12; 95% CI: 2.10-4.20) and the intervention group was 2.95 years (0-12; 95% CI: 1.66-4 , 24). The experience of hospitalization in the control group of 10 people had been treated while in the intervention group as many as 8 people. The type of fluid used mostly uses isotonic fluid in both groups. Diseases in both groups were mostly treated for infectious diseases.

The data collection in the study was carried out for 3 measurements. The following is presented the degree of phlebitis in the control and intervention groups on days 1, 2 and 3 in table 1. Based on the results of the analysis of table 1, on day 1, all control groups and intervention groups did not experience phlebitis. On the 2nd day in the control group as many as 16 people experienced phlebitis and in the intervention group as many as 2 people experienced phlebitis degrees 2 and 3. On the 3rd day, the control group experienced phlebitis as many as 11 people while the intervention group 1-person experienced phlebitis. Homogeneity test results show that the age and hospitalization variables have equal (homogeneous) variables, while the degree of phlebitis shows unequal variables. Normality test results show that the age variable and the degree of phlebitis are not normally distributed (p value <0.05).

Analysis of differences in the degree of phlebitis on days 1, 2 and 3 can be seen in table 2. There was an increase in the mean of patients who developed phlebitis on day 3 in the control group. There was a significant difference in the degree of phlebitis on days 1, 2 and 3 (p value = 0,000). In the intervention group there was no significant difference in the degree of phlebitis on days 1, 2 and 3 (p value = 0.368). Statistical test results using Mann Whitney showed no significant difference in the degree of phlebitis in the intervention group or the control group on day 1 (p = 1.00). In contrast to the results of the 2nd and 3rd day tests, there were significant differences between the intervention and control groups. From the results of the Mann-Whitney test it can be concluded that there are differences in the degree of phlebitis in the intervention group and the control group on the 2nd and 3rd day (p = 0,000).

## DISCUSSION

Age is one of the factors that influences the occurrence of phlebitis. The results of a study conducted by Fitriyanti (2015) showed that age was associated with the incidence of phlebitis. Along with the addition of age there will be various changes in bodily functions both physically, biologically, psychologically and socially. One of the physical changes is a decrease in the body's immune system. The body's immune system has the function of helping to prevent infections caused by fungi, bacteria, viruses, and other organisms and to produce antibodies (a type of protein called immunoglobulin) to combat the attack of foreign bacteria and viruses into the body. As a child ages, his body's defense system will further develop. Infants and toddlers have smaller veins and more mobile conditions that can cause the catheter to shift and this can cause phlebitis.

Children with recurrent hospitalization increase the risk of trauma to children. The impact of hospitalization can increase anxiety, feel unfamiliar with the new environment. The results of the study show that children who have never been treated will find it more difficult to adapt to the situation in the hospital than children who experience it (Commodari, 2010). The role of parents is very important to provide support to children during hospitalization, parents play a role in care, provide comfort, help the healing process and reduce the impact of hospitalization. Parents who have previously treated their children in the hospital will show lower levels of anxiety compared to parents who are caring for their children for the first time (Nurfatimah, 2019).

The results showed that most IV fluids obtained by children in both the control and intervention groups were isotonic fluids. Most children get a D5 ¼ NS infusion. Isotonic fluid is a liquid that contains osmolality equivalent to plasma. When this fluid is given to patients with normal hydration status, isotonic fluid does not cause significant movement of water from blood vessels into cells. Hypertonic fluid has a high osmolality compared to plasma. Giving hypertonic fluid can cause the movement of water from the extravascular cavity into the blood vessels, causing an increase in intravascular volume. Hypotonic studies have lower osmolality compared to plasma. This fluid will cause water to move from intravascular to extravascular and can go into cells (McNab, Ware, Neville, et al. 2014).

Extreme osmolarity and pH of intravenous fluids are always accompanied by a high risk of phlebitis. The pH of the destrosa solution ranges from 3-5, where acidity is needed to prevent caramelization of dextrose during the autoclave sterilization process, so solutions containing glucose, amino acids and lipids used in parenteral nutrition are more genetic than

normal saline (Darmawan, 2008). Experts generally agree that the slower the infusion of hypertonic solutions the lower the risk of phlebitis. The largest peripheral veins and the smallest and shortest catheters may be recommended to achieve the desired infusion rate, with a 0.45 mm filter. Cannula should be removed if there are early signs of pain or redness. This relatively quick infusion is more relevant in infusion as well as drug entry, not parenteral fluid or nutritional therapy. Based on the results of the study note that the majority of children get hypotonic type infusion fluid, none of the respondents get hypertonic solution. Peripheral veins can receive osmolality of solutions up to 900 mOsm / L. The higher the osmolality (the more hypertonic), the easier is damage to peripheral venous walls such as phlebitis, thrombophlebitis and thromboembolism (Fitriyanti, 2015).

Types of illnesses of children treated for infectious diseases. Infants and Children have imperfect body defense systems, so they are more at risk of infection and other ill conditions. High levels of morbidity will increase hospitalization in children, most of the diseases being treated are diarrhea, respiratory diseases, fever, anemia and malnutrition. Wong (2009) said that the population of children treated in hospitals experienced a dramatic increase. The percentage of children being treated at the hospital is now experiencing more serious and complex problems than the incidence of hospitalization in previous years. One of the routine procedures performed when a child is hospitalized is intravenous therapy (infusion) so that the potential for experiencing phlebitis.

Infusion is the most frequently performed procedure in a hospital (Pasalioglu & Rich, 2014). The results of this study are in line with research conducted by Annisa, Nurhaeni, Wanda (2017), that phlebitis mostly occurs after 24 hours of infusion. The risk of phlebitis will increase after 48 to 120 hours of infusion. Research conducted by Tripathi, Kaushik and Singh (2008) show that 50% of children will experience phlebitis after 96 hours of infusion. Phlebitis is characterized by redness, swelling and pain in the area attached to the infusion.

Intensive monitoring of patients can prevent phlebitis. Families as the intensivest people to children can contribute to child care (Hockenberry & Wilson, 2012). Intensive monitoring of patients who are placed intravenously includes the date of infusion, whether skin development is felt warm, redness and palpation of veins (Saji, et al, 2015). Intensive monitoring can prevent a child from complications from infusion. This research involved parents and family in monitoring children who were installed intravenously. Parents touch the area around the infusion whether it feels warm, dry and free of pain, then see every 60 minutes whether the IV line is still intensified, dry and without redness, the next step is to compare parents with the part that is not installed infuse whether the size is the same and

without swelling and give warm water compresses around the area of infusion. Parent involvement in child care is part of the concept of family-centered care. Family-centered care is one of the unique philosophies in child care. This concept allows parents and families as child care centers and can not be separated to avoid child trauma while undergoing hospitalization (Shields Linda, 2015). The results of this study are in line with research conducted by Sparks, Setlik, Luhman (2007), the study shows that involving parents in infusion can reduce the degree of stress of children in addition to involving parents can increase family satisfaction, increase child comfort and reduce pain when the invasive procedure is carried out.

The intervention in this study was to provide warm compresses in the area around the infusion. The application of compresses is intended to provide comfort to the child so as to minimize movement during the child's infusion. Giving warm compresses or known as superficial hydrotherapy has been widely used in the world of health. Research conducted by Xiao-fei, Yu-juan, Ling-mei, et al (2018), states that the administration of warm compresses can increase the temperature of the tissue around the skin so that it can improve blood circulation and vasodilatation of blood vessels in preventing thrombophlebitis. This result is also consistent with research conducted by Gauttam & Vati (2016), that the use of warm compresses can reduce pain, redness and swelling. Warm compresses are also known to increase patient comfort and become one of the non-pharmacological therapies to reduce pain (Kulisch, Bender, Németh, & Szekeres, 2009).

Annisa, Nurhaeni, Wanda (2017), recommends that clinicians both Nurses and Doctors should be able to palpate and visualize the signs of phlebitis. The Infusion Nurse Society (INS) has recommended that neonatal and pediatric patients should be monitored more frequently. The use of transparent film during infusion fixation will allow for monitoring without opening the infusion dressing

## **CONCLUSION**

Monitoring pediatric patients with intravenous therapy through TLCC interventions can prevent phlebitis

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