



THE EFFECT OF ACUPRESSURE THERAPY ON NAUSEA AND VOMITING IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA (ALL) UNDERGOING CHEMOTHERAPY

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ABSTRACT

The most common cancer in children is Acute Lymphoblastic Leukemia (ALL) with 14,979 cases in Indonesia. One of the cancer treatments is chemotherapy, which uses chemicals and has physiological side effects. One of the most common physiological side effects is nausea and vomiting, which is experienced by around 75% of patients. As a result, children experience fluid and electrolyte imbalances which negatively impact patient compliance in undergoing chemotherapy programs and are worried that patients will choose not to continue and stop their chemotherapy cycles due to discomfort caused by the side effects. Management of nausea and vomiting can be done with non-pharmacological therapy. One therapy that can be done is acupressure therapy at points P6 and St36, which is believed to improve energy flow in the stomach, thereby stimulating the release of beta endorphins in the pituitary gland, which can inhibit nausea and vomiting impulses in the vomiting center. The aim of this study was to determine the effect of acupressure therapy on nausea and vomiting in children with Acute Lymphoblastic Leukemia (ALL) undergoing chemotherapy at Dr. M. Djamil Padang General Hospital. Research methodology: using Quasi-Experimental with pre-experimental design with One-Group Pre-posttest design approach. The research sample was ALL pediatric patients undergoing chemotherapy, aged 6-18 years, experiencing nausea and vomiting and has been measured with the PeNAT instrument with results of 3 and 4, patients who were not given anti-emetic therapy. The sampling technique was carried out using purposive sampling technique. The population of this study was children with Acute Lymphoblastic Leukemia (ALL) aged 6-18 years who underwent chemotherapy at Dr. M. Djamil Padang Regional Hospital with a sample size of 15 people with the sample criteria being willing to be respondents, ALL child patients undergoing chemotherapy aged 6-18 years, who experienced nausea and vomiting. The study will be conducted within one year. Data analysis techniques were carried out univariately and bivariately with computerization. The results of the study showed that the average score of nausea and vomiting in children before the intervention was 3.467 and after the intervention was 2.133, with a mean difference of 1.334. The results of the statistical test using the Wilcoxon T-Test obtained a $p\text{-value} = 0.000 \leq 0.05$, so it can be interpreted that there is an effect of acupressure therapy on nausea and vomiting in children with Acute Lymphoblastic Leukemia (ALL) undergoing chemotherapy at Dr. M Djamil Padang Hospital. The results of this study have shown that acupressure can significantly reduce nausea and vomiting scores in respondents who experience nausea and vomiting due to chemotherapy.

Keywords: acupressure; acute lymphoblastic leukemia (ALL); chemotherapy; childhood cancer; nausea vomiting

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INTRODUCTION

Childhood cancer is a major issue that has attracted public attention in the current era (Tiala, 2023). The World Health Organization (WHO) reported in 2020 that over the past five years, the incidence of childhood cancer has reached approximately 800,000 children. Each year, an estimated 176,000 new cases occur worldwide. Indonesia ranks third in Asia for childhood cancer cases, with approximately 35,000 children. Acute Lymphoblastic Leukemia (ALL) in Indonesia ranks ninth among all cancer types (Amalia, 2021). West Sumatra shows an ALL prevalence of 2.4%, the second highest after Yogyakarta province (4.9%) (RI, 2018). Meanwhile, data from the Medical Records of Dr. M. Djamil Padang General Hospital (RSUP) shows an increase in new ALL cases of approximately 30-50 new cases annually over the past three years.

One cancer treatment is chemotherapy, a primary treatment using very strong chemicals to stop or inhibit the growth of cancer cells in the body, administered over several cycles (Kamilah, 2023). The mechanism of action of chemotherapy drugs is very strong to kill cancer cells but also has a negative effect on healthy cells, especially cells that divide rapidly such as hair follicles, spinal cord, skin and mucosa (Winarti, 2023). Side effects that are immediately felt by patients during or after chemotherapy are hair loss, nausea and vomiting, dry mouth, mouth ulcers, sore throat, diarrhea, pancytopenia, allergies, hypersensitivity, muscle and nerve disorders, fatigue and constipation (Tiala, 2023). Of the many side effects of chemotherapy that many patients experience are nausea and vomiting, which is around 75% of patients (Ismuhu, 2020). Chemotherapy-induced nausea and vomiting is the most common side effect in children. According to the American Cancer Society in 2019 high doses of intravenous Cisplatin, Doxorubicin, Methotrexate High dose, Cyclophosphamide without anti-emetic therapy can cause nausea and vomiting in 90% of patients.

The impact of nausea and vomiting is the occurrence of fluid and electrolyte balance disorders that will negatively impact patient compliance in undergoing therapy programs and it is feared that patients choose not to continue and stop their chemotherapy cycles because of the discomfort caused by the side effects caused (Wiryani, 2019). Management of nausea and vomiting can be done with non-pharmacological therapy, namely acupressure therapy, especially at the P6 (Neiguan) point, which is more recommended for children with leukemia in reducing nausea and vomiting due to chemotherapy compared to other complementary therapies because the application of acupressure at the P6 point significantly reduces the frequency, duration and severity of nausea and vomiting in children with acute leukemia undergoing chemotherapy, proven to experience a decrease in symptoms in the first 48 hours after chemotherapy compared to the control group that did not receive acupressure (Yousef, 2019). Safety and minimal risk of side effects because it does not involve chemicals or non-invasive actions, easy to apply by families of Leukemia sufferers compared to other complementary therapies, helps reduce the dose or frequency of administration of antiemetic drugs (Ayc, 2016).

Nausea and vomiting can be managed with non-pharmacological therapy, performed on pediatric patients as an adjuvant, both in the hospital and at home as a palliative therapy to improve the child's quality of life. Acupressure therapy originated in China and involves applying pressure to acupuncture points using the thumb, fingers, or forearm (Ismuhu, 2020). Acupressure plays a role in increasing the release of beta-endorphin in the pituitary gland around the chemoreceptor trigger zone (CTZ). The advantage of acupressure is that it is a natural, safe, non-invasive treatment that is easy to apply without side effects. Acupressure can be performed independently by patients and families. Acupressure can be integrated into current nursing practice, and nurses can teach patients and families because acupressure skills are easy to learn and can be used to help relieve a wide range of symptoms and patient care settings (Winarti, 2023).

The stimulation or pressure applied to points P6 and St36 is believed to improve energy flow in the stomach, increase beta-endorphin release in the pituitary gland around the Chemoreceptor Trigger Zone (CTZ), thereby reducing stomach disorders, including nausea and vomiting, and inhibiting the nausea and vomiting impulses in the vomiting and CTZ (Syarif, 2021). The P6 and ST36 point is located above the patient's wrist, between the two muscle bulges visible when gripping the hand tightly. Meanwhile, the ST36 point is located on the foot and on the stomach meridian. Meridians themselves are energy pathways within the body. The stomach meridian begins at the end of the large intestine meridian and has several branches, one of which enters the spleen and stomach. Pressure on these points is believed to stimulate beta-endorphin release in the pituitary gland. Beta-endorphins are endogenous antiemetics that can inhibit nausea and vomiting impulses and CTZ (Syarif, 2021).

Pressure applied to the P6 and ST36 points is believed to improve energy flow in the stomach, thereby reducing stomach disorders, including nausea and vomiting. Furthermore, the P6 point is

beneficial in increasing beta-endorphin release in the pituitary gland around the Chemoreceptor Trigger Zone (Tarcin, 2004). Research conducted by Rahmah and Alfianti (2021) conducted acupressure therapy on one of two ALL patients undergoing chemotherapy, which reduced nausea and vomiting in the child who received acupressure compared to the child who did not receive acupressure (Rahmah, 2021). Another study found a 20% reduction in nausea and vomiting in 20 children aged 6-12 undergoing chemotherapy (Tiala, 2023). Another study also found a 50% reduction in nausea and vomiting in children who received acupressure (Indrayanti, 2022).

Many researchers have conducted research on the benefits of acupressure, and some have reviewed the literature. However, previous literature has been limited to acupressure interventions in reducing nausea and vomiting in adult cancer patients, not specifically in children with ALL. Therefore, researchers are interested in conducting research related to acupressure therapy to reduce nausea and vomiting in ALL children undergoing chemotherapy. From the background description above, the aim of this study is to see the effect of acupressure therapy on nausea and vomiting in children with Acute Lymphoblastic Leukemia (ALL) undergoing chemotherapy.

METHOD

Type and Design This research is a quantitative research using pre-experimental design with one group pre-test post-test design approach. This research was conducted in the Children's Chronic Ward of Dr. M. Djamil Padang General Hospital. The population and sample in this study were children with Acute Lymphoblastic Leukemia (ALL) aged 6-18 years who underwent chemotherapy at Dr. M. Djamil Padang General Hospital with a sample size of 15 people with sample criteria willing to be respondents, ALL child patients undergoing chemotherapy aged 6-18 years, who experienced nausea and vomiting and had been measured using the PeNAT instrument with results of 3 and 4, patients who were not given anti-emetic therapy and had never done acupressure and other complementary therapies to overcome nausea and vomiting. The Sampling Technique in this study was purposive sampling in accordance with the wishes of the researcher, namely in accordance with the inclusion and exclusion criteria of the researcher. The research sample was ALL pediatric patients undergoing chemotherapy, aged 6-18 years, experiencing nausea and vomiting and has been measured with the PeNAT instrument with results of 3 and 4, patients who were not given anti-emetic therapy. The sampling technique was carried out using purposive sampling technique. The population of this study was children with Acute Lymphoblastic Leukemia (ALL) aged 6-18 years who underwent chemotherapy at Dr. M. Djamil Padang Regional Hospital with a sample size of 15 people with the sample criteria being willing to be respondents, ALL child patients undergoing chemotherapy aged 6-18 years, who experienced nausea and vomiting. Data were processed using computerized techniques. Review the ethics of this research from Health Research Ethics Committee RS. M. Djamil Padang with number DP.04.03/D.XVI.10.1/287/2025

RESULT

Nausea and Vomiting Score of ALL Children Undergoing Chemotherapy

Table 1.

Nausea and vomiting scores of children with Acute Lymphoblastic Leukemia undergoing chemotherapy (n= 15)

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	15	3.0	4.0	3.467	.5164

Based on table 1 above, it shows that the average nausea and vomiting score of ALL children undergoing chemotherapy at Dr. M Djamil Padang General Hospital before acupressure was 3.467 with a standard deviation of 0.5164.

Nausea and vomiting scores of ALL children undergoing chemotherapy at Dr. M Djamil Padang General Hospital after acupressure therapy

Table 2
Nausea and vomiting scores in children with Acute Lymphoblastic Leukemia undergoing Chemotherapy after acupressure

	N	Minimum	Maximum	Mean	Std. Deviation
Posttest	15	1.0	3.0	2.133	.8338

Based on table 2 above, it shows that the average nausea and vomiting score of ALL children undergoing chemotherapy at Dr. M Djamil Padang General Hospital after acupressure was 2.133 with a standard deviation of 0.8338.

The effect of acupressure therapy on nausea and vomiting in ALL children undergoing chemotherapy at Dr. M Djamil Padang General Hospital

Table 3

The Effect of Acupressure Therapy on Nausea and Vomiting in Children with Acute Lymphoblastic Leukemia (ALL) Undergoing Chemotherapy

Kelompok	Mean	Selisih Mean	95% CI		Asymp.Sig.(2-tailed)
			Lower	Upper	
Pretest	3,467	1,334	3,181	3,753	0,000
Posttest	2,133		1,672	2,595	

Based on table 3 above, it can be seen that the average score of nausea and vomiting in children before the intervention was 3.467 and after the intervention was 2.133, with a mean difference of 1.334. The results of the statistical test using the Wilcoxon T-Test obtained a p-value = $0.000 \leq 0.05$, so it can be interpreted that there is an effect of acupressure therapy on nausea and vomiting in children with Acute Lymphoblastic Leukemia (ALL) undergoing chemotherapy at Dr. M Djamil Padang General Hospital.

DISCUSSION

Acupressure, also known as finger prick therapy or acupressure, is a form of physiotherapy that involves stimulating and massaging specific points, or acupoints, on the body. The most commonly used acupressure points for treating chemotherapy-induced nausea and vomiting are P6 and ST36. Pressure on these points can reduce nausea and vomiting through its therapeutic effects on the body (Fenge, 2012). The frequency of nausea and vomiting experienced by children after acupressure decreased compared to before. The gag reflex experienced by children undergoing chemotherapy is due to the activation of the nucleus of neurons located in the medulla oblongata, which is directly activated by signals from the cerebral cortex. Chemotherapy agents stimulate enterochromaffin cells in the digestive tract to release serotonin by triggering serotonin receptors. Activation of these receptors triggers the activation of the vagal efferent pathway, which activates the vomiting center and causes the vomiting response.

The results of this study have shown that acupressure can significantly reduce nausea and vomiting scores in respondents experiencing chemotherapy-induced nausea and vomiting. Therefore, it can be concluded that acupressure is an effective intervention in reducing nausea in cancer patients undergoing chemotherapy. These results align with Syarif (Syarif), who stated that acupressure is an appropriate action in managing chemotherapy-induced nausea and vomiting. Another study, similar to these findings, conducted by Indrayanti (Indriyanti, 2022), stated that the application of acupressure is effective in reducing nausea and vomiting in patients induced by chemotherapy. In addition to administering antiemetics, patients can be given acupressure as an alternative nursing intervention to manage nausea and vomiting in patients undergoing chemotherapy.

These results are in line with the results of research by Rahmah (Rahmah, 2021) who studied 2 children suffering from ALL and undergoing chemotherapy who received acupressure intervention for 3 minutes every 6 hours after chemotherapy for 24 hours. The average score of nausea and

vomiting before acupressure was 8.5 after acupressure for 24 hours the average score of nausea and vomiting became 2.5. The P6 point is located on the pericardium meridian, and crosses the stomach and large intestine, the ST36 point is on the foot and on the meridian path from the end of the large intestine meridian that enters the spleen and stomach so that when pressure is applied to the P6 and ST36 points it will suppress the activation of neurons and increase stomach acid which will cause nausea and vomiting. According to Rusdiatin and Maulana (Yuliar, 2019), acupressure is a therapy performed by applying pressure with the fingertips, starting with light pressure and gradually increasing until a gentle but painless sensation is felt. Research results show that this intervention is effective in reducing chemotherapy-induced nausea and vomiting in children with cancer. Acupressure is effective in treating nausea and vomiting immediately and within one hour of the intervention. Physiologically, chemotherapy stimulates the release of serotonin (5-HT) from enterochromaffin cells in the small intestine. Serotonin then activates 5-HT₃ receptors on the vagus afferent nerve, sending impulses to the vomiting center in the area postrema of the brain, thereby triggering nausea and vomiting.

Acupressure at the P6 and ST36 points stimulates the median nerve and triggers the release of endorphins and modulates neurotransmitters that can inhibit the emetic impulse pathway, thereby reducing nausea and vomiting. Acupressure has long been used by the Chinese as a traditional medicine to reduce nausea and vomiting (Lee, 2010). Acupressure is also an effective alternative nursing intervention to reduce nausea and vomiting. It is a non-invasive and relatively easy intervention to perform (Lee E. J., 2011). Acupressure involves stimulation of the pericardium 6 (P6) located anterior to the wrist between the flexor carpiradialis longus tendons of the palmaris (Alfar, 2019). Acupressure pressure on the P6 point can provide benefits in the form of improving energy in the stomach meridian which can strengthen the cells of the digestive tract against the effects of chemotherapy, thereby reducing the stimulation of nausea and vomiting to the vomiting center in the medulla oblongata. This manipulation can also increase beta endorphins in the pituitary gland, thus acting as a natural anti-nausea agent in reducing nausea and vomiting impulses in the Chemoreceptor Trigger Zone (CTZ) and the vomiting center. The reduction in nausea and vomiting after acupressure therapy in chemotherapy patients is also influenced by several factors such as psychological factors, the type of chemotherapy drug given, and previous chemotherapy experience (Afrianti, 2020).

The acupressure technique at the ST36 (Zusanli/leg three miles) acupressure point is located 3 cun or 4 finger widths below the patella and one cun or 1 finger width lateral to the tibial crest. The ST36 point functions to suppress stomach-related ailments, such as nausea and vomiting, diarrhea, and epigastric pain. The ST36 acupressure point is often combined with the P6 point to reduce nausea and vomiting. The results of the study showed that a single acupressure therapy can reduce the intensity of nausea immediately after the intervention and fatigue and nausea within one hour after treatment in pediatric patients with Acute Lymphoblastic Leukemia. In line with the results of Rahmah's (Rahmah, 2021) study where nausea and vomiting in Acute Lymphoblastic Leukemia patients undergoing chemotherapy experienced a decrease with acupressure therapy at the ST36 point combined with the P6 point.

On average, pressure on the P6 and ST36 points was applied for 30 minutes before chemotherapy and every 6 hours after chemotherapy for the first 24 hours after the chemotherapy session. Therapy was performed with the respondent in a sitting or lying position on a patient bed provided at the hospital. Acupressure therapy was performed 40-60 times of pressure and rotation or for 3 minutes at each point. The P6 (Neiguan) point is located 3 finger widths above the inner wrist (between 2 large tendons) and the ST36 (Zusanli) point is combined, located about four finger widths below the kneecap, one finger width to the outside of the shinbone (the area 3 fingers and one finger width lateral to the tibial crest). How to do it: Use your thumb to apply gentle but firm pressure on the P6 point (Tiala N. H., 2023).

Another study found that acupressure therapy significantly reduced the frequency and intensity of nausea and vomiting in children with acute lymphoblastic leukemia (ALL) undergoing chemotherapy. This reduction was seen in both the acute phase (0-24 hours after chemotherapy) and the delayed phase (24-72 hours after chemotherapy). These findings demonstrate that stimulation of the P6 (Neiguan) acupressure point has a therapeutic effect in reducing the stimulation of the vomiting center in the medulla oblongata through modulation of the vagus nerve pathway. Thus, this study strengthens the scientific evidence that acupressure is an effective, repeatable, and cost-effective non-pharmacological intervention to support the management of chemotherapy-induced nausea and vomiting.

CONCLUSION

Based on the results of research conducted by researchers, it appears that the provision of acupressure therapy is effective in reducing nausea and vomiting scores in children with Acute Lymphoblastic Leukemia undergoing chemotherapy. Acupressure therapy interventions can be used as one of the nursing interventions that can be easily applied to pediatric patients to reduce nausea and vomiting due to chemotherapy. The follow-up plan from the results of this study is that these findings have important implications in the practice of nursing children with cancer undergoing chemotherapy, namely nurses can teach simple acupressure techniques to parents so that they can be done independently at home as a complementary therapy, provide education to parents about acupressure therapy techniques so that they can be done independently at home to control symptoms, for health care institutions can integrate acupressure in supportive care programs to improve the quality of life of patients and reduce the cost of using antiemetics, improve the quality of life of children so that by reducing nausea and vomiting children can maintain nutritional and fluid intake thereby preventing complications such as dehydration and malnutrition, increase therapy compliance so that children are more cooperative in undergoing chemotherapy because the side effects are reduced, reduce the use of antiemetics so that it can help suppress drug side effects such as excessive sedation and constipation.

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