

RESEARCH ARTICLE

A Study to Assess the Effect of Foot Massage on Chemotherapy Induced Fatigue and Pain Among Children from Selected Cancer Units in Sangli, Miraj, Kupwad Corporation Area

Mrs Neha Moreshwar¹ Mrs. Manisha S. Kulkarni² Mrs. Shaila Mathew³, Dr. Aparna Kale⁴, Dr. Dhanraj Babu.⁵

¹Final Year MSc Nursing Student (Child Health Nursing), Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli, Maharashtra, India 416414

²Clinical Instructor, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli, Maharashtra, India 416414

³Assistant Professor Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli, Maharashtra, India 416414.

⁴Professor, Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli, Maharashtra, India 416414.

⁵Professor Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli, Maharashtra, India 416414.

*Corresponding Author

Mrs. Manisha S. Kulkarni

Article History

Received: 10.07.2025

Revised: 18.08.2025

Accepted: 23.09.2025

Published: 26.09.2025

Abstract: Chemotherapy is a common treatment, but it can cause serious side effects like tiredness and pain. This study aimed to evaluate the effectiveness of foot massage therapy in reducing fatigue and pain levels among children. In this study a quantitative research approach was used. A quasi experimental pre and post control group design was used. Purposive sampling technique was used to select 90 sample from selected cancer units of Sangli, Miraj, Kupwad.. Tools are used modified fatigue assessment scale and Wong Bakers pain assessment scale. The statistical analysis confirmed that the intervention group showed a more significant increase in mean (4.35) performance scores compared to the control group mean (6.42). Comparative analysis was done by using the paired t-test and confirmed statistically significant as P 0.00001 Foot massage therapy is an effective intervention for reducing fatigue and pain in children with chemotherapy.

Keywords: Foot Massage; Children with Chemotherapy; Fatigue, Pain.

INTRODUCTION

Medicines are often used to treat pain and tiredness from cancer, but other methods like foot massage may also help. Foot massage non-pharmacological method, which is safe, low-cost, and easy to do. It has been shown to reduce pain and fatigue in adults and children with cancer. This study will look at how foot massage affects pain and tiredness in children getting chemotherapy, and whether it can help them feel better during treatment.¹

Background of the study

One common type is childhood acute lymphoblastic leukemia, where the bone marrow produces too many immature lymphocytes, affecting the normal production of red blood cells, white blood cells and platelets. Chemotherapy is the main treatment used for most types of childhood leukemia. It involves giving strong anti-cancer medicines, usually through a vein (IV). Children with leukemia are treated with a mix of different chemotherapy drugs, given in cycles. For children with ALL, chemotherapy is given in three main stages: induction, consolidation, and maintenance. Childhood cancer is rare, but if found early and treated properly, it is often curable. Each year, over 300,000 children worldwide are diagnosed with cancer. In India alone, more than 50,000 new cases are reported annually. Different methods are used along with medicine to help ease symptoms like nausea, vomiting, pain and tiredness during cancer treatment. One helpful method is massage therapy. Massage is often used as a type of complementary medicine for people with cancer it can reduce side effects from treatment and help improve a person's quality of life and overall well-being. Massage

may help lessen pain, fatigue, nausea, anxiety, and depression. childhood cancers constitute approximately 7.9% of all cancer cases in India between 2012 and 2019. Specifically, in Maharashtra, the age standardized incidence rate (ASIR) for paediatric cancers (0–14 years) is approximately 95.1 per million for boys and 65.5 per million for girls. These figures highlight the significant burden of paediatric cancers in the state.²

Need for the study

In India cancer occurs in children more than 50,000 new cases of childhood cancer are recorded annually. According to a recent report from the national cancer registry program, cancers among children aged 0-14 years account for 4.0% of all cancer cases in the country. Globally, cancer remains a significant health challenge and is one of the leading causes of death worldwide. Cancer patients suffer from several symptoms throughout the diagnosis and treatment process. Chemotherapy is used for treating cancer which is associated with several side effects.

Childhood cancer manifests in various forms, with leukemia, brain tumors, lymphomas, and solid tumors such as neuroblastoma and Wilms tumor being the most prevalent. While childhood cancer generally cannot be prevented or detected early through screening, many types can be effectively treated and cured using standard approaches like medication, surgery, and radiation therapy. Foot reflexology might help as a supportive therapy for children getting chemotherapy. It can be a simple way to help improve physical health and reduce tiredness and pain.

Fatigue is a most common and distressing symptom observed in pediatric cancer. During cancer treatment fatigue makes child more tired and it will affect the child's daily routine activities and sleep. Fatigue can happen in children after starting chemotherapy and it will last upto last it can be one of the harmful effects of chemotherapy and radiotherapy. Children with cancer may feel very weak, have trouble focusing, sleep too much or too little, and show some changes in their emotions. Pain in children with cancer was reported to be most prevalent symptom (84.4%) and was related to being moderate to severe (86.6%) and highly distressing (52.8%). Chemotherapy and procedures like bone marrow aspiration, or lumbar puncture insist pain frequently occurs when child relapses. Young adult survivors of childhood cancer may experience chronic pain conditions such as complex regional pain syndrome affecting the lower limb, phantom limb pain, vascular necrosis, and mechanical pain due to bones that did not properly heal after resection. The most common clinical syndrome of neuropathic pain is caused by chemotherapeutic agents, particularly Vincristine and Cisplatin and rarely Cytarabine.³

MATERIAL AND METHOD

A quantitative research approach with quasi experimental control group design. In this study, a quantitative approach was employed to evaluate the impact of foot massage on fatigue and pain in children undergoing chemotherapy. The study was conducted in cancer units of Sangli-Miraj-Kupwad.

The inclusion criteria set were children at Age 6-18 years, who is undergoing chemotherapy. Children who were willing to participate, and parents had given consent. Sample size for this study consisted of 90 children (control group 45 and experimental group 45). Non - Probability Purposive sampling method was used for the current study.

Data collection tool: The tool in this study consists of three sections, Demographic variables, Modified fatigue assessment scale, and Wong bakers pain assessment scale. Research proposal with data collection tool was presented in front of the institutional ethical committee. The written consent was taken from parents. The prior information was given and written consent taken before starting study.

RESULTS

Quantitative data analysis included the coding of data, categorizing the data. The information was deciphered utilising tables and graphical presentation.

Section I – Comparison of fatigue in experimental and control group

Table no 1 Comparison between pretest & posttest of fatigue in experimental group, and control group.
n= 45+45

Experimental group	Mean	Variance	Df	T-value	P-value
Pre-test	38.4	4.6	44	38.501	<0.00001
Post-test	24.42	6.8			
Control group	Mean	Variance	df	t-value	p-value
Pre-test	38.0	13.4	44	-3.3532	0.00049
Post- test	39.1	12.5			

The table No. 1 showed that, In experimental group pretest mean was 38.4 and variance 4. 6, with degrees of freedom 44 the t- value 38.501 and p- value is < 0.00001.

In experimental group posttest mean was 24.42 and variance 6.8, with degrees of freedom 44 the t- value 38.501 and p- value is < 0.00001. In control group pre-test mean was 38.0 and variance 13.4 with degrees of freedom 44. the t-value 38.501 and p- value <0.00001. In control group posttest mean was 39.1 and variance 12.5 with degrees of freedom 44. the t-value 38.501 and p- value < 0.00001.

Section II – Comparison of pain in experimental and control group.

Table no 2 Comparison of pre-test and post-test of pain on experimental and control group.
n=45+45

Experimental group	Mean	Variance	Df	T-value	P-value
Pre-test	6.71	0.94	44	25.95	<0.00001
Post-test	4.36	1.01			
Control group	Mean	Variance	Df	t-value	p-value
Pre-test	6.44	0.84	44	0.1776	0.4299

Post- test	6.4 2	0.75			
------------	----------	------	--	--	--

The table No. 2 showed that, In experimental group pretest mean was 6.71 and variance 0.94, with degrees of freedom 44 the t- value is 0.1776 and p – value is 0.4299. In experimental group posttest mean was 4.36 and variance 1.01, with degrees of freedom 44 the t- value 0.1776 and p - value is 0.4299. In control group pretest mean was 6.44 and variance 0.84 with degrees of freedom 44. the t-value 0.1776 and p- value 0.4299. In control group posttest mean was 6.42 and variance 0.75 with degrees of freedom 44. the t-value 0.1776 and p- value 0.4299

Section III – Comparison of fatigue level

Table no 3 Comparison of posttest fatigue level in experimental and control group
n= 45+45

	Mean	Variance	df	T – value	P – value
Experimental group	24.42	6.84	88	-22.4264	<0.00001
Control group	39.11	12.46			

The table No.3 showed that, Comparison Between post - test fatigue scores of experimental and control groups. Since the p – value is below 0.05, hypothesis 1 is accepted at a 5% level of significance, indicating a significant difference in post-test fatigue scores between the experimental and control groups after the intervention. Thus the foot massage therapy is proven to be effective.

- H0: No significant difference exists between the post- test fatigue scores of the experimental and control groups following the intervention.
- H1: A significant difference is observed in post-test fatigue scores between the experimental and control groups after the intervention.

Section IV – Comparison of pain

Table no 4 Comparison of post-test pain level in experimental and control group
n= 45+45

	Mean	Variance	df	T – value	P – value
Experimental group	4.35	1.007	86	-10.4603	<0.00001
Control group	6.42	0.7494			

The table No. 4 showed that, Comparison Between post - test Pain scores of experimental and control group.

As p value is less than 0.05, We accept the hypothesis I at 5% level of significance. This indicates a significant difference in post-test pain scores between the experimental and control groups following therapy, demonstrating the effectiveness of foot massage in alleviating pain.

- H0: No significant difference is observed between the post-test pain scores of the experimental and control groups following the intervention.
- H1: A significant difference exists between the post-test pain scores in the experimental and control groups After the intervention

DISCUSSION

Fatigue caused by chemotherapy is among the most challenging side effects of cancer treatment. Additionally, pain is a distressing symptom that can result in significant physical and emotional discomfort for children undergoing chemotherapy. The children can have profound impact on physical, emotional, and social well-being. Foot massage was found to have a positive effect in reducing the intensity of fatigue and pain. Foot massage helps to counteract the physiological and psychological effect of fatigue and pain leading to improved energy levels and sense of well-being. Foot massage techniques could be a low-cost and easily available method of providing comfort to children during chemotherapy.

Research articles discussion

A similar study was done by Fereshteh Ghaljaei and Jalalodini from the department of paediatric Nursing at Zahedan university of medical sciences in Iran. Their study supports my findings about the demographic features of the children. The children included in the study were selected based on age, sex, and education level. The intervention group had an average age of 8.06 years, while the control group averaged 8.58 years. No significant differences were observed in fundamental characteristics such as age, sex, or education level between the two groups ($p > 0.05$). After the massage treatment, the average systolic blood pressure and diastolic blood pressure in the intervention group were 88.32 mmHg. And 55.95 mmHg. in the control group, the average SBP and DBP were 95.48 mmHg and 56.62

mmHg. The independent t- test showed that the differences in SBP and DBP between the two groups after the treatment were statistically significant ($p < 0.0001$ for SBP and $p = 0.002$ for DBP). Previous studies yielded similar findings, examining physical activity as a therapeutic approach for alleviating cancer- related fatigue in children, adolescents, and young adults.⁴

A study by Hua Huang, Guowei Cai, and Hong Chun Xiang from Huazhong University of science and Technology in Wuhan, China, looked at research on chemotherapy and pain in children over the past 10 years. The study was published in December 2023. They collected information from the web of science database and found 1,130 studies on this topic, with the number of publications increasing over time. The United States had the most research papers (346), followed by China (135). Pamela S. Hinds from U.S. was the author with the most papers (8). The journal of clinical Oncology and Medicine were the leading publishers, each contributing 44 studies. Among them journal of clinical Oncology garnered the highest number of citations. Additionally, St. Jude children's research hospital stood out as the institution with the greatest number of publications. The most common keywords in the research were children, chemotherapy, management. Childhood cancer, randomized control trial, and efficacy. Most of the newer research focuses on ways to manage symptoms and provide support during treatment. However the study found that more attention is still needed on chemotherapy and pain in children with cancer. Over the past decade, bibliometric analysis has highlighted a rising interest in studying chemotherapy and pain management in children. Despite this growing focus, further research is necessary to enhance the quality of life for children suffering from chemotherapy-induced pain. The insights gained from this analysis could serve as a valuable foundation for guiding future research efforts in this crucial field.⁵

Amirat Ali Elsabe Mohammed and Manal Mohammad Ahmed Ayed conducted a study examining the impact of foot reflexology and basic foot massage on fatigue and pain experienced by children with leukaemia. This quasi-experimental research was conducted at the Oncology institution in Sohag City and the paediatric oncology department of Sohag University Hospital. To gather participants, the researcher employed purposive sampling, selecting a total of 100 children receiving chemotherapy.

These children were split into two groups 50 received foot massage as the intervention, while the other 50 served as the control group. To collect data, the study utilized three key instruments a structured interview questionnaire, a fatigue assessment scale, and the OUCHER pain measurement tool. The results showed that most children in the intervention group experienced only mild pain, with significant improvements in their physiological signs- such as better blood pressure ($p =$

0.002) and heart rate ($p = 0.003$). there were also strong statistical differences between the intervention and control group in terms of fatigue and pain levels ($p < 0.05$). The findings showed that foot massage helped to improve physical health indicators and reduced both fatigue and pain in children receiving chemotherapy. Foot reflexology could be a helpful complementary therapy alongside medical treatment for children with cancer. It's a simple and practical method that can be used to improve children's comfort and reduce the negative effects of chemotherapy.⁶

The present study enables a comparison between the results of the experimental and control groups. A discussion was conducted referencing a prior study by Jasdeep Kaur and Babita Kmari, assistant professors at Akal College of Nursing, eternal University. Their research examined the effectiveness of foot massage in alleviating pain among cancer patients undergoing chemotherapy in oncology units of selected hospitals in Jalandar, Panjab. The study also explored the potential for disease metastasis, emphasizing that cancer is not a single condition but rather a collection of over 100 distinct diseases. A quantitative research approach was employed, utilizing a quasi-experimental design, with the research conducted in selected hospitals. Total 60 samples were selected with purposive sampling technique. In this study, a total of 60 participants were selected using a sampling technique, with 30 assigned to the experimental group and 30 to the control group. The effectiveness of foot massage in reducing pain was assessed using a Modified Numeric Pain Rating Scale. The findings showed that the mean Pre-intervention pain score in the experimental group was 6.70 # 1.09. which decreased to 4.16 # 0.99 after the intervention. This reduction in pain was found to be statistically significant. Cancer is a prevalent and serious health condition, often requiring various treatment modalities such as chemotherapy. Pain is a common symptom that may occur at any stage of the disease, and its intensity generally increase as the cancer progresses. The study also noted that the mean pre-intervention pain score in the control group was 5.67 # 2.19. these findings suggest that foot massage, as a form of diversional therapy, can be an effective non- pharmacological method to help reduce pain among cancer patients undergoing chemotherapy.⁷

Implications

This study aimed to alleviate chemotherapy-induced fatigue and pain in children. Its findings hold significance for various aspects of nursing, including practice, research, administration and education. Nursing practice : It helps the nurse to assess the level of fatigue and pain and draw a framework for child's comfort. It will help the nurse to provide service to the child as they are well known of problems and its management. Nursing Education : foot massage intervention to relieve fatigue and pain among the children undergoing chemotherapy. So add it in nursing

syllabus. Nursing administration: Nurse manager will arrange CNE, and supervise such activities in wards while doing it. Nursing Research: Also, nurse researchers should make efforts to develop new and effective ways to manage problems in clinical as well as community settings.

Recommendations

Based on the study's findings, the following recommendations for future studies have been made: On the basis of findings, following recommendation was made for future study the similar study may be replicated on large scale.

1. Future study can be conducted to assess the fatigue and pain and coping strategies when caring for a child with chemotherapy.
2. A study can be conducted on application of non-pharmacological intervention to manage the fatigue and pain.

CONCLUSION

The present study aimed to evaluate the effectiveness of foot massage in reducing chemotherapy-induced fatigue and pain among children undergoing cancer treatment. The findings revealed that foot massage had a significant positive impact on lowering fatigue and pain levels in the experimental group compared to the control group, where no intervention was applied. The pre- and post-test comparisons demonstrated a marked improvement in the experimental group's condition, confirming that foot massage serves as an effective, low-cost, and non-invasive intervention.

Acknowledgement

The researcher acknowledges the institutional authorities of BVCON and the study participants for the co-operation and all the stakeholders involve in completion of the research study.

Conflict of Interest

No conflict of interest is involved.

Funding Source

The study was self-funded by researchers.

REFERENCES:

1. Yang S, Chu S, Gao Y, Ai Q, Liu Y, Li X, Chen N. A Narrative Review of Cancer-Related Fatigue (CRF) and Its Possible Pathogenesis. *Cells.* 2019 Jul 18;8(7):738. doi: 10.3390/cells8070738. PMID: 31323874; PMCID: PMC6679212.
2. Miller E, Jacob E, Hockenberry MJ. Nausea, pain, fatigue, and multiple symptoms in hospitalized children with cancer. *Oncol Nurs Forum.* 2011 Sep;38(5):E382-93. doi: 10.1188/11.ONF.E382-E393. PMID: 21875835.
3. Kuehn, M.; Wypyrsczyk, L.; Stoessel, S.; Neu, M.A.; Ploch, L.; Dreismickenbecker, E.; Simon, P.; Faber, J. Physical Activity as a Treatment for Cancer-Related Fatigue in Children, Adolescents and Young Adults: A Systematic Review. *Children* 2023, 10, 572. <https://doi.org/10.3390/children1003057>
4. Marilyn J Hockenberry PhD, RN-CS, PNP, FAAN a, Pamela S Hinds PhD, RN-CS b, Patrick Barrera BS a, Rosalind Bryant MSN, RN-CS, PNP a, Jeanette Adams-McNeill PhD, RN c, Casey Hooke RN, MSN, CPONd, Christina Rasco-Baggott RN-CS, MN, PNP, CPON e, Katherine Patterson-Kelly RN, MN f, Jamie S Gattuso RN, MSN, CPON b, Brigitte Manteuffel PhD g [https://doi.org/10.1016/S0885-3924\(02\)00680-2](https://doi.org/10.1016/S0885-3924(02)00680-2)
5. Fooladi S, Ghaljaei A, Miri- Aliabad G. Effect of Distraction Therapy on Physiological Indices and pain intensity Caused by intra spinal injection of chemotherapy drugs in cancerous children: A clinical trial. *Med Surg Nurs J.* <https://doi.org/10.5812/msnj.90409>
6. Chitra P. Foot Massage Intervention on Chemotherapy Drugs Induced Pain in Children with Cancer. *Nurse Care Open Acces J.* 2017;2(1):00027. Kashaninia, Z, Zamanian Jahromi, H, Norouzi Tabrizi, K & Bakhshi, E 2016, 'The effect of Swedish massage on relieving fatigue of children with acute Lymphoblastic Leukemia undergoing chemotherapy', *Journal of Client-Centered Nursing Care*, vol. 1, no, 4, pp. 205-210.
7. Ali Elsabely Mohammed A, Mohamed Ahmed Ayed M, El-Sayed Ali Hegazy A, Samir Ahmed El-husseiny H, Mohamed Amin F. Effect of Foot Massage on Physiological Indicators, Fatigue, and Pain among Children undergoing Chemotherapy. *Egyptian Journal of Health Care.* 2022 Dec 1;13(4):26-39.
8. Farouk Abolwafa N, Gamal Hasan AS, Boshra Shehata H. Effect of Foot Reflexology on Fatigue, Pain and Insomnia among Children undergoing Chemotherapy. *Egyptian Journal of Health Care.* 2024 Mar 1;15(1):169-79. on Shoghi M, Asadian A, Kheradmand M.