

Original article

Art and music therapy as a support post-chemotherapy pain management in children: a quasi-experimental study in Indonesia

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Abstract

Background: Children with cancer undergoing chemotherapy often experience significant post-treatment pain, leading to both physical discomfort and psychological distress. Pharmacological treatment alone is often insufficient to manage this pain effectively. Non-pharmacological approaches such as art therapy and music therapy are increasingly considered as complementary strategies to enhance pain management and improve emotional well-being. However, studies directly comparing the effectiveness of these two methods remain limited.

Methods: This quantitative, quasi-experimental study used a two-group pretest-posttest design at Dr. Moewardi General Hospital in Surakarta, Indonesia. A total of 44 children aged 6 to 12 years undergoing chemotherapy participated. Participants were recruited using convenience sampling and chose one of two interventions: the art therapy group engaged in 30 minutes of coloring, while the music therapy group listened to instrumental music for 10 minutes. Pain intensity was measured daily for seven consecutive days before and after the interventions using the Wong-Baker Faces Pain Scale-Revised. Data were analyzed using the Wilcoxon and Mann-Whitney tests.

Results: Both therapies significantly reduced pain levels ($p < 0.001$; 95% CI: Art Therapy = 3.45–4.55; Music Therapy = 2.67–3.41) from baseline to the final assessment on Day 7. The art therapy group showed an average decrease of 4.00 points, while the music therapy group had a decrease of 3.04 points. Although there was a numerical difference, statistical analysis showed no significant difference between the two groups ($p = 0.342$).

Conclusion: Both art therapy and music therapy are effective in reducing post-chemotherapy pain in pediatric patients. These therapies provide safe, simple, and useful non-pharmacological options to support pain relief and enhance the emotional comfort of children undergoing cancer treatment.

Keywords: Art Therapy; Music Therapy; Pain; Child Cancer; Chemotherapy

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Introduction

Childhood cancer is a significant global health problem, with an increasing incidence and remaining a leading cause of disease-related death in children (1,2). An estimated 397,800 new cases occurred worldwide in 2015, with the majority (54%) found in Asia. In Indonesia, data show an alarming rise in cases, including a 63.6% increase in Yogyakarta over the last decade (3). Beyond the threat to life, cancer and its aggressive treatments, such as chemotherapy, also have serious impacts on children's emotional and social development due to prolonged hospitalizations and changes in routine (4,5).

Post-chemotherapy pain in children with cancer is a serious issue that not only has a physical impact but also causes significant psychological distress. Children undergoing chemotherapy often experience nausea, vomiting, fatigue, sleep disturbances, alopecia, and peripheral neuropathy (6,7). Psychological impacts such as anxiety, stress, and mood swings are also common (7-10). The severity of these side effects can interfere with the healing process and decrease a child's quality of life during cancer treatment.

To address these challenges, non-pharmacological therapies have been widely used as an effective companion approach. Interventions such as relaxation techniques, aromatherapy, massage, acupressure, music therapy, and art therapy have been shown to help reduce pain intensity, anxiety, and improve children's well-being during treatment (11-13). Art thera-

py allows children to express emotions visually, helping them manage stress, fears, and traumatic experiences that are difficult to express verbally (14). Meanwhile, music therapy works through auditory stimulation that calms the nervous system, improves mood, and enhances coping mechanisms against pain and stress (15). Play therapy, more broadly, has also long been recognized for its role in helping children cope with the psychological impact of cancer through various activities such as role-playing, drawing, storytelling, or virtual reality, which can reduce anxiety, fear, and depression, as well as improve children's independence and quality of life (5,16-19).

Despite the promising potential of both art and music therapies, there are very few studies to date that directly compare the effectiveness of these two interventions in children with cancer. Most studies have evaluated only one of the two interventions separately, with music therapy being more predominantly studied. Research discussing art therapy is also limited, and no studies have explicitly compared these two interventions in the same patient group (20-22). These limitations leave a significant knowledge gap regarding the relative advantages, specific working mechanisms, and potential synergies between the two therapies (20,22,23). Based on this identified gap, this study aims to determine the difference in effectiveness between art therapy and music therapy on the level of post-chemotherapy pain in children with cancer.

Methods

Study Design

This study employed a quantitative quasi-experimental design with a two-group pretest–post-test approach. The aim was to compare the effectiveness of art therapy and music therapy in reducing post-chemotherapy pain among pediatric cancer patients.

Setting

The study was conducted from April 15 to May 25, 2025, in Room Tulip 6 at Dr. Moewardi General Hospital, Surakarta, Indonesia. The hospital is a tertiary referral center with a specialized pediatric oncology unit.

Population

The target population consisted of pediatric cancer patients undergoing chemotherapy. Inclusion criteria were: (1) diagnosed with cancer, (2) aged 6–12 years, (3) experiencing pain post-chemotherapy, and (4) having compos mentis awareness. The exclusion criterion was being in a coma or unconscious state.

Sampling

Convenience sampling was applied, a non-probability technique in which eligible participants were selected based on their availability and suitability at the time of data collection. The head nurse assisted in identifying suitable patients according to their condition and chemotherapy schedules.

The final sample size was determined by the number of eligible participants during the study period. A total of 44 participants were recruit-

ed. They were divided into two groups of 22 based on personal preference for intervention: art therapy or music therapy. Group allocation was not randomized, as allowing children to choose was considered more ethical and supportive of comfort, autonomy, and engagement in this vulnerable population.

Data Collection

Interventions were administered once daily for seven consecutive days.

- **Art therapy group:** participated in a 30-minute guided coloring activity using age-appropriate images and colored pencils.
- **Music therapy group:** listened to calming instrumental music through headphones for 10 minutes.

The differing intervention durations were based on the nature of the therapies (active vs. passive participation) and previous literature supporting their effectiveness.

Pain intensity was assessed using the Wong–Baker FACES Pain Scale–Revised (0–10), which includes facial illustrations to facilitate comprehension in children. Assessments were conducted by a trained research assistant at baseline (pre-intervention) and after each session (post-intervention) across seven days. For analysis, the post-intervention score on day seven was used.

A standardized monitoring sheet was employed during therapy sessions to record session duration, emotional responses, and level of child engagement.

Analysis

Data were analyzed using SPSS. Normality was tested with the Shapiro–Wilk test. Within-group differences between pre- and post-intervention scores were analyzed using the Wilcoxon signed-rank test, while between-group comparisons were conducted with the Mann–Whitney U test. Statistical significance was set at $p < 0.05$.

Ethical Considerations

The study received ethical approval from the

Ethics Committee of Dr. Moewardi General Hospital, Surakarta (No. 606/III/HREC/2025). Written informed consent was obtained from all participants' legal guardians, and confidentiality was strictly maintained.

Results

A total of 44 children with cancer undergoing chemotherapy participated in this study, divided equally into two intervention groups: art therapy and music therapy.

Table 1. Frequency distribution of characteristics of children with cancer (n=44)

Variable	Group	Art therapy, f (%)	Music therapy, f (%)
Gender	Male	8 (38.1)	13 (61.9)
	Female	14 (60.9)	9 (39.1)
Age	6-9 years	14 (56.0)	11 (44.0)
	10-12 years	8 (42.1)	11 (57.9)
Education	Kindergarten	1 (33.3)	2 (66.7)
	Primary School	21 (51.2)	20 (48.8)
Types of cancer	Acute Lymphoblastic Leukemia	20 (58.8)	14 (41.2)
	Retinoblastoma	0 (0.0)	3 (100.0)
	Osteosarcoma	1 (20.0)	4 (40.0)
	Other Cancers	1 (50.0)	1 (50.0)
Chemotherapy frequency	4-24 times	10 (43.5)	13 (56.5)
	24-48 times	3 (33.3)	6 (66.7)
	48-96 times	6 (66.7)	3 (33.3)
	>96 times	3 (100)	0 (0.0)
Total		22 (100)	22 (100)

Based on Table 1, the demographic data showed a relatively balanced distribution of male and female participants (21 and (23), respectively). The majority of participants were

aged 6–9 years (n=25) and were attending primary school (n=41). Acute Lymphoblastic Leukemia was the most common cancer type (n=34).

Table 2. Average decrease in pain score, 95% CI, and Mann-Whitney Test

Intervention	Pre-test	Post-test	Difference	Mean Rank	P value
Art Therapy	7.23	3.23	4.00	20.73	0.342
Music Therapy	6.77	3.73	3.04	24.27	

Pain intensity scores before and after the interventions are shown in Table 2. Both groups demonstrated a reduction in mean pain scores after the intervention. The art therapy group showed a numerically greater reduction than

the music therapy group, but the Mann-Whitney test indicated no statistically significant difference between the groups ($p = 0.342$).

Table 3. Data normality test results

Variable	Shapiro-Wilk P value	Interpretation
Art Therapy Pretest	0.001	Abnormal
Art Therapy Posttest	0.001	Abnormal
Music Therapy Pretest	0.001	Abnormal
Music Therapy Posttest	0.001	Abnormal

Table 3 shows the normality testing using the Shapiro-Wilk test. The p-values in both groups were less than 0.05, indicating that the data

were abnormally distributed. Thus, the non-parametric Wilcoxon test was used for within-group analysis.

Table 4. Wilcoxon test results before and after intervention

Group	Negative Ranks	Positive Ranks	Ties	P value
Art Therapy	22	0	0	0.000
Music Therapy	22	0	0	0.000

Table 4 shows the results of the Wilcoxon test, indicating that all participants in both the art therapy and music therapy groups experienced a significant reduction in pain scores post-intervention ($p = 0.000$). None of the participants showed an increase or an unchanged pain score.

Discussion

The primary finding of this study is that both art therapy and music therapy were effective in significantly reducing post-chemotherapy pain in children with cancer. The Wilcoxon test results demonstrated a p-value of 0.000

for both intervention groups, confirming the individual efficacy of both therapies in managing pain. Descriptively, the art therapy group showed a numerically larger average decrease in pain score, but the Mann-Whitney test yielded a p-value of 0.342, indicating that there was no statistically significant difference in effectiveness between the two interventions.

These findings are generally supported by existing literature. Both art and music therapies have been highlighted in systematic reviews and meta-analyses as beneficial in pediatric oncology settings. Art therapy facilitates the channelling of difficult emotions and experiences through visual expression, which can influence pain perception and provide a sense of control (14). While some studies suggest art therapy's primary benefit is emotional, this emotional regulation can indirectly contribute to pain reduction. Similarly, music therapy has been consistently demonstrated as effective in lowering pain and improving quality of life through auditory stimulation that induces relaxation and distraction (15,24).

The absence of a statistically significant difference between the two therapies suggests that both can be considered equally viable non-pharmacological options. This implies that healthcare providers have flexibility in offering either therapy based on patient preference, resource availability, or specific needs. Both therapies are complementary to conventional medical treatment and contribute to a more positive hospital experience.

Limitations

This study has several limitations that should be considered. First, the quasi-experimental design and the use of convenience sampling may limit the generalizability of our findings. Second, the sample size was relatively small, which may have limited the power to detect a significant difference between the groups if one existed. Third, the intervention duration was short (7 days), and longer-term effects were not measured. Future research should consider randomized controlled trials with larger samples and longer follow-up periods.

Conclusions

This study shows that both art therapy and music therapy are effective in lowering post-chemotherapy pain levels in children with cancer. Although art therapy showed a greater descriptive trend of decreasing pain, there was no statistically significant difference between the two types of therapy. Both interventions have relatively equivalent effectiveness and can be considered as adjuvant non-pharmacological options in post-chemotherapy pediatric pain management.

Declaration

Ethical consideration: This research was conducted in accordance with ethical principles. Informed consent was obtained from the parents/guardians of all child participants prior to their involvement in the study. The study was approved by the Health Research Ethics Committee of Dr. Moewardi General Hospital Surakarta with reference number

606/III/HREC/2025. All participant data were kept confidential and used solely for research purposes.

Conflict of interest: The authors declare that they have no competing interests.

Author's contributions SHMA: Study conception and design, data collection, data analysis and interpretation, drafting of the article, and critical revision of the article. **KDN:** Data analysis and interpretation. **I:** Drafting of the article. **SP:** Critical revision of the article.

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References

1. Johnston W, Erdmann F, Newton R, Steliarova-Foucher E, Schüz J, Roman E. Childhood Cancer: Estimating Regional and Global Incidence. *Cancer Epidemiol.* 2021;71.
2. Ward E, Sherman R, Henley S. Childhood Cancer Statistics. *Cancer J Clin.* 2019;69(5):384–401.
3. Sandi S, Supriyadi E, Purwanto I, Widjajanto P, Armytasari I, Ritter J. A province-wide childhood malignancy profiles in Indonesia (2010-2019). *Yogyakarta Pediatr Cancer Regist Paediatr Indones.* 2023;63(4).
4. Perasso G, Romeo M, Coccia P, Palego G, Mendiola PD. Fostering the Psychological Wellbeing of Children Diagnosed With Cancer: Multidisciplinary Insights in Pediatric Oncology. *Front Psychol.* 2025;16.
5. Nazari A, Sarmadi S, Ghazanfari M, Gholami M, Emami, Zeydi A, et al. The Effectiveness of Play Therapy on Depression and Anxiety In Hospitalized Children with Cancer: a Systematic Review. *Support Care Cancer.* 2025;33(2):88.
6. Bansal N, Amdani S, Lipshultz E, Lipshultz S. Chemotherapy-induced Cardio-toxicity in Children. *Expert Opin Drug Metab Toxicol.* 2017;13(8):817–32.
7. Hooke M, Linder L. Symptoms in Children Receiving Treatment for Cancer—Part I: Fatigue, Sleep Disturbance, and Nausea/Vomiting. *J Pediatr Oncol Nurs.* 2019;36(4):244–261.
8. Ruan H, Sun J, Zhao K, He M, Yuan C, Fu L. Subjective Toxicity Profiles of Children With Cancer During Treatment. *Cancer Nurs.* 2024;47(1):1–9.
9. Nugroho K, Auliya N. Relationship between Nurses' Therapeutic Communication and Family Anxiety Level of Patients Experiencing Emergency Conditions. *Babali Nurs Res.* 2024;5(2):423–432.
10. Nugroho D, Asih H, Lestari S. Responses and Expectations of Parents with Children Experiencing Emergencies due to Terminal Illnesses. A Phenomenol Study *J Nur Today.* 2025;17.
11. Santa da S, Schweitzer M, dos Santos M, Ghelman R, Filho V. Music Interventions in Pediatric Oncology: Systematic Review and Meta-Analysis. *Complement Ther Med.* 2021;59.

12. Nugroho K, Sucipto U. Maintaining Self-Stress During the Pandemic (Community Service Stikes Panti Waluya During The Covid-19 Pandemic). *J Community Serv Kasih STIKES Dirgahayu Samarinda*. 2020;2(1):11–5.
13. Astuti Y, Sukini T, Purwanto A. The Effect of Music Therapy on Pain in Children Post-chemotherapy. *J Ilmu Keperawatan Jiwa*. 2024;11(3):859–868.
14. Martínez-Vérez V, Gil-Ruiz P, Domínguez-Lloria S. Interventions through Art Therapy and Music Therapy in Autism Spectrum Disorder, ADHD, Language Disorders, and Learning Disabilities in Pediatric-Aged Children: A Systematic Review. *Children*. 2024;11(6):706.
15. Luzzatto P, Magill L. Art and Music Therapy. In: *Psycho-Oncology*. Oxford University Press. 2015. 497–502 p.
16. Ibrahim H, Arbianingsih, Amal A, Huriati. The Effectiveness of Play Therapy in Hospitalized Children with Cancer: Systematic Review. *J Nurs Pract*. 2020;3(2):233–43.
17. Hüzmei H, Semerci R, Kebudi R. The Effect of Therapeutic Play on Fear, Anxiety, and Satisfaction Levels of Pediatric Oncology Patients Receiving Chemotherapy. *J Pediatr Nurs*. 2024;7:195–201.
18. Frygner-Holm S, Russ S, Quitmann J, Ring L, Zyga O, Hansson M. Pretend Play as an Intervention for Children With Cancer: A Feasibility Study. *J Pediatr Oncol Nurs*. 2020;37(1):65–75.
19. Li W, Chung J, Ho E. The Effectiveness of Therapeutic Play, Using Virtual Reality Computer Games, in Promoting the Psychological well-being of Children Hospitalised with Cancer. *J Clin Nurs*. 2011;20(15):2135–2143.
20. Facchini M, Ruini C. The Role of Music Therapy in the Treatment of Children With Cancer: A Systematic Review of Literature. *Complement Ther Clin Pract*. 2021;42.
21. Zanchi R, Scarpellini C, Lazzarin L, Bonini P. Creative Arts Therapies in Pediatric Oncology: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Complement Ther Clin Pr*. 2024;56.
22. R-C RR, Noreña-Peña A, Chafer-Bixquert T, Lorenzo Vásquez A, González de Dios, J, Solano Ruiz C. The Relevance of Music Therapy in Paediatric and Adolescent Cancer Patients: a Scoping Review. *Glob Heal Action*. 2022;15(1).
23. Olaizola S, Lalloo C, Vickers V, Kelenc L, Tariq S, Brown S, et al. Art Therapy for Paediatric Pain: A Scoping Review. *Children*. 2024;11(6):619.
24. Miller M, Rath C, Moeschle S, Hargrove T, Cho A, Chen P. Six-Means A. Music Therapy for Pain and Anxiety Reduction in Pediatric Patients Undergoing Procedures: A Systematic Review and Meta-Analysis Protocol. *J Pediatr Surg Nurs*. 2025;14(1):15–24.