



EFFECTIVENESS MUSIC THERAPY IN REDUCING PAIN AND ANXIETY IN PRESCHOOL CHILDREN IN THE EMERGENCY ROOM: LITERATURE REVIEW

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ABSTRACT

The Emergency Department (ED) is a healthcare setting with a high risk of causing pain and anxiety in pediatric patients due to invasive procedures and emergency situations. If these conditions are not properly managed, they can negatively impact the care experience and increase the risk of psychological trauma. Music toy therapy, as a non-pharmacological intervention based on active distraction, has the potential to reduce pain and anxiety in children in the ED. This literature review aims to analyze the latest scientific evidence regarding the effectiveness of music toy therapy in pediatric patients in the ED. The method used was a traditional literature review with article searches conducted via Google Scholar and PubMed for the years 2021–2025. The literature search yielded 273 articles from Google Scholar and 21 articles from PubMed. Article selection was conducted using the PRISMA flowchart, resulting in five articles that met the inclusion criteria. The keywords used for searching Indonesian journal articles included “Music Toy Therapy,” “Pain,” “Child Anxiety,” and “Emergency Department”. The review findings indicate that music toy therapy has a positive effect on reducing pain and anxiety in children, particularly among preschoolers and early school-age children. Music toy therapy is a safe, easy-to-implement, and potentially effective intervention for improving the quality of pediatric nursing care in the emergency department through a holistic approach that involves families and the active role of nurses.

Keywords: anxiety; emergency department; music therapy; pain; preschool children

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INTRODUCTION

The emergency department (ED) is a high-pressure medical environment where children often undergo invasive procedures such as blood draws, injections, or physical examinations that can cause pain and anxiety. For preschoolers and children in general, the ED often exacerbates discomfort due to the chaotic atmosphere, loud noises, and rapid interactions with unfamiliar medical staff (Saidinejad et al., 2024). These factors make children vulnerable to emotional distress, which can affect their clinical experience and increase the risk of long-term trauma (Cruz et al., 2022). Studies show that without proper intervention, children in the ED experience an increased risk of resistant behavior during procedures (Micallef et al., 2025).

Physical pain and psychological anxiety in the emergency department can have a significant impact on children's mental health, with the potential to trigger physiological responses such as increased heart rate and blood pressure. Unmanaged anxiety often results in maladaptive behaviors, such as phobia of medical environments, which can complicate future care (Gkintoni, 2023). Empirical research shows that children in the ED who undergo procedures without support are at higher risk of emotional trauma and complications such as procedural failure (Cottrell et al., 2024). In addition, acute pain can prolong the length of stay in the ED and increase the burden on healthcare workers (Nagpal et al., 2024).

To address these challenges, non-pharmacological approaches such as music therapy have become a focus in pediatric care in the ED, with distraction mechanisms helping to reduce pain perception and anxiety. Music has been shown to be effective through auditory stimulation that distracts children from painful stimuli and triggers the release of natural endorphins (Mumcu, 2025). However, passive music is often less effective in the dynamic environment of the ED, where children need interactive elements to maintain attention (Havryliuk, 2025). A systematic review confirms that music can significantly reduce anxiety scores during emergency procedures (Havryliuk, 2025; Mumcu, 2025).

The effectiveness of non-pharmacological interventions in the emergency department is greatly influenced by the suitability of the method to the child's developmental stage. Preschoolers and early school-age children have limited understanding of medical procedures, making them more susceptible to interpreting invasive procedures as threats that cause fear and excessive pain (Pujianti et al., 2025). Therefore, an active, enjoyable approach that directly involves the child is considered more effective than passive interventions, especially in short, high-pressure emergency situations such as those in the ED (Shen et al., 2023).

One form of non-pharmacological intervention that is developing in pediatric care is music toy therapy. This therapy combines auditory stimulation with play activities using simple musical instruments or toys that produce sounds and colorful lights, thereby serving as an active distraction during medical procedures. Music therapy not only distracts children from pain stimuli, but also increases their sense of control, emotional expression, and stress regulation (Feng & Wang, 2025). This mechanism has been shown to reduce pain perception and anxiety through the activation of the natural parasympathetic nervous system (Muliasari & Susilowati, 2025).

Recent studies have shown that the use of music toy therapy during invasive procedures in the emergency department, such as IV insertion or blood sampling, significantly reduces children's pain and anxiety scores compared to standard care without distraction (Marlina, 2024; Nofitasari & Zoahira, 2024). Additionally, this therapy also contributes to reducing resistance to procedures, facilitating medical procedures, and decreasing the need for physical and pharmacological restraints (Yiwei, 2025). Thus, music toy therapy aligns with the principles of atraumatic care, which emphasizes minimizing physical and psychological trauma in children.

Based on this background, further analysis is needed to analyze and summarize the latest scientific evidence regarding the effectiveness of music therapy on pain and anxiety in children in the Emergency Department. The results of this review are expected to provide a scientific basis for the development of evidence-based pediatric nursing interventions and support the implementation of non-pharmacological therapies that are safe, easy to apply, and appropriate for the developmental needs of children in the ED environment. Therefore, the objective of this study is to identify, analyze, and synthesize published research findings regarding the effectiveness of music therapy in reducing pain and anxiety levels in preschool children receiving care in the Emergency Department.

METHOD

This study used the traditional literature review method as a form of secondary research, which was conducted through a process of searching, collecting, and analyzing various scientific literature relevant to the research topic. The data sources were national and international journal articles published between 2024 and 2025. The selected articles were full-text manuscripts and freely accessible (open access). The article search process was carried out through several scientific journal databases, namely Google Scholar and PubMed. The keywords used to search for Indonesian journal articles included "Music Toy Therapy," "Pain," "Child Anxiety," and "Emergency Room." The keywords used to search for journal articles in English include "Music Toy Therapy," "Pain," "Child Anxiety," and "Emergency Room." In Boolean logic, these keywords

are used to create logical relationships between keywords in the search to broaden or narrow the scope of the journal article search.

Eligibility criteria consist of inclusion and exclusion criteria. Inclusion criteria serve as guidelines for review and include: 1) articles published between 2021 and 2025, 2) full-text articles, and 3) studies investigating the effectiveness of music therapy to relieve pain and anxiety in children in emergency departments. Articles from the 2021–2025 period were selected because they provide the most up-to-date research. The exclusion criteria are 1) identical articles and 2) non-experimental articles. The third inclusion criterion serves to answer the research question. The researchers identified 273 articles on Google Scholar and 21 articles on PubMed based on the search results, and five of these articles were selected for review.

RESULT

The researchers found 273 articles on Google Scholar and 21 articles on PubMed based on the search results. These articles were then sorted using the Prisma Flow Diagram based on publication year, keywords, abstracts, and research results, resulting in 10 research articles. Finally, after considering the topics and objectives of the research, the researchers selected five journal articles. Based on data searches, researchers obtained five research articles, which were then evaluated based on the results contained in each article. It was concluded that music toy therapy is effective in reducing pain and anxiety in pediatric patients in the emergency room. This means that music toy therapy has an effect on the pain and anxiety of pediatric patients in the emergency room. In addition, another factor that affects the pain and anxiety of patients in the emergency room is family coping.

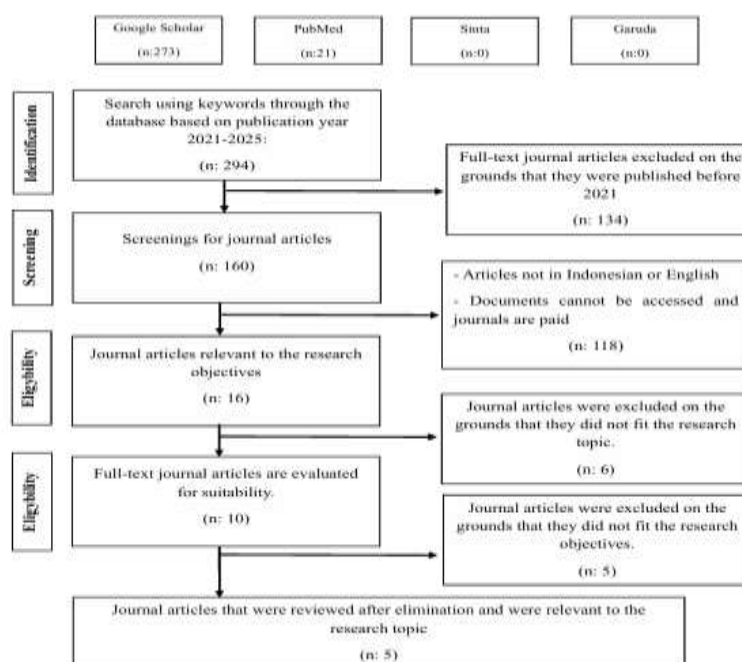


Diagram 1. Flow Prism Diagram

Table 1.
The Effect of Music Toy Therapy on Pain and Anxiety in Children in the Emergency Room

Author	Year	Title	Design	Result
Tugba Karaca Umran Guner	Nur & Cevik	2022 The Effect Of Music- Moving Toys To Reduce Fear And Anxiety In Preschool Children Undergoing Intravenous Insertion	Randomized clinical trial (RCT) with a two-group parallel experimental design.	The results showed no significant difference between the intervention group and the control group in terms of anxiety levels, physiological parameters, or duration of crying during intravenous access placement. However, the decrease in anxiety in the intervention group after the procedure was

		In A Pediatric Emergency Department:A Randomized Clinical Trial		not statistically significant. Therefore, it was proven that toys with music and movement were not effective in reducing children's anxiety during intravenous access placement in the emergency unit.
Masoumeh Bakhshandeh, Masoumeh Bagheri-Nesami, Mohammadali Heydarigorji, dan Abolfazl Hoseinnataj	2024	The Effect of Music Therapy on the Pain Level of 3 to 6-year-old Children Undergoing Wound Repair by Suturing and Their Parents' Anxiety in the Emergency Department	randomized controlled trial (RCT) with a parallel controlled trial design.	The results showed that there was no statistically significant difference between the intervention group and the control group in terms of children's pain levels and parental anxiety at each measurement time point ($p > 0.05$). However, clinically, the group that received music therapy showed a decrease in the average pain levels of children and parental anxiety in all measurement phases compared to the control group. Further analysis showed that the time factor had a significant effect on the reduction in pain and anxiety ($p < 0.001$). This study concluded that music therapy has the potential to provide clinical benefits as a non-pharmacological intervention, although it has not yet shown statistically significant effectiveness compared to standard care.
Israeli, Ari Nofitasari, Waode Aisa Zoahira, Nurdin Nurdin, Nawawi, dan Srikandi Puspa Amandaty	2024	<i>The Effect of Nature Music Therapy on Pain Intensity in Children Aged 6–12 Years During IV Insertion in the Emergency Room of the Puuwatu Community Health Center in Kendari City</i>	quasi-experimental design with a Non-Equivalent Control Group Design approach.	The results showed that nature music therapy significantly reduced pain intensity in school children during intravenous access. The average pain score in the intervention group decreased by 1.20 ($p < 0.001$), while the decrease in the control group was only 0.33 and not statistically significant ($p < 0.055$). These results indicate that nature music therapy is an effective non-pharmacological intervention for relieving pain in children.
Ratih Dwilestari Puji Utami, Nela Ulfa Alfiatun Nuriyah	2023	The Effect of Music Therapy on Anxiety Levels in Preschool Children During Invasive Procedures in the Pediatric Ward	quasi-experimental design with a one-group pretest–posttest approach.	Music therapy significantly reduced anxiety in preschool children. Before the intervention, the average anxiety level ranged from moderate to severe, with mild anxiety to no anxiety at all. Music therapy effectively reduced anxiety in preschool children during invasive procedures, as confirmed by statistical tests with a p -value < 0.05 .
Marthalena Simamora, Adventy Riang Bevy Gulo, Jek Amidos Pardede, Raisya Aulia Putri	2022	Candle and Music Play Therapy for Children's Anxiety Due to Hospitalization	Quasi-experiment with a one-group pre-test and post-test design approach	After participating in candle and music therapy, anxiety levels decreased in preschool children. A dependent t-test yielded a p -value of 0.000 ($p < 0.05$), indicating that candle and music therapy had a significant effect in reducing anxiety in preschool children treated in hospitals. The average anxiety score before the intervention was 39.32, while after the intervention it was 34.37.

DISCUSSION

The Effect of Music Toy Therapy on Pain and Anxiety in Children in the Emergency Room

Music toy therapy has been proven to be more effective in relieving pain and anxiety in children treated in the Emergency Room (ER). Through sound stimulation and play activities, this therapy helps distract children from medical procedures that cause pain and fear (Karaca & Guner, 2022; Bakhshandeh, 2024; Nofitasari & Zoahira, 2024; Puji Utami & Alfiatun Nuriyah, 2023; Simamora

et al., 2022). These results are in line with previous research findings that music therapy can reduce anxiety and pain in children (Nofitasari & Zoahira, 2024; Puji Utami & Alfiatun Nuriyah, 2023). Procedures involving needles cause children to experience severe pain accompanied by anxiety. In children, procedures involving needles can cause severe pain and anxiety. Past pain management strategies also influence current pain patterns (Kleye et al., 2021).

In addition to serving as a distraction, music therapy also works through neurophysiological and psychological mechanisms that play a role in modulating pain and anxiety in children. Musical stimulation is known to activate the limbic system and trigger the release of endorphins and dopamine, which contribute to a reduction in pain perception and an increase in feelings of comfort (Zaatar et al., 2024). At the same time, music can suppress the activity of the sympathetic nervous system so that stress responses, such as increased heart rate and muscle tension, can be significantly reduced (Georgiou & Galatos, 2025). This condition is particularly relevant in the emergency room, which is generally a high-stress environment for both pediatric patients and their parents.

Other factors: Family coping with pain and anxiety in children in the emergency room

This study is consistent with Ningsih's (2024) research, which investigated the relationship between family support and anxiety responses in school children (aged 6-12 years) during the insertion of an IV. The study found a p-value of 0.000, indicating that there was no relationship between family support and anxiety responses in school children (aged 6-12 years). The presence and involvement of family, especially parents, can provide a sense of security, boost children's confidence, and help children develop more adaptive coping mechanisms when facing medical procedures that cause pain and fear (Segers et al., 2023). Overall, these findings confirm that family support and coping are key factors in reducing anxiety responses in school-aged children undergoing invasive procedures in the emergency department.

Theoretically, family support acts as a stress buffer that can reduce the activation of physiological and psychological stress responses in children. Children who receive emotional support tend to show reduced anxiety, muscle tension, and lower pain perception compared to children who are not accompanied by their families (Basar et al., 2024). Parents who are actively involved in the care process, for example by accompanying their children while they play or providing positive reinforcement during procedures, have been shown to help children divert their attention from pain stimuli and reduce excessive fear responses (Karlsson et al., 2024). Thus, family support, particularly active parental involvement, plays an important role as a protective factor in suppressing stress responses, anxiety, and pain perception in children during medical procedures. The emotional support and positive interactions provided by the family help children develop more adaptive coping mechanisms, making the treatment experience more comfortable and manageable.

CONCLUSION

A literature review of five national and international research articles shows that music toy therapy has considerable potential as a non-pharmacological intervention to reduce pain and anxiety in pediatric emergency patients. This therapy works through active distraction, auditory stimulation, and play activities that divert children's attention from invasive procedures and the stressful emergency room environment, while supporting children's emotional regulation and stress responses.

The majority of studies show that music toy therapy is effective in reducing pain intensity and anxiety levels, particularly in preschool and early school-age children, although some randomized controlled trial studies report results that are not yet statistically significant. These differences in findings are influenced by variations in study design, intervention duration, type of music therapy used, and the dynamic characteristics of the emergency department environment.

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