Shawq, A. H. et al. (2025)
Jurnal Keperawatan Soedirman – Vol 20, No 1 page 43-50
http://jos.unsoed.ac.id/index.php/jks/index

ORIGINAL ARTICLE

THE EFFECTS OF MUSIC INTERVENTIONS ON CHILDREN'S PAIN SEVERITY AND ANXIETY DURING DRESSING CHANGES IN IRAQ: A RANDOMIZED CONTROLLED TRIAL

Adraa Hussein Shawq[1]*, Khatam Matsher Al-Musawi[2], Myasar Jasim Kalel[3], Ahmed Ali Mahmod[4]

1. Assistant prof. PhD pediatric nursing, University of Baghdad. Iraq
2. Prof. PhD Pediatric Nursing, University of Baghdad. Iraq
3. RN nurse PhD pediatric nursing. Iraq
4. MSc pediatric nursing. Iraq

Article Information
Received: 19 September 2024
Revised: 12 December 2024
Accepted: 5 March 2025

*Corresponding Author
Adraa Hussein Shawq
adraa.hussein@conursing.uobaghdad.edu.iq

DOI
10.20884/1.jks.2025.20.1.13100

ABSTRACT

Daily dressing changes cause distress and pain for victims of burn injuries. The study aimed to determine the effect of music in reducing the pain and anxiety of thermally burned children during routine dressing changes. This quantitative study employed a randomized controlled trial design. The participants comprised 80 children at the Specialized Burns Hospital, in Baghdad, Iraq who were divided into two groups. The intervention group were exposed to three generic musical pieces (children's music, nature sounds, and classical music) for 10-15 minutes. The researchers used the Objective Pain Scale, State-Trait Anxiety Inventory, and physiological parameters to measure the children's responses immediately before the dressing change and five minutes after, over seven days. The paired t-test and independent t-test were used to compare the means between the control and intervention groups. The mean values for the pain, anxiety, and physiological parameters before the procedure in both groups showed no significant differences ($p > 0.01$). The intervention group revealed significant statistical differences after being played music in all study parameters for pre- and post-dressing ($p < 0.01$), except for the blood pressure parameter. The music intervention alleviated children's pain, anxiety, respiration, and pulse measurements when undergoing dressing changes.

Keywords: *Anxiety; burn; children; music and pain*

ISSN : 1907-6637 **e-ISSN : 2579-9320**

BACKGROUND

Burn injuries are the fifth most common cause of injuries in children, and they mostly occur at home (Jordan et al., 2022). Previous studies reported that burn mortality among children is 7 times higher in low- and middle-income countries (Bradt et al., 2021; Suzuki et al., 2024). Its morbidity rate is also greater than adult burn injuries (Patterson et al., 2023).

Daily dressing changes require staple removal and showers (Suman & Owen, 2020). Different degrees of pain and anxiety are associated with dressing changes, and the degree of pain is associated with the size, depth, and location of the burned area (K. C. Hsu et al., 2016). Routine dressing changes are stressful experiences, and the physical pain and fear related to dressing procedures worsen the patient's experience, particularly in children (Inal & Canbulat, 2015).

The inadequate management of burn injuries can lead to prolonged hospitalization, disability, stigma, rejection, and stress disorders (Shoghi et al., 2022). Ineffective care may influence the patients' mood and cognition and build mistrust between them and healthcare providers. It may also affect the patient's quality of sleep and physical activity (Azeez et al., 2023; Hanser, 2020). Pain experience in burn children may extend beyond the physical issue, and include psychological components (Purnawan et al., 2021). Previous studies

indicate that pain and stress management for adult and pediatric burn patients is insufficient because of traditional pain management methods and the adverse effects of analgesics (Friedrichsdorf et al., 2016; Romanowski et al., 2020). Providing adequate care for children with burn injuries is challenging for nurses. Such treatment requires multidisciplinary methods that consider physical and psychological aspects (Ciornei et al., 2023; Shawq & Ali, 2019).

Healthcare providers are recommended to use alternative approaches based on psychological techniques to treat burn injury patients without pharmacotherapy (Su et al., 2015). These techniques include distraction, relaxation, family-centered care, and mind-body techniques. The distraction technique is mostly used for painful medical procedures. Such techniques include visual reality, music therapy, and play therapy (Rohilla et al., 2018; Shawq, 2024).

Music is a safe and easy alternative method for managing pain and stress associated with painful procedures. Music can distract children's attention from a painful procedure and trigger the release of the pain relief hormone endorphin (K. C. Hsu et al., 2016).

Evidence shows that music can be easily used in some medical procedures to reduce pain and distress. Listening to music can distract individuals from painful thoughts, reduce stress, and induce relaxation (Kabuk et al., 2022). Previous literature found that music can help alleviate the adverse effects of medical procedures, such as pain. Listening to music can decrease and regulate the patient's respiration and heart rate, resulting in improved relaxation and mood (Mohanasundari et al., 2023). Overall, music can help create a positive and less stressful experience during painful procedures such as burn dressing changes.

Music is an inexpensive, easy, safe, and noninvasive method that can be implemented during painful procedures. Moreover, child-centered care would allow children to have control in selecting the music used during treatment (Shoghi et al., 2022). Incorporating music with traditional management can also reduce the stress and pain associated with dressing changes (Suman & Owen, 2020). Thus, nurses can use music intervention to help manage the children's pain and anxiety during painful medical procedures (Avishai et al., 2017).

Previous studies have reported that children respond positively during music intervention. Some music can even enhance infants' communication skills and develop their cognitive skills (Nguyen et al., 2023). Past literature also recommends music intervention for reducing pain and anxiety during medical procedures because it can stabilize vital signs and reduce the patient's stressful experience of pain and the state of anxiety during dressing changes (H. F. Hsu et al., 2022; Patiyal et al., 2021; Ting et al., 2022). Additionally, children with neurological disorders such as cerebral palsy showed an improvement in motor and cognitive skills when supported with music therapy (Vinolo-Gil et al., 2021). A previous randomized control trial also emphasized that integrating music therapy for children with burn injuries according to protocol guidelines can increase the treatment program's efficacy (Eid et al., 2021).

Music therapy interventions were established in the late 1970s to support burn patients as a form of alternative therapy (Sihvonen et al., 2017). Music can be used as a nonverbal emotional expression in children and in trauma recovery. It distracts the patient from pain stimuli and induces relaxation through brain stimulation. Music intervention can also improve children's cooperation and quality of life (Mohanasundari et al., 2023).

Furthermore, previous studies stated that music can reduce pain and stress and stabilize a patient's vital signs (Patiyal et al., 2021). Another study showed its role in improving the social interaction ability of children with communication disorders (Ereny & Mohamed, 2019). Music intervention is recommended as it can be integrated into child-centered care by engaging them as a participant to enhance their confidence and self-esteem (H. F. Hsu et al., 2022; Lee, 2016; Van Der Heijden et al., 2019).

Music interventions are noninvasive, cost-effective, and not dependent on medication. Thus, it could be utilized for children and adults to reduce pain and associated anxiety in certain painful procedures, such as dressing changes (Bushnell et al., 2021). Play therapy can also be used to reduce pain and stress in some painful procedures. Nevertheless, the nursing intervention must consider the children's age, preferences, and procedure types when selecting a nursing intervention (Chen et al., 2024).

Most previous studies recommend applying music intervention during medical procedures lasting for 15-20 minutes (da Silva Santa et al., 2021; Y. Li et al., 2020). Music interventions are mainly used for therapeutic purposes, to induce relaxation, and emotional comfort, and to improve self-esteem. These types of music therapy can be applied depending on the children's age and accessibility (van der Heijden et al., 2018). Providing a wide range of music could also increase children's cooperation, ensuring their privacy and rights are respected during interventions (Lee, 2016).
In this study, music intervention was provided during the daily dressing changes of children with burn injuries to improve their relaxation and decrease anxiety and pain.

METHOD

Study design

This is a randomized control trial with two groups, and the study's design follows the CASP checklist (Figure 1). The intervention group received the music intervention to determine its effect on children's pain and anxiety levels during burn dressing changes.

Study sample

As many as 100 children with burn injuries at the Specialized Burns Hospital during the study period were eligible for this study. Nine refused to participate, and 11 did not meet the study's inclusion criteria (Figure 1). The minimum sample size required in each group was 40 children. This number was calculated based on the A-priori sample sizes for student t-tests, the anticipated effect size (Cohen's d) of 0.5, the desired statistical power level of 0.8, and the probability level of 0.05.

This study used control groups to determine the true effect of music intervention. The children who participated were those between 6 and 12 years old. Both genders were included. The samples were divided into the experimental and control groups. Both have an equal number of the participants. The selected samples were referred to the dressing room at the Specialized Burns Hospital for the first dressing change. Children with a previous experience with burn injuries were excluded. The burn surface area of these patients was less than 39%, and they did not suffer from hearing or cognitive impairment. Children diagnosed with hot fluid burns were

enrolled in the study, while those with deep burns were excluded. The included children have the same characteristics, such as the percentage of body surface area affected and burn degree.

Study Instruments

The main outcome is pain and anxiety, measured by the Objective Pain Scale (OPS) and State-Trait Anxiety Inventory (STAI). The research assistant assessed the children's pain levels by collecting the following OPS parameters: movement, crying, agitation, verbal, and blood pressure (Tandon et al., 2016). The children's responses were scored with a range of 1-10. A score of 0 is classified as no pain, mild = 1-2, moderate = 3-6, and severe =7-10.

Children's anxiety was assessed via STAI, a self-report instrument consisting of 12 items, rated on a trichotomous Likert scale. The children selected how they experienced the situation: 1 = hardly ever, 2 = sometimes, or 3 = often. Higher scores indicate greater anxiety. The researchers used the Arabic version of the STAI for the participants.

The children's physiological parameters in both groups were assessed by measuring their respiratory and pulse rates, as well as systolic and diastolic blood pressure, through a monitoring device. The pain and anxiety levels were compared between the two groups to determine any differences over seven days.

Intervention

The researchers randomly assigned the children to both groups and matched their characteristics to compare the effects of the music intervention. The participants were blinded to ensure accurate outcomes. In addition, the same dressing change protocol was used for all participants. Finally, covariance was used in the data analysis.

Before the dressing procedure, the researchers communicated with the participants and their parents to obtain their informed consent. The music intervention included a list of musical genres, including children's music, nature sounds, and classical music, that were played for 10-15 minutes. The efficacy of these music genres has been demonstrated in a previous study. They were found to decrease the state of anxiety and pain severity of children who underwent lumber punctures in Iraq (Kalel & Shawq, 2023). The approval to use the music was obtained from the authors.

The same music and listening duration were played for the intervention group before and during each daily dressing change. The participant's pain, anxiety, and physiological signs were measured immediately before dressing and after five minutes of the dressing procedure for both groups. The control group received standard care.

The music selection included the following characteristics: slow and steady rhythm, soft and gentle tone, and low-frequency sound. The music list included five popular calming children's songs, five classical pieces, and five nature sounds. The child could choose their preferred song from a list of selected music. They were also given the choice of repeating the same song or selecting another song to listen to until the end of the procedure.

The same nurses performed the dressing change for all participants, and each procedure lasted approximately 15-20 minutes. The dressing changes were conducted in the same room with the same factors, including noise level and temperature, to ensure environmental control. Moreover, all participants had one of their parents present to provide emotional support.

The control group only received routine care without any intervention. The participants' pain and anxiety levels were measured continuously for seven days. Measurements were taken without analgesic medication. The pain level was also evaluated approximately five minutes after the dressing was changed. The anxiety levels of both groups were assessed before the dressing was changed. A summary of the interventions is presented in Figure (1).

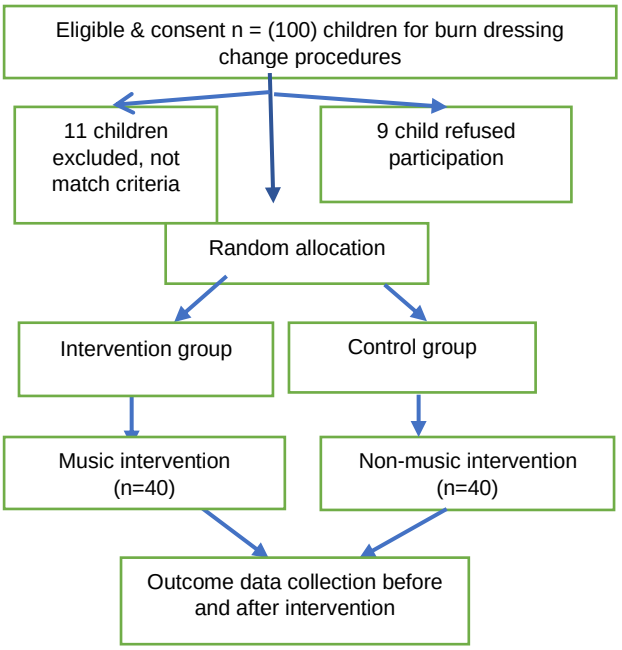

Figure 1. CASP flow diagram

The included children had the same characteristics, such as the percentage of body surface area burned and the degree of burn. The same nurses performed the dressing change procedure for all participants, and the duration of procedure the procedure was 15-20 minutes for all participants. The dressing changes were conducted in the same room with the same factors, including noise level and temperature, to ensure environmental control. Moreover, all participants had one of their parents present to provide emotional support.

Ethical consideration

The current study has been approved by the Research Ethical Committee at the College of Nursing, University of Baghdad (REC.123.56320) and the Iraqi Ministry of Health. After the purpose and benefit of the study were explained, all participants and their parents were informed of their autonomy. The consent forms were signed by their parents.

Data analysis

The data were analyzed using the SPSS program version 16. The frequencies, percentages, means, and standard deviations were used to analyze the descriptive data. The chi-square and t-test were used to determine the groups' homogeneity. The two groups' variables were compared by paired t-tests, and independent t-tests within the same group. The significance level was set at $P \leq 0.01$.

RESULT

The participants' sociodemographic characteristics are represented in Table 1. A total of 80 participants with burn injuries were measured for their pain and anxiety levels and physiological parameters during burn dressing changes over seven continuous days.

Table 1. Children's sociodemographic characteristics

Variables		Music group n = (40) f (%)	Non-music group n = (40) f (%)	Sig
Child age	Mean ± SD	9.13 ± 1.3	9.32 ± 1.4	.58†
Sex	Male	19 (47.5%)	20 (50%)	.55*
	Female	21 (52.5%)	20 (50%)	
Causes of burns	Boiling water	18 (45%)	16 (40%)	.65*
	Hot liquids	9 (22.5%)	7 (17.5%)	
	Steam	3 (7.5%)	5 (12.5%)	
	Hot objects	10 (25%)	12 (30%)	
Burns degree	1	2 (5%)	1 (2.5%)	.56*
	2	35 (87.5%)	32 (80%)	
	3	1 (2.5%)	2 (5%)	
	1 & 2	1 (2.5%)	2 (5%)	
	2 & 3	1 (2.5%)	3 (7.5%)	

*note: †=independent t-test, *= **χ^2 test***

The participants were in the school-age group (6-12 years old). The mean age ± SD of the intervention group was 9.13 ± 1.3, and the control group was 9.32 ± 1.4. The number of female and male participants was distributed equally. The highest percentages of burns were caused by boiling water in both groups (45%, 40%). Most participants were diagnosed with second-degree burn injuries (87.5%, 80%). The statistics show no significant differences between the two groups regarding their sociodemographic data. The participants also had similar characteristics.

Table 2. Mean Score Comparison of the Pain and Anxiety levels and Physiological Parameters between the Intervention and Control Groups

Variables	Duration	Music n = (40) Mean (SD)	Non-music n = (40) Mean (SD)	Independent *t*-test
Pain	Before	2.31 (5.1)	2.11 (3.6)	*t*= 1.73, P=.72
	After	1.88 (4.2)	2.53 (4.1)	*t*= 2.394, P < 0.01
	Paired *t*-test	*t*= 7.314, P < 0.01	*t*= 0.83, P = .52	
Anxiety	Before	2.82 (3.5)	2.77 (5.6)	*t*= 3.95, P=.54
	After	1.53 (5.8)	2.53 (4.2)	*t*= 5.214, P < 0.01
	Paired *t*-test	*t*= 9.24, P < 0.01	*t*= 0.91, P = .36	
Respiration rate	Before	23.02 (5.8)	23.92 (7.4)	*t*= 7.23, P = .42
	After	20.53 (6.3)	22.64 (6.8)	*t*= 9.94, P < 0.01
	Paired *t*-test	*t*= 6.84, P < 0.01	*t*= 0.87, P = .69	
Pulse rate	Before	88.54 (9.4)	88.94 (8.2)	*t*= 6.43, P=.85
	After	80.68 (7.5)	86.98 (7.7)	*t*= 4.94, P < 0.01
	Paired *t*-test	*t*= 8.86, P < 0.01	*t*= 0.37, P = .43	
Systolic BP	Before	121.43 (54.2)	121.75 (68.3)	*t*= 5.91, P=.46
	After	120.86 (76.8)	121.14 (85.4)	*t*= 4.33, P=.28
	Paired *t*-test	*t*= 0.76, P = .41	*t*= 0.87, P = .53	
Diastolic BP	Before	70.65 (5.8)	70.87 (7.6)	*t*= 5.68, P=.27
	After	69.83 (6.3)	70.66 (8.5)	*t*= 4.88, P=.32
	Paired *t*-test	*t*= 0.66, P = .94	*t*= 0.97, P = .78	

Note: M: Mean, SD: Standard deviation, t: t test, Sig: Significance p≤ 0.01

The pain, anxiety, and physiological parameters of the children in both groups were measured twice, before and after the daily burn dressing changes for seven days. Table 2 shows both groups' pain and anxiety levels before the dressing procedure. The paired t-test shows no significant differences in the means of the participant's pain (P=0.72), anxiety (P=0.54), and physiological signs (P=0.42, 0.85, 0.46, 0.27) in both groups before the dressing change.

Moreover, the paired t-test shows crucial differences between the intervention and control groups because after the dressing change, their pain, anxiety, respiration, and pulse values were P < 0.01, except for their blood pressure (P > 0.01).

According to the independent t-test reviews, after the intervention, there were differences in the participant's pain and anxiety levels and their respiration and pulse rates before and after the dressing change (P < 0.01). However, there were no differences between the blood pressure values (P > 0.01) before and after the dressing change. Meanwhile, the control group had no statistically significant differences in the measured variables before and after the dressing change (P > 0.01).

DISCUSSION

The signs and symptoms of anxiety and noncompliance are usually associated with children undergoing painful medical procedures, particularly when these procedures are conducted daily (Eidan & Shawq, 2024; Ettenberger et al., 2021). This study explored a nonpharmacological supportive treatment method, music intervention, on children's responses concerning their pain, anxiety, and physiological parameters during dressing changes. The data revealed a

significant difference in the mean score between the intervention and control groups during the dressing procedure.

Table 2 shows that the mean pain score values in both groups before the music intervention were similar M ± SD (2.31 ±5.1), (2.11 ±3.6), with no statistical difference (P=0.72). In addition, the degree of burn between the groups showed no statistical difference (P=0.56). The baseline pain level is equal before the music intervention to determine music's effects. After the music intervention, the participants presented a lower degree of pain than the control group (1.88 ±4.2) vs (2.53 ±4.1), and a significant difference appeared at P < 0.01.

Moreover, the statistics revealed a significant difference when comparing the mean values of the participant's pain within the intervention group before and after the dressing change (P < 0.01). Meanwhile, there was no difference for the control group with the same variable (Table 2). In this study, the children could choose their favorite music without the researcher's interference.

Listening to preferred music decreases the transmission of the pain signal due to distraction, resulting in decreased pain (Lee, 2016). Music can reduce pain and anxiety through distraction, which shifts the children's focus and stimulates the endorphin hormone to reduce pain perception (Jasim Kalel & Hussein Shawq, 2023). Listening to preferred music can also lower heart and lung function, resulting in muscle relaxation and decreased tension (K. C. Hsu et al., 2016).

Furthermore, a previous study of children less than 10 years old with thermal burns revealed that listening to music for five days during dressing changes significantly decreased the degree of pain and anxiety (Rohilla et al., 2018). A randomized clinical trial of 70 patients with burns also revealed that music intervention significantly reduced pain and anxiety levels on the fourth day of dressing change (K. C. Hsu et al., 2016).

The integration of music intervention with rehabilitation therapy during painful procedures among children with burn injuries on their lower limbs resulted in a significant improvement in the range of motion, pain, and gait assessment (Eid et al., 2021). Another study found that music treatment could decrease the pain intensity of children with cancer, with a significant decrease in postintervention pain levels in the test group (P = 0.034) (Krishnaswamy & Nair, 2016). Various styles of music intervention, such as classical music, children's music, and pop music, have shown significant analgesic effects (Ting et al., 2022).

Previous studies involving advanced technologies have also reported how music can affect the brain when it is exposed to stimulation through listening to music. It has a positive influence on prick pain, postoperative pain, chronic pain, and procedural pain (Mohanasundari et al., 2023). Therefore, this supportive method can create a comfortable environment and friendly rapport and reduce the patient's pain (Li et al., 2017).

The physiological parameters of the children with burn injuries were assessed with a monitoring device before and after the dressing procedure. Both groups had approximately the same measurement values, with no difference between their means before and after the dressing change (P > 0.01). Next, in this study, the intervention group had lower mean values of all measured parameters, except blood pressure, after the intervention. The statistics showed that the mean values related to the participant's respiration and heart rates were statistically different at P < 0.01. In comparison, the mean values of the control group for the measured parameters had no difference before and after the dressing procedure.

Previous research has shown that children's physiological parameters, such as heart and respiratory rates, oxygen saturation, and cortisol levels, are triggered by their current pain state (Abdulzahra & Shawq, 2024; Bonutti et al., 2017). Meanwhile, music influences a person's mood, cognitive, and physical condition. Evidence-based practices have shown that listening to music positively affects the healing process and can provide patients with comfort. Music distracts an individual's attention and redistributes the pain's physical and psychological attributes (Romanowski et al., 2020).

This study's result aligns with a meta-analysis of previous studies that determined the effect of music interventions on children's responses during painful procedures. The analysis revealed that the music intervention helped the children's respiratory and heart rates to decrease and their peripheral oxygen saturation to increase (Shawq et al., 2020; Ting et al., 2022). Our results are supported by those of another study where three types of live music were played to infants for five days. The results revealed that after listening to music, the infants' heart rates and breathing rates decreased, and their sleep patterns improved (Loewy et al., 2013). Additionally, when music therapy was applied in the pediatric critical care unit, children's heart rate decreased by 17.9 to (18.9) beats per minute, their oxygen saturation increased by 2.4% (2.1%), their systolic blood pressure decreased by 9.2 (2.8) mmHg, and their diastolic blood pressure is 7.9 (0.3) mmHg (Liu & Petrini, 2015).

This study measured the participants' anxiety levels before the dressing procedures. The participants in both groups experienced anxiety. Table (2) revealed that the mean anxiety levels in both groups before the music intervention were similar M ± SD (2.82 ± 3.5) and (2.77 ± 5.6), with no statistical difference (P=.54). Both groups had similar anxiety levels before the dressing procedure.

After the music intervention, the participant's mean anxiety decreased to (1.53 ± 5.8) and a significant difference at P < 0.01. Meanwhile, the control group did not show any difference in their mean anxiety levels over seven days (Table 2).

Previous studies regarding using music therapy for decreasing anxiety showed a positive outcome. Music therapy can reduce anxiety by distracting children from pain stimuli (Liu & Petrini, 2015), calming children through inducing relaxation and decreasing respiratory and heart rates (Ting et al., 2022). In addition, allowing the participants to select their preferred music can reduce their stress (Ghezeljeh et al., 2016).

Evidence has shown that the brain's auditory and motor functions are correlated, as rhythmic auditory cues can program motor movement. Several studies have suggested using musical rhythm for muscle relaxation and anxiety reduction (Bushnell et al., 2021). Music can distract patients' attention and redirect the sensory simulation of pain impulses. Therefore, reducing the associated pain and anxiety significantly.

The results of the previous randomized control trial were also consistent with our results, which revealed that the participants' anxiety and sleep quality were significantly lower

in the intervention group on the third day of music therapy intervention (Kabuk et al., 2022). Another study also recorded a noticeable gap between the study and the control regarding the participants' anxiety and relaxation levels before and after the music intervention (Ghezeljeh et al., 2016).

Moreover, a quasi-experimental study to reduce the pain and anxiety levels of preschool children with burn injuries via distraction techniques such as music therapy revealed that the mean pain and anxiety scores were significantly lower than the values before the music intervention (Shoghi et al., 2022). Another study was conducted to explore music therapy's impact on the anxiety and pain symptoms of young children with chronic illness and revealed that those in the music group experienced less pain during and after the painful procedure than those in the control group (Masarogulları, 2017).

Music can reduce pain and anxiety by shifting the children's focus and stimulating the endorphin hormone, which reduces pain perception (Vinolo-Gil et al., 2021). Listening to preferred music can lower heart and lung functions, resulting in muscle relaxation and decreased tension (Hua et al., 2015).

Fear and stress also usually exacerbate pain, leading to distress. Thus, reducing the children's stress can indirectly reduce their pain perception (Chen et al., 2024). Music intervention can improve the children's mood and create a positive experience, resulting in lower pain scores and improved well-being (k et al., 2018; Shawq & Ali, 2019).

Music intervention has been found to reduce pain and associated anxiety in patients with cancer, chronic pain, hospice patients, and burn injuries. It can improve self-care, reduce stress, enhance mood, and improve the patient's sense of control (Bradt et al., 2021; Jordan et al., 2022). A randomized control trial of 114 school-aged children also supported implementing music routinely preoperatively during elective operations resulted in lower anxiety levels (Kalel & Shawq, 2023). Additionally, previous studies have shown that considerable music intervention can alleviate the patient's pain and anxiety and improve negatively associated symptoms to different degrees (van der Heijden et al., 2018).

IMPLICATION AND LIMITATIONS

A challenge in this study was having the participants' parents agree to their children listening to music during the procedure. Future studies can focus on other techniques that can be used to reduce children's pain and distress, such as structured play therapy. This study's findings will support the body of evidence that states that music can reduce children's pain and increase their compliance during dressing changes. Music reduces nervous system stimuli by providing a distraction and calming effects, resulting in relaxation.

CONCLUSION AND RECOMMENDATION

Music intervention effectively decreases children's pain and anxiety levels during dressing changes. Thus, music intervention can be used as a cost-effective and easy distraction method to promote children's compliance during painful medical procedures.

The authors recommend that nurses use music to reduce children's reactions to pain and increase their cooperation during burn dressing changes. Nevertheless, further studies are needed to investigate music's effects in reducing pain and stress in children during dressing changes.

ACKNOWLEDGMENTS

The authors would like to thank the administrative staff of the Specialized Burns Hospital and the nurses for their cooperation in data collection, especially the children and their families who participated in the study.

REFERENCES

Abdulzahra, F. A., & Shawq, A. H. (2024). Mobile application to develop nurses' knowledge of pediatric cardiopulmonary resuscitation: A quasi-experimental study. In *Journal of Emergency Medicine, Trauma and Acute Care* (Vol. 2024, Issue 6). https://doi.org/10.5339/jemtac.2024.absc.7

Avishai, E., Yeghiazaryan, K., & Golubnitschaja, O. (2017). Impaired wound healing: Facts and hypotheses for multi-professional considerations in predictive, preventive and personalised medicine. In *EPMA Journal* (Vol. 8, Issue 1, pp. 23–33). https://doi.org/10.1007/s13167-017-0081-y

Azeez, A. O., Hussain, A. H. M., & Shawq, A. H. (2023). Effectiveness of an Educational Program on Nannies' Practice Regarding Cholera Infection in the Nurseries. In *Health Education and Health Promotion* (Vol. 11, Issue 3, pp. 349–356). https://doi.org/10.58209/hehp.11.3.349

Bonutti, D. P., Daré, M. F., Castral, T. C., Leite, A. M., Vici-Maia, J. A., & Scochi, C. G. S. (2017). Dimensioning of painful procedures and interventions for acute pain relief in premature infants. *Revista Latino-Americana de Enfermagem*, *25*. https://doi.org/10.1590/1518-8345.1387.2917

Bradt, J., Dileo, C., Myers-Coffman, K., & Biondo, J. (2021). Music interventions for improving psychological and physical outcomes in people with cancer. In *Cochrane Database of Systematic Reviews* (Vol. 2021, Issue 10). https://doi.org/10.1002/14651858.CD006911.pub4

Bushnell, M. C., Frangos, E., & Madian, N. (2021). Non-pharmacological Treatment of Pain: Grand Challenge and Future Opportunities. In *Frontiers in Pain Research* (Vol. 2). https://doi.org/10.3389/fpain.2021.696783

Chen, J., Deng, K., Yu, D., Fan, C., Liu, L., Gu, H., Huang, F., & Huo, Y. (2024). Recent Developments in the Non-Pharmacological Management of Children's Behavior Based on Distraction Techniques: A Concise Review. In *Healthcare (Switzerland)* (Vol. 12, Issue 19). https://doi.org/10.3390/healthcare12191940

Ciornei, B., David, V. L., Popescu, D., & Boia, E. S. (2023). Pain Management in Pediatric Burns: A Review of the Science behind It. In *Global Health, Epidemiology and Genomics* (Vol. 2023). https://doi.org/10.1155/2023/9950870

da Silva Santa, I. N., Schveitzer, M. C., dos Santos, M. L. B. M., Ghelman, R., & Filho, V. O. (2021). MUSIC INTERVENTIONS IN PEDIATRIC ONCOLOGY: Systematic review and meta-analysis. In *Complementary Therapies in Medicine* (Vol. 59). https://doi.org/10.1016/j.ctim.2021.102725

Eid, M. M., Abdelbasset, W. K., Abdelaty, F. M., & Ali, Z. A. (2021). Effect of physical therapy rehabilitation program combined with music on children with lower limb burns: A twelve-week randomized controlled

study. In *Burns* (Vol. 47, Issue 5, pp. 1146–1152). https://doi.org/10.1016/j.burns.2020.11.006

Eidan, A. T., & Shawq, A. H. (2024). Effect of a Nutritional Education Program on Mother Knowledge Regarding Their Children Nutritional Status. In *Journal of Obstetrics, Gynecology and Cancer Research* (Vol. 9, Issue 5, pp. 522–531). https://doi.org/10.30699/jogcr.9.5.522

ERENY S. WAHBA, Ph.D., M. M. E. P. D., & MOHAMED, M.Sc., M. S. (2019). Efficacy of Exercise Combined with Music on Pain and Range of Motion in Pediatric Lower Limb Burn. In *The Medical Journal of Cairo University* (Vol. 87, Issue 12, pp. 4103–4107). https://doi.org/10.21608/mjcu.2019.76638

Ettenberger, M., Maya, R., Salgado-Vasco, A., Monsalve-Duarte, S., Betancourt-Zapata, W., Suarez-Cañon, N., Prieto-Garces, S., Marín-Sánchez, J., Gómez-Ortega, V., & Valderrama, M. (2021). The Effect of Music Therapy on Perceived Pain, Mental Health, Vital Signs, and Medication Usage of Burn Patients Hospitalized in the Intensive Care Unit: A Randomized Controlled Feasibility Study Protocol. *Frontiers in Psychiatry*, *12*(October), 1–9. https://doi.org/10.3389/fpsyt.2021.714209

Friedrichsdorf, S. J., Sidman, J., & Krane, E. J. (2016). Prevention and Treatment of Pain in Children: Toward a Paradigm Shift. In *Otolaryngology - Head and Neck Surgery (United States)* (Vol. 154, Issue 5, pp. 804–805). https://doi.org/10.1177/0194599816636100

Ghezeljeh, T. N., Ardebili, F. M., Rafii, F., & Haghani, H. (2016). The effects of music intervention on background pain and anxiety in burn patients: Randomized controlled clinical trial. In *Journal of Burn Care and Research* (Vol. 37, Issue 4, pp. 226–234). https://doi.org/10.1097/BCR.0000000000000266

Hanser, S. B. (2020). Music Therapy for Pain Management. *3 Juni 2020*, *301*, 1–2. https://www.practicalpainmanagement.com/treatments/complementary/music-therapy-pain-management

Hsu, H. F., Chen, K. M., & Belcastro, F. (2022). The effect of music interventions on chronic pain experienced by older adults: A systematic review. In *Journal of Nursing Scholarship* (Vol. 54, Issue 1, pp. 64–71). https://doi.org/10.1111/jnu.12712

Hsu, K. C., Chen, L. F., & Hsiep, P. H. (2016). Effect of music intervention on burn patients' pain and anxiety during dressing changes. In *Burns* (Vol. 42, Issue 8, pp. 1789–1796). https://doi.org/10.1016/j.burns.2016.05.006

Hua, Y., Qiu, R., Yao, W. Y., Zhang, Q., & Chen, X. L. (2015). The Effect of Virtual Reality Distraction on Pain Relief During Dressing Changes in Children with Chronic Wounds on Lower Limbs. In *Pain Management Nursing* (Vol. 16, Issue 5, pp. 685–691). https://doi.org/10.1016/j.pmn.2015.03.001

Inal, S., & Canbulat, N. (2015). Using of Distraction Methods on Procedural Pain Management of Pediatric Patients. In *Güncel Pediatri* (Vol. 13, Issue 2, pp. 116–121). https://doi.org/10.4274/jcp.29292

Jasim Kalel, M., & Hussein Shawq, A. (2023). Music Medicine Intervention-Based Program for Reducing Pain and Anxiety of Children Undergoing Bone Marrow Aspiration and Lumber Puncture Procedures. *Pakistan Heart Journal*, *56*(2), 407–413. http://www.pkheartjournal.com

Jordan, K. C., Di Gennaro, J. L., von Saint André-von Arnim, A., & Stewart, B. T. (2022). Global trends in pediatric burn injuries and care capacity from the World Health Organization Global Burn Registry. *Frontiers in Pediatrics*, *10*(Lmic). https://doi.org/10.3389/fped.2022.954995

k, S., V, I., Diwakar, K., & Raghavan, Rv. (2018). Effect of Nesting on Physiological Parameters Among Preterm Infants Admitted in Nicus. *International Journal of Advanced Research*, *6*(4), 357–362. https://doi.org/10.21474/ijar01/6867

Kabuk, A., Şendir, M., & Filinte, G. (2022). The effect of reflexology massage and passive music therapy intervention before burn dressing on pain, anxiety level and sleep quality. In *Burns* (Vol. 48, Issue 7, pp. 1743–1752). https://doi.org/10.1016/j.burns.2021.10.012

Krishnaswamy, P., & Nair, S. (2016). Effect of music therapy on pain and anxiety levels of cancer patients: A pilot study. In *Indian Journal of Palliative Care* (Vol. 22, Issue 3, pp. 307–311). https://doi.org/10.4103/0973-1075.185042

Lee, J. H. (2016). The Effects of Music on Pain : In *The Effects of Music on Pain: A Meta-Analysis Jin* (Vol. 00, Issue 00, pp. 1–48).

Li, J., Zhou, L., & Wang, Y. (2017). The effects of music intervention on burn patients during treatment procedures: A systematic review and meta-analysis of randomized controlled trials. In *BMC Complementary and Alternative Medicine* (Vol. 17, Issue 1). https://doi.org/10.1186/s12906-017-1669-4

Li, Y., Xing, X., Shi, X., Yan, P., Chen, Y., Li, M., Zhang, W., Li, X., & Yang, K. (2020). The effectiveness of music therapy for patients with cancer: A systematic review and meta-analysis. In *Journal of Advanced Nursing* (Vol. 76, Issue 5, pp. 1111–1123). https://doi.org/10.1111/jan.14313

Liu, Y., & Petrini, M. A. (2015). Effects of music therapy on pain, anxiety, and vital signs in patients after thoracic surgery. In *Complementary Therapies in Medicine* (Vol. 23, Issue 5, pp. 714–718). https://doi.org/10.1016/j.ctim.2015.08.002

Loewy, J., Stewart, K., Dassler, A. M., Telsey, A., & Homel, P. (2013). The effects of music therapy on vital signs, feeding, and sleep in premature infants. In *Pediatrics* (Vol. 131, Issue 5, pp. 902–918). https://doi.org/10.1542/peds.2012-1367

Masarogulları, G. (2017). the Effects of Music Therapy on Anxiety and Pain Symptoms of Children With Cancer. In *New Trends and Issues Proceedings on Humanities and Social Sciences* (Vol. 4, Issue 7, pp. 139–153). https://doi.org/10.18844/prosoc.v4i7.2654

Mohanasundari, S. K., Thanigainathan, S., & Padmaja, A. (2023). Comparison of music medicine intervention and visual imagery techniques and conventional treatment alone on preoperative anxiety among children undergoing surgery – A Randomized Control Trial. In *Complementary Therapies in Clinical Practice* (Vol. 53). https://doi.org/10.1016/j.ctcp.2023.101799

Nguyen, T., Flaten, E., Trainor, L. J., & Novembre, G. (2023). Early social communication through music: State of the art and future perspectives. In *Developmental Cognitive Neuroscience* (Vol. 63). https://doi.org/10.1016/j.dcn.2023.101279

Patiyal, N., Kalyani, V., Mishra, R., Kataria, N., Sharma, S., Parashar, A., & Kumari, P. (2021). Effect of Music Therapy on Pain, Anxiety, and Use of Opioids Among Patients Underwent Orthopedic Surgery: A Systematic Review and Meta-Analysis. In *Cureus*. https://doi.org/10.7759/cureus.18377

Patterson, K. N., Beyene, T. J., Lehman, K., VerLee, S. N., Schwartz, D., Fabia, R., & Thakkar, R. K. (2023). Evaluating effects of burn injury characteristics on quality of life in pediatric burn patients and caregivers. In *Burns* (Vol. 49, Issue 6, pp. 1311–1320). https://doi.org/10.1016/j.burns.2023.01.010

Purnawan, I., Hidayat, A. I., Sutrisna, E., Alivian, G. N., & Wirakhmi, I. N. (2021). Efficacy of Listening To Murattal in Reducing the Pain Experienced By ICU Patients. in Jurnal keperawatan soedirman. (Vol. 16, Issue 3, pp. 97-100). http://jks.fikes.unsoed.ac.id/index.php/jks/index.

Rohilla, L., Agnihotri, M., Trehan, S. K., Sharma, R. K., & Ghai, S. (2018). Effect of Music Therapy on Pain Perception, Anxiety, and Opioid Use during Dressing Change among Patients with Burns in India: A Quasi-experimental, Cross-over Pilot Study. In *Ostomy Wound Management* (Vol. 64, Issue 10, pp. 40–46). https://doi.org/10.25270/owm.2018.10.4046

Romanowski, K. S., Carson, J., Pape, K., Bernal, E., Sharar, S., Wiechman, S., Carter, D., Liu, Y. M., Nitzschke, S., Bhalla, P., Litt, J., Przkora, R., Friedman, B., Popiak, S., Jeng, J., Ryan, C. M., & Joe, V. (2020). American Burn Association Guidelines on the Management of Acute Pain in the Adult Burn Patient: A Review of the Literature, a Compilation of Expert Opinion, and Next Steps. In *Journal of Burn Care and Research* (Vol. 41, Issue 6, pp. 1129–1151). https://doi.org/10.1093/jbcr/iraa119

Shawq, A. H. (2024). Effectiveness of Deep Breathing Technique on Pain Level of School Children during Catheterization. *Medical Journal of Babylon*, *21*(Suppl 1), S120–S125. https://doi.org/10.4103/mjbl.mjbl_258_23

Shawq, A. H., Al-Mousawi, K. M., & Ajil, Z. W. (2020). Effects of caring children with leukemia on their mothers` psychosocial status. In *Medico-Legal Update* (Vol. 20, Issue 3, pp. 620–623). https://doi.org/10.37506/mlu.v20i3.1580

Shawq, A. H., & Ali, E. G. (2019). Body image and physical perception of children with precocious puberty in baghdad city. *Indian Journal of Public Health Research and Development*, *10*(9), 587–590. https://doi.org/10.5958/0976-5506.2019.02494.X

Shoghi, M., Zand Aghtaii, M., & Kheradmand, M. (2022). The effect of the active and passive distraction techniques on the burn children's pain intensity and anxiety during dressing changes. In *Journal of Nursing and Midwifery Sciences* (Vol. 9, Issue 3, pp. 167–172). https://doi.org/10.4103/jnms.jnms_139_21

Sihvonen, A. J., Särkämö, T., Leo, V., Tervaniemi, M., Altenmüller, E., & Soinila, S. (2017). Music-based interventions in neurological rehabilitation. In *The Lancet Neurology* (Vol. 16, Issue 8, pp. 648–660). https://doi.org/10.1016/S1474-4422(17)30168-0

Su, K. P., Matsuoka, Y., & Pae, C. U. (2015). Omega-3 Polyunsaturated Fatty Acids in Prevention of Mood and Anxiety Disorders. In *Clinical Psychopharmacology and Neuroscience* (Vol. 13, Issue 2, pp. 129–137). https://doi.org/10.9758/cpn.2015.13.2.129

Suman, A., & Owen, J. (2020). Update on the management of burns in paediatrics. In *BJA Education* (Vol. 20, Issue 3, pp. 103–110). https://doi.org/10.1016/j.bjae.2019.12.002

Suzuki, D. R. R., Santana, L. A., Ávila, J. E. H. G., Amorim, F. F., Modesto, G. P., Gottems, L. B. D., & Maldaner, V. (2024). Quality indicators for hospital burn care: a scoping review. In *BMC Health Services Research* (Vol. 24, Issue 1). https://doi.org/10.1186/s12913-024-10980-7

Tandon, M., Singh, A., Saluja, V., Dhankhar, M., Pandey, C. K., & Jain, P. (2016). Validation of a new "objective pain score" vs. "Numeric rating scale" for the evaluation of acute pain: A comparative study. *Anesthesiology and Pain Medicine*, *6*(1), 4–8. https://doi.org/10.5812/aapm.32101

Ting, B., Tsai, C. L., Hsu, W. T., Shen, M. L., Tseng, P. T., Chen, D. T. L., Su, K. P., & Jingling, L. (2022). Music Intervention for Pain Control in the Pediatric Population: A Systematic Review and Meta-Analysis. In *Journal of Clinical Medicine* (Vol. 11, Issue 4). https://doi.org/10.3390/jcm11040991

van der Heijden, M. J. E., Jeekel, J., Rode, H., Cox, S., van Rosmalen, J., Hunink, M. G. M., & van Dijk, M. (2018). Can live music therapy reduce distress and pain in children with burns after wound care procedures? A randomized controlled trial. In *Burns* (Vol. 44, Issue 4, pp. 823–833). https://doi.org/10.1016/j.burns.2017.12.013

Van Der Heijden, M. J. E., Mevius, H., Van Der Heijde, N., Van Rosmalen, J., Van As, S., & Van DIjk, M. (2019). Children Listening to Music or Watching Cartoons during ER Procedures: A RCT. In *Journal of Pediatric Psychology* (Vol. 44, Issue 10, pp. 1151–1162). https://doi.org/10.1093/jpepsy/jsz066

Vinolo-Gil, M. J., Casado-Fernández, E., Perez-Cabezas, V., Gonzalez-Medina, G., Martín-Vega, F. J., & Martín-Valero, R. (2021). Effects of the combination of music therapy and physiotherapy in the improvement of motor function in cerebral palsy: A challenge for research. In *Children* (Vol. 8, Issue 10). https://doi.org/10.3390/children8100868