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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: A Randomized Controlled Trial

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Abstract

Background: Music can serve as a passive distraction to reduce pain and anxiety. Due to the limited number of studies in this field, a study was designed and implemented to determine the effect of music therapy on the pain level of 3 - 6-year-old children undergoing wound repair by suturing and their parents' anxiety in the emergency department.

Objectives: This study aimed to examine 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.

Methods: The present study is a parallel, controlled, randomized clinical trial. Sixty children aged 3 to 6 years referred to the emergency room for sutures were included in the study. In the test group, music was played on a mobile phone from the time the child entered the outpatient operating room until the end of the procedure and discharge. In the control group, children were sutured as usual. The behavioral reactions of both groups were assessed using Wong-Baker's pain scale before washing the wound, immediately after the injection of lidocaine, and at the end of the suture. The abbreviated Spielberger Situational Anxiety Questionnaire was used to measure parents' anxiety before washing the wound and at the end of the suture. These measures were recorded by the researcher.

Results: Comparing the mean (standard deviation) of pain before washing the wound in the test group (9.90 ± 0.44) and the control group (9.97 ± 0.258) showed no statistically significant difference ($P = 0.311$). Using the GEE model, the average pain score immediately after lidocaine injection and at the end of the suture decreased by 1.77 and 4.9 units, respectively, compared to the phase before washing the wound ($P < 0.001$). The average anxiety of parents before washing the wound was 21.05 ± 2.59 in the test group and 21.05 ± 2.09 in the control group, showing no statistically significant difference ($P = 0.801$).

Conclusions: Based on the results of this study, there was no statistically significant difference between the two groups in terms of children's pain and parents' anxiety. However, clinically, the average levels of children's pain and parents' anxiety in the intervention group decreased at all three times. Music therapy seems to be effective in the emergency department during painful procedures.

Keywords: Pain, Anxiety, Suture, Parents, Music Therapy, Child, Emergency Department

1. Background

Every year, 10 - 30 million children and teenagers worldwide suffer injuries, with lacerations and abrasions being the most common types of injuries among preschool children (aged 3 - 6 years) at a rate of 27.6%. Additionally, most injuries are related to the head, face, neck, and occur more frequently in males (1, 2). Studies conducted in Iran indicate that trauma is more common in boys than girls in both preschool and

elementary school groups. The most common cause of injury was falling (53%), and the most common site of injury was the head and face area (41%).

The suturing technique is used to repair lacerations, which involves placing body tissues in a natural state to facilitate repair (3). Suturing is always associated with pain, which is not only an unpleasant and annoying feeling for the child but also confusing due to their inability to understand the causes of pain (4). Research on the effect of distraction by watching cartoons to relieve the pain of 3 - 12-year-old children undergoing laceration repair in the emergency room showed that the mean and standard deviation of pain in the age group of 3 to 6 years in the test group before anesthesia injection was (3.23 ± 0.752) and in the control group before anesthesia injection was (4.50 ± 0.964). Inadequate relief from painful interventions causes unpleasant experiences for both children and their parents, negatively affecting the outcome of therapeutic interventions. Therefore, it is important to consider measures to reduce the pain of children and the anxiety of parents during suturing (5).

Anxiety is an adaptive reaction to an external stressor with many physiological, behavioral, and psychological consequences for each person (6). In a study examining the effect of distraction using a tablet in the presence of parents on the amount of pain in 2 - 12-year-old children and the anxiety of parents during facial suturing in children, the results showed that the mean and standard deviation of parental anxiety were at a severe level (7).

To control children's pain, both pharmacological and non-pharmacological interventions are used (8). Lidocaine 1% and 2% is a common method for pain management during laceration repair because it relieves pain by blocking sodium channels in local nerve fibers and is particularly effective for deep lacerations (9). Needle-induced pain is often the worst pain children, especially younger ones, experience in the hospital (10). In addition to the pain and cost of using these interventions, they may cause minor to severe complications, such as respiratory distress, in children's health.

Non-pharmacological interventions to help reduce pain include music, hypnosis (11), bubble-making, iPads, books, and toys (12). These interventions are easy, cheap, and non-invasive (13). Distraction, the primary technique in non-pharmacological interventions, should be appropriate to the age and attractiveness of children to be effective (14). It is the most common method used for short, painful procedures (5).

Contradictory results have been published in various studies on children's suturing. One study investigated the effect of music on the pain and anxiety of 6 - 18-year-old children who went to the emergency room to repair a laceration under 5 cm and found that music therapy was effective in reducing children's pain (15). Another study on the effect of watching cartoons on reducing the pain of 3 - 12-year-old children during laceration repair showed that watching cartoons effectively reduces children's pain (5). Additionally, research on the effect of music and cartoons as distraction techniques in children aged 3 to 13 undergoing laceration repairs showed no statistically significant difference in average pain evaluation between the test and control groups (16).

Previous studies mostly included wide age groups (preschool and elementary school) (15, 17). In the present study, only children in the preschool age group were considered to ensure a consistent understanding of children's pain. The tools used in the studies, the duration of music played, and the type of music in many studies have differed from the present study (5, 12, 15, 17). Most studies measured only child pain (5, 16), with only one study examining parents' anxiety (7). Additionally, some studies have reported contradictory results (12, 16).

According to available databases and the contradictions in the previous studies, no research has been conducted on 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.

2. Objectives

This study was designed to determine the effect of music therapy on the pain level of children aged 3 to 6 years undergoing wound repair by suturing and their parents' anxiety in the emergency department. The goal is to evaluate music therapy as a non-drug method that can be effective in relieving children's pain and parents' anxiety.

3. Methods

The current study is a parallel, controlled, randomized clinical trial conducted to determine the effect of music therapy on the pain level of children aged 3 to 6 years undergoing wound repair by suturing and their parents' anxiety in the emergency department of Valiasr Qaemshahr Hospital. The study population includes all children aged 3 to 6 years who visited the

emergency room of Valiasr Qaemshahr Hospital for suturing.

3.1. Inclusion Criteria

- Laceration in the facial area of less than 3 cm that needs suturing (5).

- Age between 3 and 6 years old.

- Absence of mental, visual, hearing, speech, physical-motor, and limb paralysis issues.

- Lacerations that do not require sedation (7).

- Child not suffering from diabetes, neurological, or mental diseases under treatment.

- Lacerations that do not require painkillers and the child did not take painkillers before the suture.

- Presence of parents with the child.

- Absence of sensory disorders and neuromuscular diseases.

- Absence of the need for suturing around the eyes.

- Absence of multiple lacerations and simultaneous injuries to other organs.

3.2. Exclusion Criteria

- The child and the family do not cooperate during the intervention for any reason.

- The researcher cannot perform the intervention during the procedure according to the child's condition, such as if the child is restless and the parents exhibit tension and signs of agitation due to playing the desired music for the child while studying.

To determine the sample size, a similar article titled "Evaluation of children's pain during laceration repair by listening to music and watching cartoons in the emergency department" was used (16). In the mentioned study, the mean (standard deviation) of children's pain in the music group was 2 (2.05), and in the control group, it was 3.10 (2.24). Considering a significance level of $\alpha = 0.05$ and a test power ($1-\beta$) of 80%, 60 samples were determined for each group, resulting in a total of 120 samples.

In this study, two groups were designed: group A (experimental group) and group B (control group). During the process of random allocation, only gender sub-groups were considered, and the children's ages ranged from 3 to 6 years. The stratified block randomization method was used for the random allocation of samples. According to the sample size, 30 quadruple blocks were created, each containing 2 girls and 2 boys, with one girl and one boy placed in each of the test and control groups. Additionally, children were matched according to their accompanying parent. For this purpose, 20 blocks for mothers (80 mothers and children, with 40 in each group) and 10 blocks for fathers (40 fathers and children, with 20 in each group) were used. Concealment was achieved using non-transparent envelopes, with the cards designed for stratified block randomization from 1 to 120 placed inside the envelopes.

The intervention began after providing sufficient explanations to the child and their parents and obtaining written consent. First, the demographic information of the patient was recorded. Then, in each group, anesthesia was administered with a 2 cc syringe according to the child's weight. Up to a maximum dose of 5 mg/kg of 2% lidocaine was injected, and the suturing was performed by the nurse.

In the current study, Iranian children's instrumental music called "Badbadak," composed by Mr. Amir Hossein Sargazi, was played in the ambulatory operating room, considering the age range of 3 to 6 years. The performance of this song is multi-instrumental, including guitar, bass, drums, strings (violins), and bells, and its duration is 3 minutes and 19 seconds. This song was looped for 15 minutes to ensure continuous playback during wound healing, continuing until the end of the procedure. The MT30 device determined the beat rate at 78 beats per minute. The music is considered soothing as the beat is between 60 and 80 (18). It was played using a Xiaomi mobile phone positioned one meter from the child's head in the ambulatory operating room. The researcher played the music from the time the child entered the outpatient operating room until the end of the procedure and discharge. The duration of music played was recorded for each patient separately. In the control group, children were sutured as usual, and no music was played.

Data collection tools included children's and their parents' demographic and medical information questionnaires, the Wong-Baker Faces Pain Scale, and the Short Form of Spielberger's State Anxiety Inventory. The Wong-Baker Faces Pain Scale has 6 faces used for adults and children over 3 years old. It ranges from a smiley face representing "no pain" to a crying face representing "the worst possible pain that makes you cry." The ratings are 0, 2, 4, 6, 8, and 10, where 0 means "absence of pain," 8 means "the most imaginable pain without crying," and 10 means "the most severe pain with crying." The faces show increasing pain from left to right. This instrument is standardized, and its validity and reliability have been confirmed in several studies (19). In Garra et al.'s study, Spearman's correlation was used to measure the correlation between the Wong-

Baker Faces Pain Scale and the Visual Analog Scale in 120 children, resulting in r = 0.90 and P > 0.01 (20). This study used this scale to measure children's pain in both groups before washing the wound, immediately after the lidocaine injection, and at the end of the suture.

In the current study, the Wong-Baker Faces Pain Scale was recorded in 15 children by the researcher and a trained emergency nurse when the child was placed on the bed, before washing the wound, immediately after the lidocaine injection, and at the end of the suture. The reliability between the two evaluators was estimated using the intra-class correlation coefficient (ICC) in the stage before washing the wound, resulting in r = 0.99 and P < 0.001, indicating high agreement between the two evaluators.

The Short Form of Spielberger's State Anxiety Inventory measures adult anxiety and has 6 items. In Azimi Lolti et al.'s research titled "Investigating the Level of Anxiety of Pregnant Mothers in the Prenatal and Postpartum Periods in Women Referring to Health-Treatment Centers in Sari City," the correlation coefficient between the full and shortened form of this tool was 0.96 (21). The scores obtained in this test range between 6 and 24 and indicate anxiety at three levels: Mild (6 - 11), moderate (12 - 17), and severe (18 - 24). This questionnaire has been used in several studies to measure adult anxiety (15, 22). In the present study, this questionnaire was used to measure parents' anxiety before washing the wound and after completing the suture in children of both groups.

A total of 132 children were initially examined; ultimately, 120 children were included in the study. Five children were excluded due to having lacerations in non-facial areas, two due to needing sutures around the eyes, one due to the absence of parents with the child (the presence of a nurse at the child's home), and four due to having facial lacerations greater than 3 cm (Figure 1).

Chi-square tests (for qualitative variables) and independent *t*-tests (for quantitative variables) were used to compare demographic and clinical variables between the two groups. For inferential analysis, the hypothesis of the normality of pain and anxiety variables was first examined using the Kolmogorov-Smirnov test; none of the variables had a normal distribution. Subsequently, non-parametric tests were used to describe variables, including mean and standard deviation. Inferential statistics such as Mann-Whitney's exact test were used to compare the mean pain and anxiety of the test and control groups at each stage, and Friedman's test was used to compare the three stages of pain measurement in both groups. The Wilcoxon test was employed to compare the two stages of anxiety measurement in the test and control groups. Additionally, the GEE model was used to compare pain and anxiety scores over time and to adjust for the effect of confounding variables. Analyses were performed using SPSS version 25 software, and the criterion for judging significance was a P-value of less than 0.05.

4. Results

The average age of children in the test group was 4.83 ± 1.08 years, and in the control group, it was 4.70 ± 1.00 years. Both groups had an equal distribution of female and male children, each at 50%. The most common laceration site was the forehead (30.8%), followed by the chin (22.5%) and the eyebrow (17.5%).

In the control group, 60% of the parents were female and 40% were male. In the test group, 73.3% of the parents were female and 26.7% were male. Regarding parents' employment status, 65% were employed and 35% were unemployed in the test group, while 68.3% were employed and 31.7% were unemployed in the control group. The highest frequency was related to working parents (66.7%), with no significant statistical difference observed using the chi-square test (P = 0.699).

When comparing the educational status of the parents, the highest frequency was among those with a bachelor's degree (54.2%). According to the chi-square test, no statistically significant difference was observed (P = 0.735). The duration of music played in the test group was 14.89 ± 0.323 minutes. In comparing the frequency of the number of sutures in the test group and the control group, the highest frequency was related to 2 sutures in the repair of lacerations (62.5%). According to the chi-square test, no statistically significant difference was observed (P = 0.710). Other demographic and medical information is presented in Table 1.

In general, the pain scores of children in both the test and control groups decreased clinically over time. There was a significant difference in the pain scores across the three time points in each group, as determined by the Friedman test (P < 0.001) (Table 2).

The GEE model was used to simultaneously investigate the effects of group and time on children's pain scores while controlling for the effect of suture duration. Time had a significant effect on children's pain scores. On average, the pain score decreased by 1.77 units immediately after the lidocaine injection and by 4.9 units at the end of the suture compared to the phase before washing the wound (P < 0.001). The pain score in the music group was 0.51 units lower than in the control

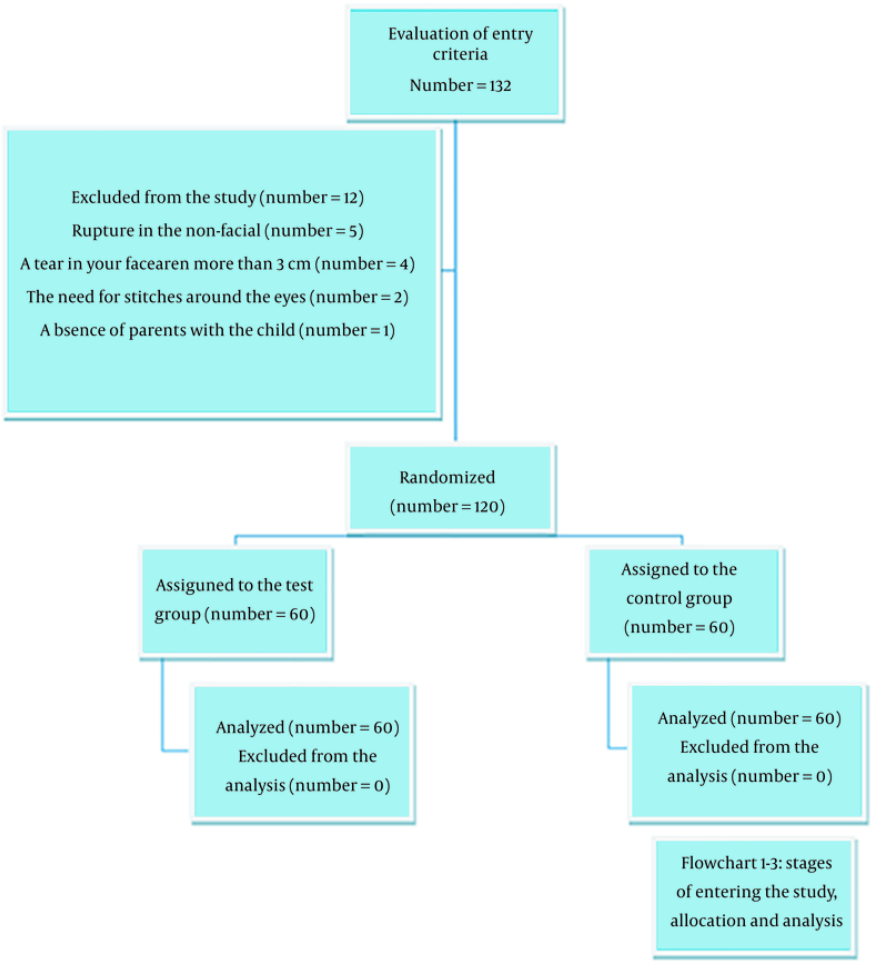

Figure 1. The stages of entering the study, data allocation, and analysis

Table 1. Comparison of Demographic and Medical Information in the Test and Control Groups

Variables	Control Group [a]	Test Group [a]	Independent *t*-Test	P-Value
Children's age, y	4.70 ± 1.00	4.83 ± 1.08	0.704	0.483
Numbing amount, cc	0.66 ± 0.23	0.69 ± 0.24	0.657	0.512
Average suture time, min	13.53 ± 1.44	14.20 ± 1.30	2.658	0.009
Parents' age, y	34.43 ± 5.24	35.40 ± 5.03	1.031	0.305

[a] Values are expressed as mean ± SD.

group, but this difference was not statistically significant (P = 0.053) (Table 3).

According to Table 4, there was no statistically significant difference in the average anxiety scores of the parents in the test and control groups at both times before washing the wound and at the end of the suture (P > 0.05). However, there was a significant clinical difference within both groups when comparing the average anxiety scores before and after the procedure.

Table 2. Comparison of Pain Scores before Washing the Wound, Immediately after Lidocaine Injection, and at the End of the Suture in the Test and Control Groups

Phase	Test Groups		Control Groups		Mann-Whitney U Test	P-Value
	Standard Deviation ± Mean	(IQR) Median	Standard Deviation ± Mean	(IQR) Median		
Before washing the wound	9.90 ± 0.44	10 (0)	9.97 ± 0.258	10 (0)	Z = 1.01	0.311
Immediately after lidocaine injection	8.00 ± 1.56	8 (4)	8.33 ± 1.53	8 (2)	Z = 1.18	0.240
End of the suture	4.63 ± 2.98	4 (6)	5.43 ± 2.81	6 (5.5)	Z = 1.42	0.156
Friedman's test	Q = 106.71		Q = 103.06		-	
P-Value	< 0.001		< 0.001		-	

Table 3. Simultaneous Examination of the Effect of Group and Time by Controlling the Effect of Suture Duration on the Average Pain Score of Children

Parameter	Regression Coefficient	Standard Deviation	95% Confidence Interval	Chi-Square Parent Test	P-Value
Group					
Test	0.51-	0.26	-1.02, 0.01	3.73	0.053
Control	Reference				
Time					
Before washing the wound	Reference				
Immediately after lidocaine injection	1.77-	0.14	-2.04, 1.50	164.35	< 0.001
End of suture	4.90-	0.26	-5.41, 4.39	360.60	< 0.001
Suture duration	0.16	0.09	-0.02, 0.35	2.87	0.090

Table 4. Comparison of the Anxiety Score of Parents of Children before Washing the Wound and the End of the Suture in the Test and Control Groups

Phase	Test Group		Control Group		Mann-Whitney U Test	P-Value
	Standard Deviation ± Mean	(IQR) Median	Standard Deviation ± Mean	(IQR) Median		
Before washing the wound	2.59 ± 21.05	22 (6)	2.09 ± 21.05	22 (2)	Z = 0.25	0.801
End of the suture	3.09 ± 15.38	15 (5.5)	2.76 ± 15.47	15 (4)	Z = 0.26	0.793
Wilcoxon signed-rank test	Z = 6.77		Z = 6.77		-	
P-Value	< 0.001		< 0.001		-	

The results of the simultaneous examination of the effects of group and time on parents' anxiety scores are presented in Table 5. The time and duration of the suture significantly affected parents' anxiety scores. The average anxiety score of parents in the test group decreased by 5.63 units at the end of the suture compared to the stage before washing the wound ($P < 0.001$). With each additional minute of suture duration, the anxiety score increased by 0.34 units ($P = 0.043$). The anxiety score in the music group was 0.27 units higher than in the control group, but this difference was not statistically significant ($P = 0.544$).

5. Discussion

Based on the results of the present study, there was no statistically significant difference in the average pain before washing the wound between the patients in the test group and the control group. Similarly, a study conducted in England investigated the effect of music and watching cartoons on pain during laceration repair in children aged 3 to 13. In that study, the average pain of children using the FPS-R tool before anesthetic injection was 2.94 ± 3.39 in the control group and 2.62 ± 3.21 in the test group, indicating an average pain level. The statistical difference between the two groups was not significant (16). The average pain difference before anesthetic injection in the two groups of the above study was 0.32, while in the present study, this number was 0.07 before washing the wound. The similarity in pain differences between the two studies suggests consistency with the present study's results.

Another study conducted in Iran investigated the effect of distraction by watching cartoons on the amount of pain during pre-stitch preparation in children aged 3 to 12 years. The results showed that

Table 5. Simultaneous Examination of the Effect of Group and Time, Controlling for the Effect of Suture Duration, on the Average Anxiety Score of Parents

Parameter	Regression Coefficient	Standard Deviation	95% Confidence Interval	Chi-Square Parent Test	P-Value
Group					
Test	0.27	0.44	-1.13, 0.59	0.37	0.544
Control	Reference				
Time					
Before washing the wound	Reference				
End of suture	5.63-	0.23	-6.08, -5.17	585.54	< 0.001
Suture duration	0.34	0.17	0.01, 0.66	4.08	0.043

before the injection of anesthesia (after playing the cartoon), the mean and standard deviation of pain with the FLACC tool were 4.47 ± 0.032 in the control group and 3.19 ± 0.906 in the test group, indicating an average pain level. The statistical difference between the two groups was significant, with children in the test group experiencing less pain before anesthesia injection (5). The difference in average pain before anesthesia injection in the two groups of the above study was 1.28, whereas in the present study, this number was 0.07 before washing the wound. In the present study, children's pain before anesthesia injection was severe, while in the above study, it was reported at an average level. This difference in pain levels may be due to the age group of the children, as the above study included children aged 3 - 12 years, and pain tolerance seems to be lower at younger ages (5, 7, 23). The present study differs from the above study in the pain measurement tool, age group, and type of distraction intervention, which can account for the differences in results.

Another study investigated the effect of music therapy on the pain and anxiety levels of adult patients aged 18 - 65 years undergoing wound repair by suturing in emergency departments. The results showed that before washing the wound, the mean and standard deviation of pain measured with the VAS tool were 5.31 ± 1.69 in the control group and 5.38 ± 1.31 in the test group, indicating an average pain level. The statistical difference between the two groups was not significant. The average pain difference before washing the wound in the two groups of the above study was 0.07, similar to the present study (12). However, in the present study, the pain level was severe, whereas it was moderate in the above study. This discrepancy could be due to differences in the pain measurement tool and the age group of the patients, as pain perception varies across different age groups.

Based on the results of the present study, there was no statistically significant difference in the average pain immediately after anesthesia injection between the test and control groups. However, the test group experienced less pain immediately after the anesthesia injection compared to the control group. In a related study investigating the effect of distraction by watching cartoons on children aged 3 to 10 years, it was found that immediately after anesthesia injection, the average pain measured with the FLACC tool was statistically significant between the two groups. In the test group, the average pain was 5.50 ± 0.598, while in the control group, it was 7.0 ± 45.800, with children in the test group experiencing less pain (5). The difference in average pain immediately after anesthesia injection in the above study was 1.95, whereas in the present study, this number was 0.33. The difference in average pain between the two studies can be attributed to the variations in the pain assessment tool, the type of distraction intervention, and the age group of the children. The above study included children aged 3 - 12 years.

In the mentioned study, as in the present study, pain was measured immediately after the anesthetic injection. It should be considered that the needling itself causes pain and can increase pain in patients. It is worth noting that in both studies, patients with lacerations below 3 cm were included.

In another similar study, the effect of music on pain in adults was investigated, and the average pain and standard deviation of the patients using VAS instruments were 3.1 ± 71.98 in the test group and 4.2 ± 60.31 in the control group. Comparing the average pain between the two groups, the patients in the test group experienced less pain immediately after the anesthesia injection than those in the control group. The patients' pain was at an average level, and the statistical difference between the two groups was not significant; the difference in the average pain immediately after the anesthesia injection between the two groups was 0.89 (12), while in the present study, this number was 0.33. The small difference in average pain between the two studies could be due to differences in the pain

measurement tool and the age group of the patients. The level of pain in the present study was severe, while it was moderate in the above study. It seems that pain tolerance in adults is higher than in children aged 3 - 6 years. Nevertheless, the findings are consistent with the present study from a statistical point of view.

Based on the results of the present study, there was no statistically significant difference in the average pain at the end of the suture between the test and control groups. However, in the clinical comparison, the test group patients experienced less pain immediately after the anesthesia injection than the control group. In Vanderheyden's study, after the suture was completed, the average pain of children using the FPS-R tool was 3.93 ± 3.77 in the control group and 2.19 ± 3.23 in the test group. The average difference in pain at the end of the suture in the above study was 1.74, whereas in the present study, according to Table 2, this number was 0.8.

The pain scores were lower in the music group, and the pain was average, but the statistical difference between the groups was not significant (16). The pain measurement tool in the above study was the same as in the present study; in both studies, pain was reported at a moderate level. The difference in average pain between the two studies seems to be due to the difference in the age groups, as the children in the above study were aged 3 - 13 years, and pain tolerance is higher in older children. However, the results are statistically consistent with the present study.

Based on the results of the present study, comparing the average anxiety before washing the wound in the parents of the test group and the control group showed no statistically significant difference. The parents of both groups experienced almost the same level of anxiety, which was severe. No study has been found that investigates parents' anxiety before washing the wound in children undergoing wound repair with sutures. In existing studies, only children's anxiety and parents' satisfaction with the intervention have been measured (17).

The present study's findings also showed no statistically significant difference in the average parents' anxiety immediately after the suture was completed in the test and control groups. The parents' anxiety was at a moderate level. However, in the comparison between the two groups, the parents in the test group experienced less anxiety after completing the suture than those in the control group.

A study in the United States was conducted using a tablet to distract children aged 2 to 12 years while suturing facial wounds, and it reported parents' anxiety at the end of the procedure at a severe level (7). While in the present study, the anxiety of the parents in the music group was less than that in the control group, the statistical difference between the two groups was not significant. The difference in anxiety levels between the two studies may be due to the type of intervention, the anxiety measurement tool, the cultural context of Iran and America, and the age group of the children in the two studies.

Similar to the results of the present study, it was found that music therapy reduces the child's pain and parents' anxiety at the end of the suture, but there is no statistically significant difference between the test group and the control group.

Given the high pain levels experienced by patients in the emergency room and the secondary consequences of pain, such as anxiety and the side effects of poor pain and anxiety management on clients' health, it is recommended that nurses and the treatment team use music therapy as a safe and easy method. It is suggested that nursing courses include non-pharmacological and complementary methods as teaching units in their theoretical-practical curriculum. Additionally, nursing managers should incorporate complementary medicine into continuous education programs. Further research should explore other distraction methods, such as using music with words, cartoons, and games, to study the intensity of pain during suturing in children. Since this study focused on the head and face due to differences in pain levels in various organs, it is recommended to conduct similar research on other body parts, including hands and feet.

The limitations of the present study included the lack of homogeneity in the person injecting lidocaine and performing the suture for all samples. Additionally, children's interest in music varies. Due to limited time in the emergency department waiting room, it was not possible to allow children and parents to choose from several music options. In this study, music was played openly to benefit both children and parents. Music therapy appears to have a special place in the emergency department during painful procedures, indicating the need for more studies in this field.

Footnotes

Authors' Contribution: Study concept and design, B-N.M; acquisition of data, B.M; analysis and interpretation of data, H.A; drafting of the manuscript, B-N.M, B.M, and H.M; critical revision of the manuscript for important intellectual content, B-N.M, B.M, and H.M; statistical analysis, H.A; administrative, technical, and

material support, B-N.M and H.M; study supervision, B-N.M and H.M.

Clinical Trial Registration Code: IRCT20110906007494N43 .

Conflict of Interests Statement: The authors have no conflicts of interest.

Data Availability: The data presented in this study are uploaded during submission as a supplementary file and are openly available for readers upon request.

Ethical Approval: This study was approved under the ethical approval code of IR.MAZUMS.REC.1401.340 .

Funding/Support: This study received no funding.

Informed Consent: The intervention began after providing sufficient explanations to the child and their parents and obtaining written consent.

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