Research Paper

The Effect of Distraction With Watching Cartoons on the Level of Pain at Preparation Before Suturing Children in the Emergency Ward

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ABSTRACT

Background: Distraction is a technique that has had positive effects on reducing children's pain in painful interventions, such as venipuncture, and replacing the burn dressing. Based on the available data, very few articles exist about the application of this technique when suturing children.

Objectives: This study was designed to determine the effect of distraction by watching cartoons on the level of pain during preparation before suturing children in the emergency ward.

Methods: This study is a randomized controlled trial. The research population included all children aged 3-12 years who were referred to the emergency ward of Bu Ali Sina Hospital in Sari City, Iran. Forty-three subjects were selected from each group. In the intervention group, playing cartoons on the tablet was initiated from the time of placing the child on the bed for suturing, and continued until the end of the anesthetic injection, and this time was recorded. In the control group, the suturing was performed conventionally. The behavioral reactions of both groups were measured twice based on the pain behavioral reactions scale. The first time was when the child was placed on the bed and before cleaning for the anesthetic agent, while the second time was observed and recorded by the researcher immediately after injecting the anesthetic agent.

Results: The comparison of mean pain before injecting the anesthetic agent (after playing the cartoon) showed a significant difference between the intervention and control groups based on Mann-Whitney test (P=0.0001). The comparison of mean pain immediately after termination of anesthetic injection also showed a significant difference in both the intervention and control groups based on the Mann-Whitney test (P=0.0001). Based on the results of the present research, the pain in the intervention group was less before the anesthetic injection and less in the control group immediately after the injection.

Conclusion: The results suggested that distraction from watching cartoons has a positive effect on reducing the pain of preparation before suturing children. Therefore, this technique can be used in emergency departments.

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Introduction

Suture techniques are performed with thread loops to tighten wound edges [1]. The Suture is one of the emergency department procedures during which children experience a lot of pain [2]. Pain can cause physical and psychological complications [3]. Unfamiliar medical interventions in children and their lack of awareness about these methods cause anger, insecurity, a sense of distress, uncooperativeness, and negative feelings towards healthcare specialists [4]. Insufficient alleviation of painful interventions causes unpleasant experiences in children and their parents as well as negative effects on the outcomes of the therapeutic intervention [5]. Pharmacological and nonpharmacological interventions are used to control pain in children [5]. Local anesthesia is used to control pain during suturing but seeing the needle during suturing causes the child to not cooperate so that fear of the needle is one of the common fears of children [6, 7]. Further, injecting anesthetic drugs is very painful for children [8]. In addition, non-pharmacological interventions to reduce pain may contribute to alleviate pain and enhance pain tolerance. These strategies are simple, inexpensive, and non-invasive [9]. The non-pharmacological interventions include supportive, physical, and cognitive-behavioral methods [10]. Supportive methods include watching films, reading books, and parents being with the child when painful methods are applied. Examples of physical methods include touch, massage therapy, heat therapy, and cold therapy. Instances of cognitive-behavioral methods include techniques, such as relaxation and distraction [11]. Meanwhile, distraction is the most common method applied for painful procedures that last for a short time and is usually employed by parents and healthcare providers during painful procedures [11, 12]. It seems that distraction can help the patient to cope with pain and its related experiences, and is often associated with relaxation as well as pleasant imagery, which provides easy and suitable conditions for the patient [13]. Distraction functions by changing the person's focus of attention from pain and painful stimuli to more attractive stimuli [14]. For this technique to be effective, it should be considered according to the child's age as well as the psychological and physical conditions [15]. Distraction based on the child's cooperation involves active and inactive. In the inactive one, environmental stimuli are applied to prevent focusing on pain, such as watching films and animations and listening to music [16]. In the active approach, the child is encouraged to participate in activities, such as making puzzles or playing games [17]. Various distraction methods have been applied to reduce children's pain. The results of a study showed that cartoon distraction was effective in alleviating pain perception during venipuncture in preschooler children [18]. Also, in research on children in which distraction methods, such as watching cartoons and making bubbles were used during chemotherapy, the results showed that the children reported less pain due to chemotherapeutic injection compared to the control group [19]. Another study showed that distraction through playing reduced the pain of 3-6-year-old children during a burn dressing change [11]. However, a study found that pain and anxiety in children using the virtual reality distraction method during intravenous line placement were similar to the control group levels [20]. In addition, in another research, music as a distraction technique reduced pain and anxiety in children during phlebotomy, but the difference between the two groups was not significant.

Although several studies have applied distraction techniques to reduce pain in children during painful interventions, very sparse studies are conducted on the utilization of this technique during suturing children [21, 22]. The results of one of them showed that distraction by watching cartoons was effective in reducing the pain in 3-6-year-old children [21]. But another study indicated that children's anxiety is not significantly different between the distraction and control groups [22]. Also, some discrepancies exist in some of the above-mentioned studies, in some of which distraction technique was effective in reducing children's pain during painful interventions [11, 17, 23]. While two others reported that usage of this technique did not report any significant difference between the two groups for pain mitigation [20, 24].

Considering the above-mentioned discrepancies, a study to determine the effect of distraction technique by watching cartoons on the level of pain in preparing children before suturing in an emergency ward seems necessary, it is recommended to nurses and treatment staff, if effective.

Methods

This study is a randomized controlled trial conducted from March 2021 to November 2021 to determine the effect of distraction technique by watching cartoons on the level of pain before suturing children in the emergency ward of Bu Ali Sina Hospital in Sari City, Iran. The statistical population included all children aged 3-12 years who were referred to the emergency ward to un-

dergo suturing in the facial region. The age range of 3-12 years meant two age groups: 3 years and one day up to 6 years, and 6 years and one day up to 12 years. We selected children between the ages of 3 and 12 years, who experienced repair of a lacerated wound smaller than 3 cm with damaged skin or subcutaneous tissue only, had no mental, visual, auditory, speech, motor, or physical disability or paralysis, diabetes, psychiatric diseases under treatment, lacerations requiring analgesics, neuromuscular disease and sensory disorders, and required suturing around the eyes and presence of mother by the child's side. The exclusion criteria included uncooperativeness by the child or family during intervention for any reason that the researcher is not able to perform intervention during the procedure according to the child's status.

To determine the sample size, a similar paper entitled the effects of audiovisual distraction on children's pain during laceration repair was used [25]. In the mentioned study, the Mean±SD of pain in the intervention group after the intervention was 10.67±4.610 and in the control group, it was 15.14±6.792. Considering these results, a confidence interval of 95%, test power of 90%, test direction, and range, as well as using the formula of comparing between two means and based on STATA software, version 11, the sample size was determined 72 people (36 each group). Considering 20% attrition from each group, 7 other subjects were also considered, and 43 individuals from the intervention and control groups were included in the intervention. In this study, convenience sampling was performed. Further, the stratified random allocation was applied to age and gender subgroups. A total of 131 children were investigated, and eventually, 86 were included. Random sequencing was performed based on the software using the stratified block randomization method (Figure 1).

Four blocks were considered as follows, blocks of girls aged 3-6 years (11 children in group A and 11 children in group B), boys aged 3-6 years (11 children in group A and 11 children in group B), block of girls aged 6-12 years (11 children in group A and 11 children in group B), and boys aged 6-12 years (10 children in group A and 10 children in group B). To conceal allocation, 86 non-transparent packets were provided to the number of study subjects; the first 22 packets were numbered from 1 to 22, on which the 3-6-year-old girl's block was written; the second 22 packets were numbered from 1 to 22 on which the 3-6-year-old boy's block was written; the next 22 packets were numbered from 1 to 22 on which 6-12-year-old girls block was written; eventually, the last 20 packets were numbered from 1 to 20 on which 3-6-year-old boys block was written, in which cards A and B were placed based on the sequence given by the software. After providing necessary explanations to the children and their parents as well as receiving a written informed consent form, the intervention was initiated. First, the demographic information of the patient was completed. Next, in both groups, an anesthetic drug was injected using a 2 cc syringe, and based on the child's weight. Lidocaine 2% up to the maximum dose of 3 mg/kg was injected [26].

Two types of cartoons depending on the children's age and considering surveys among the most viewed cartoons and short duration in two age groups were considered by the researcher. The cartoon name was (sheep) in three years and one day up to six years with a duration of 8 minutes and in the age group of six years and one day up to 12 years was (the great grape ape show) with a duration of 10 minutes, which began from the time of the child's placement on the bed to initiate the suturing and continued until the end of the anesthetic injection, and their duration was recorded. The cartoon was played on a tablet (Lenovo 8"). Supplementary information about these two cartoons is available on the channel's website. Based on the available statistics, the cartoon of the 3-6-year-old group was chosen among the most viewed cartoons according to the survey of the Islamic Republic of Iran Broadcaster, while regarding the 6-12-year-old cartoon, since the highly viewed cartoons according to surveys all had a long duration (about 20 minutes), the researcher chose a 10-minute cartoon [27]. The data collection instrument included a questionnaire for examining demographic-medical factors, with the face, leg, activity, cry, and consolability (FLACC) scale. This scale has five sections that evaluate the child's pain based on facial expression, legs, movement, activity, cry, and consolability. Scores from zero to two are attributed to each of these sections, and eventually, these scores are summed up together. A score of 0 means no pain, while a score of 10 represents the most severe pain. This scale is a standard instrument and has been applied and validated in numerous studies [17, 28].

FLACC has been employed on children, and in Sadeghi's study, the content and face validity of this instrument was confirmed by seven faculty members of Qazvin University of Medical Sciences. To examine the reliability, it was performed on 20 children, the reliability of which was confirmed using a matched form (Wong_Baker FACES pain rating scale) ($P<0.001$, $r=0.707$) [29]. In the present study, FLACC was recorded for 10 children by the researcher and one of the emergency nurses at the time of the child's placement on the bed and be-

fore cleaning the wound, and immediately after termination of the anesthetic agent. The Spearman correlation coefficient between observers was investigated in these two stages, whereby the inter-rater reliability was estimated in the first and second stages as (r=0.702, P=0.024) and (r=0.936, P=0.0001), respectively. The behavioral reactions of all subjects in the two groups were observed and recorded by the researcher based on the FLACC immediately when they were placed on the bed for suturing and before cleansing as well as immediately after the end of the anesthetic injection. Data entry and analysis were performed by SPSS software, version 24. Shapiro Wilk was also performed, and since the data had non-normal distribution, a nonparametric test was used. Qualitative variables were compared using Fisher's exact test, while the quantitative variables were compared based on Mann-Whitney and Wilcoxon tests.

Results

According to the findings, in the control group, the frequency of male and female children was 51.2% and 48.8%, while in the experimental group, the frequency of the male and female children was 51.2% and 48.8%, respectively. Mean age in the intervention and control groups was 75.19±33.40 months (6.26±2.78 years) and 73.25±28.92 (6.10±2.41 years) (Table 1). Comparing the frequency of the wound site in the experimental and control groups, no significant difference was observed based on the Fisher test (P=0.648). The duration of the cartoon in the intervention group was 3.94±0.532 minutes.

Discussion

Based on the results of the present study, in the comparison of mean pain before the anesthetic injection for suturing (after playing the cartoon), the difference between children in the control and intervention groups was significant; in the between-group comparison, the children in the intervention group experienced less pain before the injection. In this regard, a study was conducted in Korea c on the effects of audiovisual distraction on the pain of 83 children aged 3-10 years during laceration repair, it was found that in the stage before anesthetic injection, the mean pain of children reported by Wong-Baker self-report instrument was lower in children of the experimental group compared to the control counterparts, but the difference was not significant. On the other hand, in the comparison of mean pain before the anesthetic injection, the difference between the experimental and control groups was significant using the procedure behavior checklist (PBCL) [25]. The results of the present research were inconsistent when reporting the pain based on the Wong-Baker self-report scale, and since the age range of children in Young's study was 3 to 10 years, younger children may have not expressed their pain properly using this scale, and this difference in pain measurement tool may explain the discrepancy with the present study. However, it was adopted when reporting the pain with the PBCL instrument.

Based on the results of the present study, the comparison of mean pain immediately after the anesthetic injection showed a significant difference between the children in the control and experimental group. In the between-group comparison, the children in the experimental group experienced less pain immediately after the anesthetic injection. In this regard, the results of a study examining the effects of audiovisual distraction on the pain of 83 children aged 3-10 years during laceration repair showed that immediately after the anesthetic injection, the mean pain of children in the experimental group compared to the control based on the PBCL instrument was less, and the difference between the two groups was significant [25]. The sample size in the above study is almost equal to the present research and the age range of children is almost similar and consistent with the findings of the present study.

The results showed a significant difference in the intervention group, comparison of mean pain before the anesthetic injection and immediately after its termination. Meanwhile, in the comparison of mean pain before injecting the anesthetic agent and immediately after its termination, this difference was again significant in the control group. So far no study has been published that merely compared pain before injection and immediately after injection of the anesthetic agent between control and intervention groups. According to the results, the children's pain increased in the control and intervention groups. When the injection is performed for the patient, pushing the needle into the skin is very painful and can elevate the level of pain. Nevertheless, the critical point here is the comparison of pain between the two groups, whereby the intervention group pain was lower than the control (Table 2).

The research findings showed that in the comparison of mean pain between the intervention and control groups in terms of age group before the anesthetic injection, the age group of three years and one day up to six years experienced more pain in both the control and intervention groups compared to the age group of six years and one day up to 12 years. The mean level of pain based on the FLACC scale in the intervention group was 3.23 and in the control group was 4.50 in the group

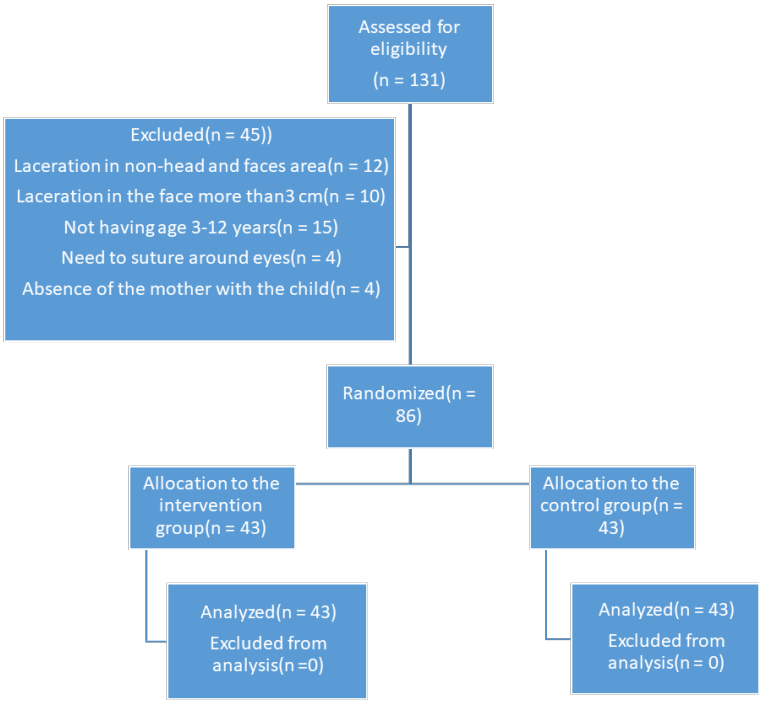

Figure 1. Steps of enrollment, allocation, and analysis data

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of three years and one day up to six years, while in the six years and one day up to 12 years, the pain levels in the intervention and control groups were 3.14 and 4.43, respectively (Figure 2). Elsewhere, another study aimed to indicate the effectiveness of playing cartoons as a distraction technique during suturing children in the emergency ward on 106 children aged 2-8 years. They recorded the level of pain observed in children using the Wong_Baker faces pain rating scale (scoring 0-10) before preparing the child for the suturing as well as during and after the anesthetic injection. They found that the Mean±SD of pain before the anesthetic injection was 4.1±2.0 in 4.6±1.9-year-old children, 8.0±1.7 in 7.4±1-year-old children, and 5.2±2.6 in 2.7±1.8-year-old children. Their results indicated that distraction through cartoons is more effective in children aged 3-6 years, and decreases the duration of intervention and the number of medical personnel [21]. In the above study, in 45.3% of subjects, the total duration of suturing was 5-10 minutes; in our study, the cartoon was played only during the preparation before the suturing, with a time of about 4 minutes. On the other hand, the instruments applied in the two studies were different, and this difference seems to arise from the different tools utilized.

The research findings regarding the comparison of mean pain in the intervention and control groups in terms of age group showed that immediately after the anesthetic injection in the age group of six years and one day up to 12 years in the control group and the three years and one day up to six years of age in the intervention group experienced more pain. The mean level of pain based on the FLACC scale in the age group of three years and one day up to six years in the experimental group was 5.50 and in the control group, it was 7.45. On the other hand, the values in the intervention and control groups for the age group of six years and one day up to 12 years were 5.33 and 7.95, respectively (Figure 2). In this regard, Choi et al. found the following values for

Table 1. Comparison of demographic and medical information in intervention and control groups

Variables / Group	Mean±SD		Mann-Whitney Test	P
	Control	Intervention		
Age (month)	73.25±28.92	75.19±33.40	910.000	0.900
Duration of anesthesia injection (second)	23.19±12.02	22.42±9.71	905.500	0.866

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Table 2. Comparison of mean pain before and immediately after anesthetic injection in intervention and control groups

Phase \ Pain	Mean±SD		Mann-Whitney Test	P
	Intervention	Control		
Before injecting anesthesia	3.19±0.906	4.47±1.032	344.500	0.0001
Immediately after anesthetic injection termination	5.42±0.82	7.70±0.803	68.000	0.0001
Wilcoxon test	Z=-5.835	Z=-5.777		
P	0.0001	0.0001		

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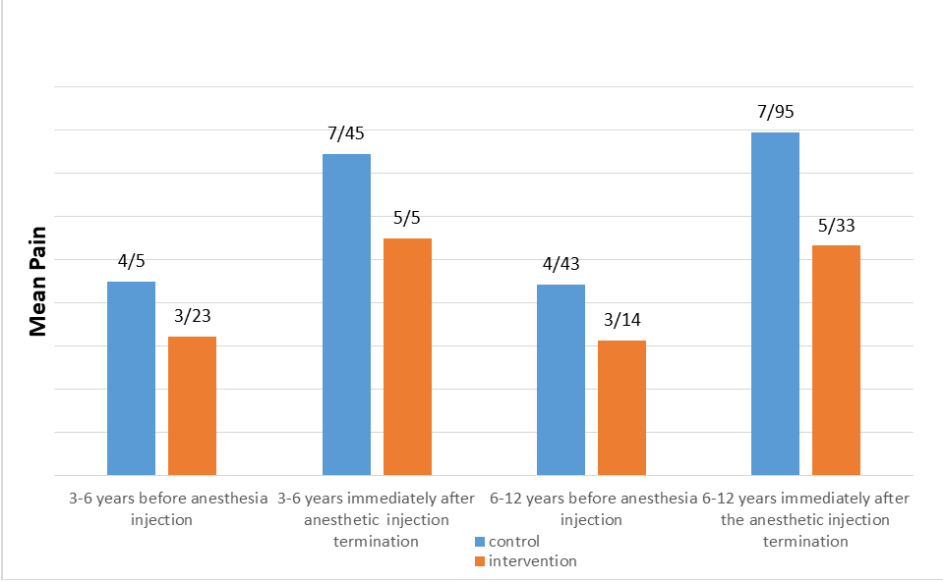

Figure 2. Mean comparison of pain in the intervention and control groups in terms of age before anesthetic injection and immediately after its termination

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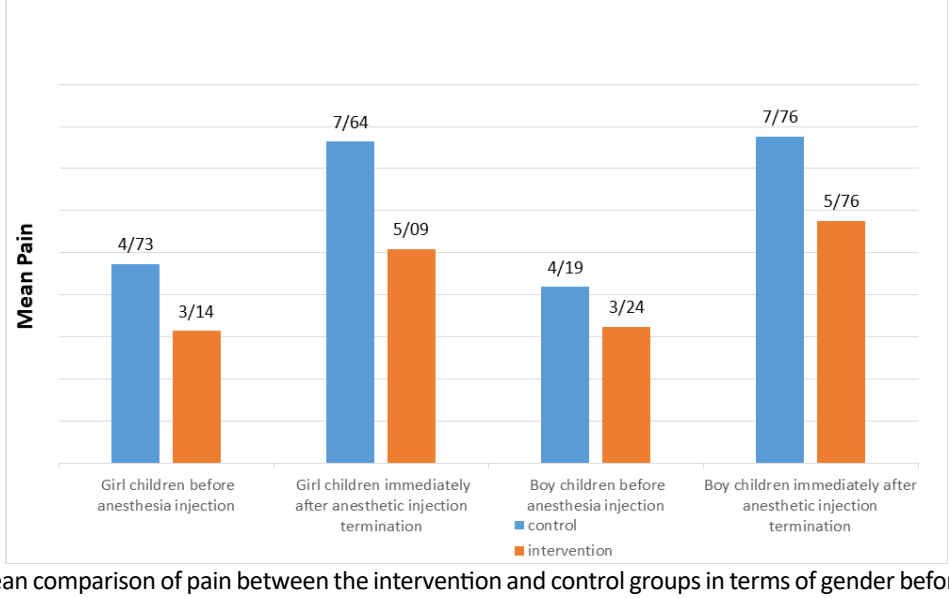

Figure 3. Mean comparison of pain between the intervention and control groups in terms of gender before anesthetic injection and immediately after its termination

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the Mean±SD of pain during injecting anesthetic agent were 9.0±1.1 in 4.6±1.9-year-old children, 9.4±0.5 in 7.4±1-year-old children, and 9.1±0.8 in 2.7±1.8-year-old children [21]. In the above-mentioned study, the children in the age range of six to eight years experienced more pain, while in our study, the mean pain of the age group of six years and one day up to twelve years was more in the control group, and no significant difference was observed in the mean pain of the three years and one day up to six-year-old experimental group and six years and one day up to twelve-year intervention group, it is consistent with the results of the present research. No study was found on the mean pain level in children at the time of suturing in terms of gender. Based on the results of the study, in the intervention group, the mean pain level was higher in male children and lower in female counterparts (Figure 3). In this regard, a study compared the effect of distraction and tactile methods on the severity of pain resulting from venipuncture on 120 children aged 5-10 years through the Wong_Baker faces pain rating scale. They found that in the bubble distraction group, the boys had more pain than the girls [30]. The results of the above study are consistent with our findings.

Conclusion

The present study showed that distraction from watching cartoons can reduce the pain level during preparation before suturing in children. Due to the fear of needles and lack of cooperation of children as well as the experience of great pain at the time of injecting lidocaine in children, the nurse as a member of the healthcare group has a vital responsibility in alleviating and resolving the problems of these patients and duty of applying different ways to mitigate these problems, it is suggested that in other studies, other distraction methods such as distraction with games and music be examined on the severity of pain at the time of suturing children. One of the limitations of the present study was the lack of homogenization of the lidocaine injector due to the different skills of nurses, which may have confounded the study results. Further, the children's interests in cartoons vary, and due to the short time of this study, it was impossible to choose a cartoon among several cartoons for children. In addition, in this study, since pain is different in various organs, only the head and face were considered, and since only one emergency center existed for suturing children, only one center was chosen and it is recommended for future studies to take samples from various centers.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles were considered in this article. The participants and their families were informed about the purpose of the research and the stages of its implementation, they were also assured about the confidentiality of their information. Moreover, they were allowed to leave the study at any time and if desired, the research results were made available to them.

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Authors contributions

All authors equally contributed to preparing this article.

Conflicts of interest

The authors declared no conflict of interest.

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