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Research Article

Investigating the Effect of Distraction on Venipuncture Pain in 3-6 Year Old Children: Cross-Sectional experimental Study

Mohammad Sadegh Sanie[1], Mohammad Rahmanian[1], Abdol Ali Sepidkar[2], Fatemeh Olad[3], Ehsan Rahmanian[4*] and Ali Akbar Shakeri[5]

[1]Anesthesiology, Critical Care and Pain Management Research Center, Jahrom Universityof Medical Sciences, Jahrom, Iran.
[2]Department of surgery, Jahrom University of Medical Sciences, Jahrom, Iran.
[3]Student research committee, Jahrom University of medical sciences, Jahrom, Iran.
[4]Department of Pediatrics, Jahrom University of medical sciences, Jahrom, Iran.
[5]Medical ethic research center, Jahrom University of medical sciences, Jahrom, Iran.
Author Correspondence: E-mail: ehsanrahmanian90n@yahoo.com

ABSTRACT:

Introduction: The patients pain reducing -specially in children- is a clinical and ethical duty for care staff.Children get irritable, restless and excited in response to pain. Negative memories create a negative perception of clinical care in younger children. Distraction is a technique of pain control, applied to reduce pain and behavioral stresses in children undergoing invasive therapeutic procedures. Therefore, this study aimed to investigate the effect of distraction on venipuncture pain in 3-6 year old children.

Methodology: This was a cross-sectional experimental study. Randomized convenience sampling was used to select 110 individuals from all the children admitted to the pediatric ward of the Medical Education Center of Peymanieh Hospital, Jahrom. Demographic questionnaire, Children's Behavioral Pain Assessment Scale and Numerical Pain Assessment Scale were used to collect data. Data were analyzed using descriptive statistics indices such as percentage and mean and Kruskal-Wallis and Mann Whitney tests.

Results: 63.6% of the participants were female. The participants aged between 3 and 6 years old and their mean age was 4.29 ± 1.14. The Mann-Whitney test results showed that there were significant differences between all the musical ball group, balloon blowing group, in mother's hug group and "musical ball + in mother's hug" group with the control group (p-value <0.05). In addition, there were significant differences between the "musical ball + in mother's hug" group and the other groups (including: musical ball group, balloon blowing group, in mother's hug group) in terms of the behavioral pain scores (p-value <0.05). Finally, there was a significant difference between the musical ball group and the in mother's hug group (p-value <0.05).

Conclusion: The results showed that the "control" and the "musical ball + in mother's hug" groups had the highest and lowest mean of behavioral pain and numerical pain.

Keywords: distraction, pain, venipuncture, children.

INTRODUCTION

The patients pain reducing -specially in children- isn't only a clinical processbut it is also an ethical duty for care staff.Pain is derived from the Latin word "Poena"; meaning penalty and punishment [1]. From early childhood, children experience events such as cuts, bruises and sore throat caused by tonsillitis and pain is a part of their lives [2]. There is limited information on the epidemiology of pain. It is stated that unlike the pain of adults that is important due to economic losses caused by lost working days, children's pain has no important social reflection. Therefore, there are not sufficient incentives to conduct the necessary research on this issue in children [2]. Most children anticipate the pain induced by injection and prevent it by non-adaptive anxious behaviors. They usually spend a lot of time to accept the injection and this creates problems for nurses in injections. They have to firmly hold

and immobilize the child. This in turn institutionalizes unpleasant injection experiences and has an adverse effect on child's reactions to future injections [2]. Surgery and entering the operating room have been constantly as one of the causes of anxiety and fear during the life. This issue, especially in children when they are separated from their parents, not only leads to his resistance before the surgery, but also it can leave adverse psychological effects on future[3]. For children undergoing painful procedures for various therapeutic or diagnostic purposes, the use of medications and non-drug strategies form a multi-dimensional process of pain [4]. As stated earlier, there are various medications and non-drug techniques to prevent and relieve pain and each one has its own advantages and disadvantages. One of the non-drug techniques is distraction which involves focusing attention on stimuli other than pain. This method puts one's consciousness on the sidelines. Therefore, in the case of receiving adequate sensory input by the reticular brainstem formation, chosen external feelings, such as pain are stopped or ignored [5]. Non-drug treatments can be used before, during and after painful procedures [6]. Various studies, including Cohen's study have shown that distraction can lead to the obedience of children andvaccination stress and pain relief [7]. On the other hand, bubbling is known as a distraction technique [8]. It is a combination of rhythmic breathing with visual distraction through watching bubbles [4]. Another distraction technique is the touch technique. This technique is based on the gate control theory. According to this theory, peripheral nerve impulses [including pain] are transmitted to the central nervous system. Touch and pain are both transmitted through the same path; however, the touch impulses move faster than the pain impulses and close the pain-control gate. Therefore, fewer pain impulses will reach the brain [9]. This method reduces pain and anxiety in older people and decreases the heart rate and respiratory rate in infants [10]. Based on the distraction technique, if the reticular brainstem formation receives adequate and diverse sensory input, it will be able to selectively prevent and ignore the transmission of feelings such as pain [11]. On the other hand, the study of Parvizi et al. showed that 90% of nurses have received no special training in this regard and they tend to distract children by stroking and talking with them [10]. Today, children undergo various diagnostic or therapeutic measures which cause different levels of pain. Circumcision, vaccination, repairing and suturing wounds, venipuncture and blood sampling are painful techniques that are part of the child's everyday experiences in clinical centers [12].Venipuncture is a very painful invasive procedure that is frequently used in hospitalized patients, outpatients and even at homes; because it is the base of diagnosis and treatment of most diseases [13]. Many patients and especially children, consider this action painful and frightening; because this action is an inevitable threatening invasion to child's physical and mental domain [14]. Lack of pain relief during invasive procedures will result in serious negative consequences. Especially when the pain is caused by needle insertion, child's memory and recalling painful action will lead to severe mental responses [such as crying, restlessness and preventing the injection] and physiological responses [such as increased heart rate and vasospasm] during future experiences [13]. This will interfere with the injection and the injection will repeatedly fail. In most cases, nurses inevitably restrict the child's movements. This exacerbates the child's fear and pain and institutionalizes unpleasant experience of fear of injection and hospital and disrupts the relationship between the child and the treatment team [15-16]. Sometimes children do not express their pain and disease or may consider injection a punishment for their mistakes [17]. Thus, the venipuncture pain causes physical and mental stresses and must be relieved. Research has shown that using non-medical mental and cognitive methods, such as distraction, can effectively reduce the pain and anxiety of painful invasive procedures. Therefore, this study aimed to investigate the effect of distraction on venipuncture pain in 3-6 year old children.

METHODOLOGY

This was a cross-sectional experimental study. Randomized convenience sampling was used to select eligible participants from all the children

admitted to the pediatric ward of the Medical Education Center of Peymanieh Hospital, Jahrom. After obtaining permission from the research deputy and the ethics committee of Jahrom University of Medical Sciences, the researcher outlined the research objectives for hospital authorities and selected the research sample. In addition, the participants signed informed written consent forms and were assured about the confidentiality of their information. The inclusion criteria included: to be between 3 and 6 years, experiencing the first venipuncture, feeling no other pain (pains induced by severe diseases, such as severe stomach ache, the pain of fracture, tumor, etc. that interfere with the venipuncture pain), being able to communicate with others consciously (person ,place and time consciousness). The exclusion criteria included: failure in the first attempt for venipuncture, seizure, any life-threatening emergency situation and taking any analgesicbefore the venipuncture process. The children were randomly assigned into 5 groups: group 1: musical ball; group 2: balloon blowing; group 3: in mother's hug; group 4: "musical ball + in mother's hug" and group 5: the control group. Demographic questionnaire (including age, gender, etc.), Children's Behavioral Pain Assessment Scale and Numerical Pain Assessment Scale were used to collect data. The demographic questionnaire was completed by the researcher through interviewing the children or their parents. The behavioral pain of children was observed and recorded during the procedure in both groups. The Children's Behavioral Pain Assessment Scale was used to determine the intensity of venipuncture pain through the child's behavioral reactions. This scale consists of 5 parts of face, legs, activity, crying and consolability. It assesses pain behavior on a three-point scale (0-2). Higher scores indicate higher reaction to pain. The score of each part is recorded separately and then the 5 parts are added to obtain the total score of pain. The scores range from zero (i.e., lowest) to 10 (i.e., highest). The reliability of this tool has been measured in previous studies (in 2008, HamedTavassoli reported a reliability of 74%). After completion of the venipuncture, the intensity of pain was measured using the Numerical Pain Assessment Scale. The scale was shown to the children and they were asked to choose a number from 0 to 10 to show their pain. This linear pain-scale is a standard scale used to measure pain. The validity and reliability of this tool have been confirmed in other studies [16]. The nurses responsible for venipuncture, the size, type and the manufacturer of IVCs, the venipuncture spot and environmental conditions were all identical in all the procedures. Data were analyzed in SPSS 21, using descriptive statistics indices such as percentage, mean etc. and Kruskal-Wallis and Mann Whitney tests.

FINDINGS

63.6% of the participants were female. The participants aged between 3 and 6 years old and their mean age was 4.29 ± 1.14. The "control" and the "musical ball + in mother's hug" groups had the highest and lowest mean of behavioral pain and numerical pain.Table 1 shows the descriptive indices of the research groups for the Behavioral pain assessment scale and the numerical pain assessment scale.

Table 1: Descriptive indices of the research groups for the Behavioral Pain Assessment Scale and the Numerical Pain Assessment Scale

	Behavioral pain assessment scale				Numerical pain assessment scale			
Group	Mean	Median	Min	Max	Mean	Median	Min	Max
Musical ball	2.95	3.00	1.00	5.00	2.59	2.50	.00	6.00
Balloon blowing	3.64	3.00	2.00	5.00	4.05	3.00	.00	9.00
In mother's hug	3.86	4.00	3.00	5.00	4.59	5.00	2.00	8.00
Musical ball + in mother's hug	1.77	2.00	1.00	4.00	.95	.00	.00	9.00
Control group	4.55	5.00	2.00	5.00	4.91	4.50	.00	9.00

The Kruskal-Wallis test results showed that the research groups were similar in terms of age and no significant difference was observed in this regard (p-value> 0.05). They were also similar in terms of age and no significant difference was observed in this regard (p-value> 0.05). The Mann-Whitney test results showed that there was a significant difference between the musical ball group and the control group, in terms of the behavioral pain scores(p-value <0.05). The

mean of behavioral pain assessment scale was lower in the musical ball group than the control group. In addition, there was a significant difference between the musical ball group and the control group, in terms of the numerical pain scores (p-value <0.05). The mean of numerical pain assessment scale was lower in the musical ball group than the control group.

The Mann-Whitney test results showed that there was a significant difference between the musical ball group and the "musical ball + in mother's hug" group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the "musical ball + in mother's hug" group than the musical ball group. In addition, there was a significant difference between the musical ball group and the "musical ball + in mother's hug" group, in terms of the numerical pain scores (p-value <0.05). The mean of numerical pain assessment scale was lower in the "musical ball + in mother's hug" group than the musical ball group.

The Mann-Whitney test results showed that there was a significant difference between the musical ball group and the in mother's hug group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the musical ball group than the in mother's hug group. In addition, there was a significant difference between the musical ball group and the in mother's hug group, in terms of the numerical pain scores (p-value <0.05). The mean of numerical pain assessment scale was lower in the musical ball group than the in mother's hug group. Table 2 compares the musical ball and the in mother's hug groups in terms of their behavioral and numerical pain scores.

Table 2: Comparison of the musical ball and the in mother's hug groups in terms of their behavioral and numerical pain scores

	Behavioral pain assessment scale			P-value	Numerical pain assessment scale			P-value
Group	Mean	SD	Median		Mean	SD	Median	
Musical ball	2.95	1.09	3.00	0.004	2.59	1.82	2.50	0.001
In mother's hug	3.86	0.64	4.00		4.59	1.47	5.00	

The Mann-Whitney test results showed that there was no significant difference between the musical ball group and the balloon blowing group, in terms of the behavioral pain scores(p-value >0.05). However, there was a significant difference between the musical ball group and the balloon blowing group, in terms of the numerical pain scores(p-value <0.05). The mean of numerical pain assessment scale was lower in the musical ball group than the balloon blowing group. Table 3 compares the musical ball and the balloon blowing groups in terms of their behavioral and numerical pain scores.

Table 3: Comparison of the musical ball and the balloon blowing groups in terms of their behavioral and numerical pain scores

	Behavioral pain assessment scale			P-value	Numerical pain assessment scale			P-value
Group	Mean	SD	Median		Mean	SD	Median	
Musical ball	2.95	1.09	3.00	0.069	2.59	1.82	2.50	0.042
Balloon blowing	3.64	1.09	3.00		4.05	2.38	3.00	

The Mann-Whitney test results showed that there was a significant difference between the balloon blowing group and the control group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the balloon blowing group than the control group. In addition, there was no significant difference between the balloon blowing group and the control group, in terms of the numerical pain scores (p-value >0.05). The Mann-Whitney test results showed that there was a significant difference between the "musical ball + in mother's hug" group and the control group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the "musical ball + in mother's hug" group than the control group. In addition, there was a significant difference between the "musical ball + in mother's hug" group and the control group, in terms of the numerical pain scores (p-value <0.05). The mean of numerical pain assessment scale was lower in the "musical ball + in mother's hug" group than the control group. Table 4 compares the "musical ball + in mother's hug" and control groups in terms of their behavioral and numerical pain scores.

Table 4: Comparison of the "musical ball + in mother's hug" and control groups in terms of their behavioral and numerical pain scores

	Behavioral pain assessment scale			P-value	Numerical pain assessment scale			P-value
Group	Mean	SD	Median		Mean	SD	Median	
"Musical ball + in mother's hug"	1.77	0.75	2.00	0.000	0.95	1.99	0.00	0.000
Control	4.55	0.74	5.00		4.91	2.54	4.50	

The Mann-Whitney test results showed that there was no significant difference between the balloon blowing group and the in mother's hug group, in terms of the behavioral and numerical pain scores (p-value >0.05). Table 5 compares the balloon blowing and in mother's hug groups in terms of their behavioral and numerical pain scores.

Table 5: Comparison of the balloon blowing and in mother's hug groups in terms of their behavioral and numerical pain scores

	Numerical pain assessment scale			P-value	Behavioral pain assessment scale			P-value
Group	Mean	SD	Median		Mean	SD	Median	
Balloon blowing	3.64	1.09	3.00	0.004	4.05	2.38	3.00	0.181
In mother's hug	3.86	0.64	4.00		4.59	1.47	5.00	

The Mann-Whitney test results showed that there was a significant difference between the control group and the in mother's hug group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the in mother's huggroup than the control group. In addition, there was no significant difference between the control group and the in mother's hug group, in terms of the numerical pain scores (p-value >0.05).

The Mann-Whitney test results showed that there was a significant difference between the "musical ball + in mother's hug" group and the in mother's hug group, in terms of the behavioral pain scores (p-value <0.05, Table 4). The mean of behavioral pain assessment scale was lower in the "musical ball + in mother's hug" group than the in mother's huggroup. In addition, there was a significant difference between the "musical ball + in mother's hug" group and the in mother's huggroup, in terms of the numerical pain scores (p-value <0.05, Table 4). The mean of numerical pain assessment scale was lower in the "musical ball + in mother's hug" group than the in mother's huggroup.

The Mann-Whitney test results showed that there was a significant difference between the control group and the "musical ball + in mother's hug" group, in terms of the behavioral pain scores (p-value <0.05). The mean of behavioral pain assessment scale was lower in the "musical ball + in mother's hug" group than the control group. In addition, there was a significant difference between the control group and the "musical ball + in mother's hug" group, in terms of the numerical pain scores (p-value <0.05). The mean of numerical pain assessment scale was lower in the "musical ball + in mother's hug" group than the control group.

DISCUSSION

The present study aimed to investigate the effect of distraction on venipuncture pain in 3-6 year old children. Distraction is a technique for pain relief and should be more considered due to its applicability, simplicity and ease of use and should be used for other pediatric patients who require frequent injections. According to the findings, there was no significant difference between pain and gender. In the study of Sparkesconducted on children aged 4 to 6 [9],it was shownthat small children and females reported more painthan older children and males during the injection of vaccine.However, the ANOVA test conducted on pain, age and genderand pain intensity showed no significant difference.Alavi et al. also observed no significant difference between age and the severity of venipuncture pain [18].Kleiberet al. in their study (2002) conducted on 7-13 yearold children found that there were significant relationships between numerical pain intensity with numerical scale and gender [19]. Different results of various studies may be due to the differences inthestudied age groups. Sparkesin his article entitled"taking the "ouch" out of injections for children" selected using distraction techniques (touch and bubbling) to

reduce child's pain and showed that both of the twotechniques have caused significant reductions in pain intensity. There was no statistically significant difference between the two groups; however, the difference between the intervention and control groups was statistically significant [9]. Tanabe also showed that distraction has led to higher levels of pain reductionthan ibuprofen and standardized treatment procedures [20]. Potter & Perry stated that age is among the important factor affecting individuals' perception of pain [21] Urden et al. also stated that the threshold of pain is lower in children and elderly people than other people and thus, the perceived pain intensity is higher in this group [22]. The findings of Pour movahed et al. showed that the intensity of pain decreases in children, with increasing their age[23]. In the study of Bagherian et al., there was a significant reverse correlation between age and numerical pain scores and with increasingthe age, the reported pain score decreased in children aged 6 to 12 with thalassemia.Using Spearman's rank correlation coefficient test, a significant reverse correlation was also found between age and behavioral pain scores [24]. The results of studies of Bagherian et al showed that children aged 6 to 12 with thalassemia have reported a mild to moderate pain for venipuncture[26-27]. However, children aged 3 to 6 years with thalassemia have reported moderate (32.5%) to severe (49.2%) pain during venipuncture. In this regard, it can be said that with increasing age and intellectual maturity, children's fear and anxiety of venipuncture decreases and they will show more adaptive behaviors [24]. Hasanpouret al.conducted a study entitled "the effects of two non-pharmacologic pain management methods (namely; cold therapy and distraction) for intramuscular injection pain in children" and found similar results in terms of breathing and heart rate. They found that distraction was more effective in adjusting physiologic factorsas well asin pain reduction [25]. Aein in Shahrekord found that distraction technique was more effective than relaxation in reducing the intensity of child's pain[26]. Cohen's study also showed that distraction can lead to the obedience of children and vaccination stress and pain relief [7]. Dahlquist et al. conducted a study to investigate the effect of distraction on the intensity of injection procedures' pain and found that various distraction techniques can successfully reduce children's pain [27]. Broome et al. (1998) used regular breathing technique on children with cancer at the time of pulling CSF and the pain was significantly reduced [28]. Manne et al. (1994) used a tool called crystal party to regulate breathing to distract children during venipuncture and this method reduced their pain significantly [29]. Winskill et al. in their study concluded that toys can be used as effective distraction tools to reduce mild and moderate (not severe) pains during venipuncture and children with severe pain cannot easily concentrate [30].Distraction is indeed, focusing one's attention to stimuli other than pain [5].Biermeier et al. (2007) conducted a study in the U.S. to investigate the effect of distraction on the intensity of pain experienced by 50 childrenand 5-18 year old teens during venipuncture. Different distraction techniques included: bubble making, reading book, listening to a music, 3-D glasses and video games. Participants were divided into the control (N= 28) and distraction (N= 22) groups and the intensity of their experienced painwas measured during venipuncture. The results showed significantly lower levels of pain intensity in the intervention group [31]. DeMore (2005) stated that distraction reduces vaccination anxiety and its pain; however, it is less effective in infants [32]. Vessy et al. (1998) also investigated the effect of distraction techniques on children during venipuncture.They found that distraction techniques can significantly reduce the intensity of pain during venipuncture, compared to the control group [13]. In their study, Vosoughi et al. (2010) investigated the effect of bubble making distraction technique on physiological parameters and the intensity of venipuncturepain in 3-6 year old children.They concluded thatthis technique can effectively decrease physiological responses and the intensity of venipuncture pain in 3-6 year old children[33].Nam Nabati (2002) conducted a study to investigate the effect of distraction on the intensity of pain experience by burned patientsin Isfahan.In this study, convenience sampling was used to select 68

children. They were randomly assigned into two age groups of 1-6 years old and 7-12 years old children and were studied for 6 months. The results showed that the average intensity of pain was reduced from 11.9 to 9.25, after using the distraction technique. Therefore, it can be said that distraction has effectively reduced the intensity of pain [34]. In another study, French et al. (1994) investigated the effect of distraction technique on the intensity of pain experienced by children during vaccination. The participants included 149 children between 4 and 7 years old.

Children were taught to blow out air repeatedly during the injection. The VAS Scale was used to measure their pain. Based on the findings, children who were taught to blow out air during the injection reported significantly lower levels of pain than the control group [35]. Lal et al. (2001) in their study investigated the underlying effect of distraction on venipuncture pain experienced by children receiving placebo and EMLA cream and found that distraction was effective in levels of pain and heart rate and children who had received the intervention had less heart rate and less pain [36].KalaniTehrani in Shiraz conducted a study to investigate the effect of EMLA cream and distraction (music) on the intensity of pain in thalassemia children and found that distraction (music) and EMLA cream had contributed to the adjustment of physiological parameters (respiration and pulse); however, they had no significant effect on blood pressure levels. He concluded that considering the lower cost and simplicity of distraction, it is a suitable alternative to EMLA cream [37].

CONCLUSION:

The results of studies conducted in the area of distraction indicate that performing distraction program reduces vein puncturingpainin children. Therefore, the distraction techniques can be used to reduce the effects of destructive experience of painful and stressful vein puncturingprocedure in children who experience severe pain during vein puncturing procedure.

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