The Effect of 3 Methods (Buzzy, ShotBlocker, and DistrACTION Cards) Used While Taking Blood Samples From Children with Pain and Anxiety

A Randomized Controlled Trial

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Objectives: The aim of this study was to compare the effectiveness of 3 methods (Buzzy, ShotBlocker, and DistrACTION Cards) in reducing pain and anxiety while taking venous blood samples in children.

Methods: The study population consisted of children aged 9 to 12 years admitted to the Child Health and Diseases Department in a Faculty of Medicine in Turkey. The sample of the study consisted of 242 children (Buzzy = 60, ShotBlocker = 61, DistrACTION Cards = 60, control = 61) who met the patient selection criteria and agreed to participate in the study. The data were obtained using an Information Form, the State-Trait Anxiety Inventory for Children, visual analog scale, and the Faces Pain Scale–Revised.

Design: This article is an experimental randomized controlled study.

Results: During venous blood collection, the scores of visual analog scale were significantly lower in ShotBlocker, Buzzy, and DistrACTION Cards groups than the control group. It was also observed that the control group experienced more anxiety than the other groups.

Conclusions: Methods such as Buzzy, ShotBlocker, and DistrACTION Cards can be used to reduce the anxiety and pain of children during painful procedures such as blood collection and vascular access. Among these methods, "Buzzy" and "DistrACTION Cards" can be preferred as it is equally effective, and then ShotBlocker can be preferred.

Key Words: pain, Buzzy, ShotBlocker, DistrACTION Cards, venous blood collection, anxiety

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Pain is a concept that human beings have been trying to explain for centuries. According to the definition of the International Association for the Study of Pain, it is defined as an unpleasant, sensorial emotion originating from any part of the body, accompanied by existing tissue damage, affected by the past experiences of humans.[1] The Joint Commission on Accreditation of Healthcare Organizations defined pain as the "fifth vital sign" that should be followed up in medical care.[2] Pain is usually experienced in childhood for the first time and is one of the important events in the lives of children.[3]

Invasive procedures such as blood collection, vascular access, injection, and repetitive vaccination cause significant pain, stress, and fear.[4,5] For example, approximately 20 injections are given to a healthy child until they reach the age of 6 years.[6] If the pain in these children is not managed effectively, it may cause future physical and emotional discomfort in the child.[3] Therefore, health professionals have great responsibilities.

Pharmacologic and nonpharmacologic methods are used in the management of pain in children. Analgesic treatment (eg, EMLA), which is a pharmacologic method in pain control, is the most preferred treatment method for pain relief because of its rapid effect and easy use.[7] However, analgesic administration itself causes pain. In addition, the unconscious and intensive use of analgesics has negative aspects such as the burden on the individual and the country's economy, negative effects on some physiological functions, and development of tolerance due to the increase of the dose each time, especially when narcotics are used.[8]

Nonpharmacologic methods are inexpensive, noninvasive, cause no pain and adverse effects, and are independent functions of nurses.[3] Nonpharmacologic methods can be classified as cognitive-behavioral techniques and peripheral-physical techniques.[8,9] Peripheral techniques include skin stimulation interventions, and they are used to reduce or relieve pain. Skin stimulation is not permanent; it is performed for temporary purposes.[3] Skin stimulation can be performed in several ways. It can be applied directly on, around, opposite, or proximal to the painful area. Peripheral techniques include hot application, cold application, menthol application to the skin, vibration, transcutaneous electrical nerve stimulation, massage, and touch.[9]

Cognitive-behavioral techniques act through changes in sensory factors in relieving pain. These techniques include guiding imagination, hypnosis, breathing techniques and relaxation, progressive muscle relaxation, biofeedback, and distraction (eg, games with rhythm and music, bubble blowing, kaleidoscope, distraction cards, balloon inflation, coughing, aromatherapy).[10–13] Using these methods diverts the attention of the child from the painful procedure and reduces tension, pain, and anxiety. Cognitive and behavioral methods appropriate for the child's age and developmental level should be used.[8]

It is stated that Buzzy, ShotBlocker, and DistrACTION Cards, which are nonpharmacologic methods, are effective in reducing the resulting pain. Buzzy temporarily blocks pain signals by applying local skin stimulation with the effect of cold and vibration. ShotBlocker blocks pain signals by applying pressure to the skin with protrusions on its surface. DistrACTION Cards reduce the perception of pain by drawing the child's attention to the pictures on the cards.[13–15] On the other hand, no research has been found on the application of 3 different methods of venous blood collection in children.

For this reason, the study was conducted to compare the effects of peripheral-physical techniques (Buzzy, ShotBlocker) and cognitive-behavioral (DistrACTION Cards) techniques in reducing the pain that occurs when taking blood samples in children. The results of the research will guide nurses in the use of these simple, easy-to-use effective methods in reducing the pain that occurs during blood collection. The use of these methods will also

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contribute to reducing the problems caused by painful practices for children, their families, and health care professionals. The data obtained from this research are expected to guide health care professionals and contribute to the literature on interventions to reduce pain during painful procedures in pediatric clinics.

METHODS

Aims

The study was conducted to compare the effectiveness of 3 methods (Buzzy, ShotBlocker, and DistrACTION Cards) in reducing pain and anxiety while taking venous blood samples in children.

Study Design

This research was designed as a randomized controlled experimental study.

Research Hypotheses

Hypothesis 0 (H0): There is no difference in terms of procedural pain and anxiety between children in the control group and other groups (Buzzy, ShotBlocker, and DistraCTION Cards).

Hypothesis 1 (H1): Children who received Buzzy during venous blood collection have less pain and anxiety than children in the control group.

Hypothesis 2 (H2): Children who received ShotBlocker during venous blood collection have less pain and anxiety than children in the control group.

Hypothesis 3 (H3): Children who received DistrACTION Cards during venous blood collection have less pain and anxiety than children in the control group.

Participants

The study population consisted of children aged 9 to 12 years admitted to the Emergency Care of the Child Health and Diseases Department in a Faculty of Medicine in Konya in Turkey between June 1 and July 31, 2015. Children who met the inclusion criteria agreed to participate in the study. It was calculated that there should be 50 children in the groups to obtain 95% power at the level of $\alpha = 0.05$. Considering that there might be data loss during the research process, children who met the inclusion criteria were included in the sampling, and the total number of children reached 242 (Buzzy = 60, ShotBlocker = 61, DistrACTION Cards = 60, control = 61). To determine which child would be assigned to which group, numbers from 1 to 242 were divided randomly (https://www.randomizer.org/) into 4 groups using a computer-based program without number repetition; none of the children rejected participation in the study between the aforementioned dates. Power analysis was performed using the Power (v3.1.7) program according to the results obtained after the data were collected. According to visual analog scale (VAS), the power was found as 99.3% for the values obtained from the pain measurements in the procedure and 99.2% for the values obtained from the pain measurements in the procedure according to the Faces Pain Scale–Revised (FPS-R).

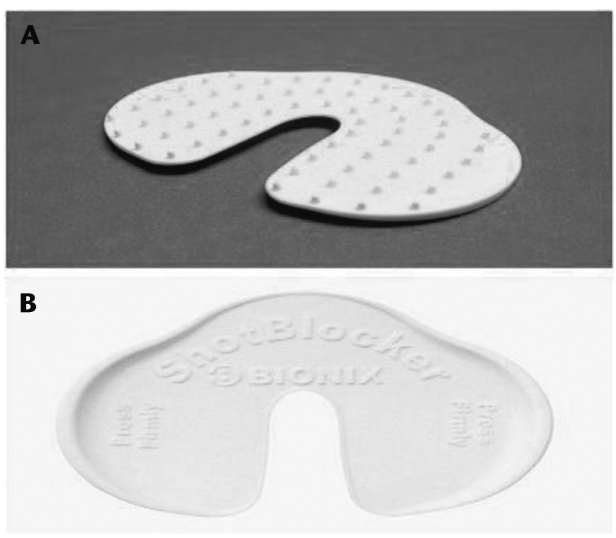

FIGURE 1. ShotBlocker.

FIGURE 2. Buzzy.

Inclusion Criteria

- Age 9–12 years,
- Not having a disease that causes chronic pain,
- Not having a mental or neurologic disability,
- Never undergone surgery or hospitalized in hospital,
- The absence of chronic disease (eg, kidney, diabetes) that would require frequent blood transfusions,
- Not taking analgesic in the last 6 hours (expert opinion was obtained),
- No history of fainting during blood collection, and
- Families and children who agreed to participate in research.

FIGURE 3. DistrACTION Cards.

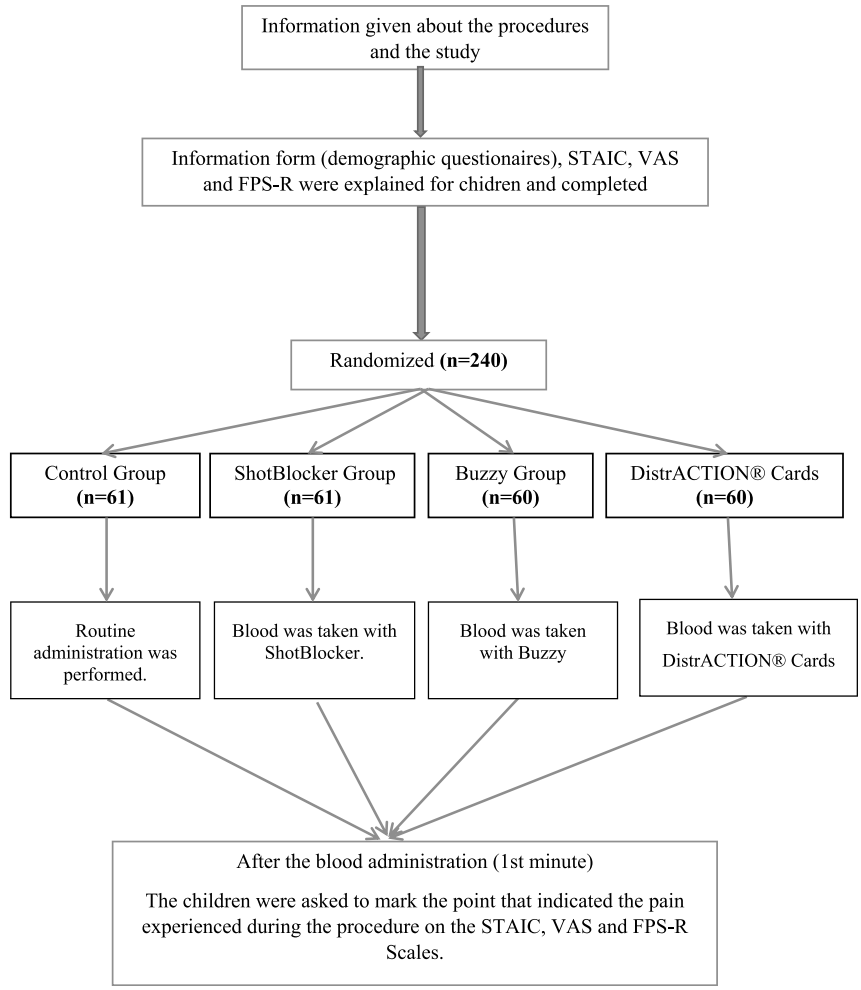

FIGURE 4. Sample flow and protocol.

Measuring Tools

In the study, we used an information form that included a total of 14 questions about the descriptive characteristics of the children and their families (parents' educational level, age, sex) and the blood collection process (past and present experience, child's reaction), the State-Trait Anxiety Inventory for Children (STAIC) to determine the anxiety of the children, and the VAS and FPS-R to evaluate the pain.

State-Trait Anxiety Inventory for Children

This form was developed by Spielberger[16] to measure the anxiety levels of children aged 9 to 12 years. The STAIC was adapted into Turkish by Özusta in 1995, and its validity and reliability study was conducted. The inventory is a 3-point Likert-type scale consisting of 20 items that aim to evaluate feelings associated with state anxiety such as tension, nervousness, haste, and unease. The highest

TABLE 1. Comparison of Sociodemographic Characteristics According to Groups

		ShotBlocker (n = 61)	Buzzy (n = 60)	DistrACTION Cards (n = 60)	Control (n = 61)	Test Evaluation; *P*
Age, y	Mean ± SD median (K1, K3)	10.34 ± 1.45 (1.5)	10.45 ± 1.55 (1.4)	10.45 ± 1.32 (1.4)	10.38 ± 1.28 (1.5)	$F = 0.087$; 0.967*
		10 (9.12)	10 (9.12)	11 (9.12)	10 (9.12)	
		n (%)	n (%)	n (%)		
Sex	Girl (n = 131)	32 (52.5)	34 (56.7)	37 (61.7)	28 (45.9)	$\chi^2 = 3.260$; 0.353†
	Boy (n = 111)	29 (47.5)	26 (43.3)	23 (38.3)	33 (54.1)	

*One-way analysis of variance.

†Pearson χ^2 test.

K1, 25% percentile value; K3, 75% percentile value.

TABLE 2. Comparison of the Children's and Their Parent's Evaluations Regarding the Injection Procedure According to the Groups

		ShotBlocker (n = 61)	Buzzy (n = 60)	DistrACTION Cards (n = 60)	Control (n = 61)	
		n (%)	n (%)	n (%)	n (%)	Test Evaluation; *P*
How the child feels	Very good	11 (18)	32 (53.3)	29 (48.3)	3 (4.9)	$\chi^2 = 63.236$; 0.001*,†
	Good	38 (62.3)	23 (38.3)	26 (43.3)	31 (50.8)	
	Moderate	8 (13.1)	3 (5.0)	4 (6.7)	15 (24.6)	
	Bad	4 (6.6)	2 (3.3)	1 (1.7)	12 (19.7)	
Child's reaction	Very positive	14 (23)	33 (55.0)	29 (48.3)	2 (3.3)	$\chi^2 = 64.903$; 0.001*,†
	Positive	35 (57.4)	22 (36.7)	28 (46.7)	37 (60.7)	
	No reaction	9 (14.8)	4 (6.7)	2 (3.3)	10 (16.4)	
	Negative	3 (4.9)	1 (1.7)	1 (1.7)	12 (19.7)	

*Fisher-Freeman-Halton exact test.

†$P < 0.01$.

score that can be obtained from the STAIC is 60, and the lowest score is 20. A high score indicates an increase in anxiety level, and a low score indicates a decrease.[17]

Pain Measures

Visual Analog Scale

This scale consists of a 10-cm line (0–10 cm or 0–100 mm). The 0-line on the scale indicates "no pain," and the 10-line indicates "unbearable pain." The child is asked to mark the place that expresses the degree of pain. Its validity and reliability have been shown in studies.[18,19]

Faces Pain Scale–Revised

This consists of 6 facial expressions graded from 0 to 10 according to the presence and severity of pain.[20] The FPS-R has been shown to be valid and reliable in painful situations in children. The scale is suitable for use in children aged 4 to 16 years, and its assessment is based on personal expression.[19,20]

Buzzy

Buzzy is a 8 × 5 × 2.5-cm sized, noninvasive device with a plastic battery and vibration motor used for pain control in adults and children. It was developed by the pediatrician Amy Baxter. An ice pack is placed under Buzzy. It has a local cold application and vibration effect. More information about the device can be found at the Web site for the device at https://www.buzzy4shots.com.

ShotBlocker

It is a noninvasive, small, flat, horseshoe-shaped, yellow-colored plastic device that does not cause any adverse effects, is suitable for all age groups, and does not carry drug properties. ShotBlocker has short, nonpointed blunt protrusions on one side that connect with the skin, and a hole in the middle to reveal the injection site. More information about the device can be found at the Web site for the device at http://www.bionixmed.com/.

DistrACTION Cards

The distraction method is an attempt to focus the patient's attention on another stimulus to reduce pain. It is based on the hypothesis that the brain's capacity to concentrate attention on stimuli is limited. Distraction cards consist of picture cards containing various hidden pictures and patterns. For example, "How many ladybugs are in the picture?" and "Can you see the elephant in the picture?"[9] More information about the device can be found at the Web site for the device at https://buzzyhelps.com/store/distraction-products.

TABLE 3. Comparison of Children's Preprocedure and Postprocedure STAIC Scores According to the Groups

Groups		ShotBlocker (n = 61)	Buzzy (n = 60)	DistrACTION Cards (n = 60)	Control (n = 61)
STAIC preprocedure	Mean ± SD	36.66 ± 5.57	36.28 ± 5.79	36.08 ± 5.47	36.80 ± 5.67
STAIC postprocedure	Mean ± SD	32.56 ± 4.23	32.43 ± 5.09	31.90 ± 3.2	35.02 ± 5.63
Difference (preprocedure and postprocedure)	Mean ± SD	4.10 ± 4.74	3.85 ± 5.48	4.18 ± 5.25	1.78 ± 4.55
	Med (K1, K3)	*2 (0–7)*	2 (0–8)	1 (0–7)	0 (0–4)

[1]ShotBlocker; [2]Buzzy; [3]DistrACTION Cards; [4]Control.

*One-way analysis of variance.

†$P < 0.01$.

‡$P < 0.05$.

§Kruskal-Wallis test.

||Mann-Whitney *U* test.

K1, 25% percentile value; K3, 75% percentile value.

Procedure

The nurse who performed the blood collection during the research had 3 years' experience working in the clinic. The same nurse performed the blood collection of all children from the beginning to the end of the study and remained in contact with the researcher.

Child groups were determined according to randomization, and blood collection procedures were performed daily accordingly.

- Before the procedure: All groups were informed about the research 15 to 20 minutes before the blood collection procedure. Information form, STAIC, VAS, and FPS-R were completed.
- During the procedure: The blood collection procedure of all children participating in the study was performed by a nurse experienced in blood collection using a 21-gauge vacuum blood collection tube needle tip from the left arm. The children included in the control group were given blood collection. This ShotBlocker device was used in the ShotBlocker group during blood collection (Fig. 1). In the DistrACTION Cards group, picture cards containing various hidden pictures and patterns were used during blood collection (Fig. 2). In the Buzzy group, 30 seconds before the blood collection procedure and during the procedure, the Buzzy device was placed 3 to 5 cm above the area from where the blood would be taken (Fig. 3). The researcher used the materials.
- After the procedure: The blood collection was completed, the children completed the STAIC, VAS, and FPS-R scales again, and children's and parent's evaluations of the procedure were evaluated.
- All procedures took approximately 15 to 20 minutes for the children to complete.

The research application flowchart is given in Figure 4.

Ethical Considerations

The study was approved by a University Clinical Research Ethics Committee (14.05.2015-26857650-133), and written permission was obtained from the institution where the study was conducted (21.05.2015-730.08.03). Before starting the study, the nurses, parents, and their children were informed about the purpose, plan, and duration of the study, and written and verbal informed consents were obtained from the mothers and their children.

Data Analysis

The Number Cruncher Statistical System 2007 (Kaysville, UT) program was used for statistical analysis. Although evaluating the study data, descriptive statistical methods (mean, standard deviation, median, 25% percentile, 75% percentile, frequency, ratio, minimum, maximum) were used. One-way analysis of variance was used in the comparison of 3 or more groups with normally distributed quantitative data, and Tukey's honestly significant difference (HSD) test was used to identify the group that caused the difference. The Kruskal-Wallis test was used in the comparison of 3 or more groups that did not show normal distribution, and the Mann-Whitney *U* test was used to determine the group that caused the difference and to compare 2 groups. Pearson χ^2 test was used to compare qualitative data. Spearman correlation analysis was used to evaluate the relationships between variables, and significance was evaluated at $P < 0.01$ and $P < 0.05$ levels.

RESULTS

There was no statistically significant difference between the age distributions and sex of the children according to the groups (Table 1; $P > 0.05$).

When asked how the children felt during the procedure according to the groups after the procedure was over, mostly it was determined that the Buzzy and DistrACTION Cards groups felt very good, and the ShotBlocker and control groups felt good. In addition, the rates of those who felt moderate or bad in the control group were higher than in the other groups (Table 2).

A statistically significant difference was found between the groups in terms of the distribution of the children's reaction ($P = 0.001$). The reaction of the children was very positive in Buzzy and DistrACTION Cards groups, and it was positive in the ShotBlocker and control groups. The rate of negative reactions in the control group was significantly higher than in the other groups (Table 2; $P > 0.05$).

There was no statistically significant difference between the groups in terms of preprocedure STAIC scores ($P > 0.05$), but there was a statistically significant difference between groups in terms of postprocedure STAIC scores ($P = 0.001$). In addition, when the differences between the preprocedure and postprocedure STAIC scores were compared, it was observed that there was a difference. According to the binary evaluations made to determine the group that created the difference, the postprocedure STAIC scores of the control group were found to be statistically significantly higher than those of the children in the ShotBlocker, Buzzy, and DistrACTION Cards groups ($P = 0.020$, $P = 0.012$, and $P = 0.002$, respectively). There was no significant difference between the ShotBlocker, Buzzy, and DistrACTION Cards groups in terms of the postprocedure STAIC scores (Table 3; $P > 0.05$).

TABLE 3. Comparison of Children's Preprocedure and Postprocedure STAIC Scores According to the Groups, Continued

*P**	^{1-2}P	^{1-3}P	^{1-4}P	^{2-3}P	^{2-4}P	^{3-4}P
$F = 0.208$; 0.891	0.983	0.944	0.999	0.998	0.957	0.898
$F = 5.420$; 0.001†	0.999	0.863	0.020‡	0.924	0.012‡	0.002†
0.009†,§	$Z = -0.031$; 0.975‖	$Z = -0.500$; 0.617‖	$Z = -3.048$; 0.002†,‖	$Z = -0.496$; 0.620‖	$Z = -2.939$; 0.003†,‖	$Z = -2.539$; 0.011‡,‖

TABLE 4. Comparison of VAS/FPS-R Scores of Children Before and After the Procedure According to the Groups

	ShotBlocker (n = 61)	Buzzy (n = 60)	DistrACTION® Cards (n = 60)	Control (n = 61)	Test Evaluation; *P**
Mean ± SD median (K1, K3)					
VAS preprocedure	3.15 ± 2.66	3.17 ± 2.92	3.00 ± 2.47	3.21 ± 3.15	$\chi^2 = 0.111$; 0.991
2 (1, 4)	2 (2, 4)	2 (2, 4)	2 (0, 4)		
VAS postprocedure	1.77 ± 2.43	1.07 ± 2.10	1.12 ± 1.87	2.98 ± 3.10	$\chi^2 = 24.985$; 0.001‡
0 (0, 2)	0 (0, 2)	0 (0, 2)	2 (0, 4)		
FPS-R preprocedure	3.18 ± 2.62	3.17 ± 2.91	3.03 ± 2.46	3.15 ± 3.15	$\chi^2 = 0.305$; 0.965
2 (0, 4)	2 (2, 4)	2 (2, 4)	2 (0, 4)		
FPS-R postprocedure	1.77 ± 2.43	1.07 ± 2.10	1.13 ± 1.89	2.98 ± 3.11	$\chi^2 = 24.473$; 0.001‡
0 (0, 2)	0 (0, 2)	0 (0, 2)	2 (0, 4)		

[1]ShotBlocker; [2]Buzzy; [3]DistrACTION Cards; [4]Control.

*Kruskal-Wallis test.

†Mann-Whitney *U* test.

‡$P < 0.01$.

§$P < 0.05$.

K1, 25% percentile value; K3, 75% percentile value.

In the study, when the pain status in all groups was evaluated according to both VAS and FPS-R, it was found that the pain scores were similar before the procedure and that there was no statistically significant difference ($P > 0.05$). After the procedure, when the pain score averages were evaluated, there was no statistically significant difference between the Buzzy and DistrACTION Cards and ShotBlocker groups ($P > 0.05$), and that the children in the control group experienced more pain than those in the ShotBlocker, Buzzy, and DistrACTION Cards groups. It was determined that the difference was highly significant ($P < 0.001$). The postprocedure pain scores of the children in the control group were found to be statistically significantly higher than the scores of the children in the Buzzy and Dischart groups ($P < 0.001$) compared with ShotBlocker ($P < 0.01$) (Table 4).

DISCUSSION

The American Academy of Pediatrics and the American Pain Society recommend minimizing and relieving stress and pain applications such as vascular access and intramuscular injections.[1,2] This study investigated and compared the effects of using the Buzzy, ShotBlocker, and DistrACTION Cards in reducing pain and anxiety while taking venous blood samples in children.

A child's reaction to painful procedure is affected by age, sex, developmental level, cognitive development, communication skills, previous experience, and culture.[5,8] In this study, there was no statistically significant difference between the age distributions and sex of the children according to the groups (Table 1; $P > 0.05$). The reaction of the children was very positive in Buzzy and DistrACTION Cards groups, and it was positive in the ShotBlocker and control groups. The rate of negative reactions in the control group was significantly higher than in the other groups (Table 2; $P > 0.05$). Özkan Koc and Balci[21] reported that there were no differences between the children (9 to 12) in the acupressure and control groups in terms of age, sex, presence of the parents during the venipuncture procedures, and number of venipunctures within the previous year.

Many interventions in a hospital setting can cause fear and anxiety, especially in children.[4] Studies have also found that children experience anxiety before the intervention.[11,12,14,22] Anxiety and fear are important factors in the perception of pain. According to the gate control theory, anxiety and fear open the gate and increase the perception of pain. Therefore, it is stated that high anxiety levels of children may cause higher pain response.[3] In a study by Akram et al[23] on the investigation of the effect of reflexology on anxiety and pain levels in pediatric patients, it was determined that children in the reflexology, control, and placebo groups experienced anxiety before the injections. In this study, it was found that the preprocedure anxiety mean scores of the children in the ShotBlocker, Buzzy, DistrACTION Cards, and control groups were similar to each other, and the difference between the groups was not statistically significant ($P > 0.05$) (Table 3). The anxiety levels experienced by children before the procedure must be similar because it indicates that the pain levels after the procedure can be affected in the same way.

There was a statistically significant difference between the groups in terms of the postprocedure STAIC scores ($P = 0.001$). It was determined that the postprocedure anxiety scores of the children in the control group were significantly higher than in the children in the ShotBlocker, Buzzy, and DistrACTION Cards groups (Table 3). When the average pain scores of the ShotBlocker, Buzzy, and DistrACTION Cards groups were evaluated according to each other, after the VAS and FPS-R procedure, it was found that there was no significant difference in terms of the pain between the Buzzy, ShotBlocker, and DistrACTION Cards groups, and that the children in the control group experienced more pain than the other groups (Table 4). When the literature is examined, studies are seen to measure the pain and anxiety of children after the procedure. Canbulat et al[24] found that anxiety and pain were lower in children who used Buzzy during peripheral blood collection in children aged 7 to 12 years. Semerci et al[25] used distracting cards and a kaleidoscope during venous blood sampling in children aged between 6 and 12 years, and it was shown that it also reduced pain. In a study by Drago et al,[26] using ShotBlocker to reduce intramuscular injection pain in children, it was found that pain scores of children decreased according to the evaluations of nurses and caregivers, but some studies showed that ShotBlocker was ineffective in decreasing pain during immunization.[27,28]

In the study of Alemdar Küçük and Aktaş,[12] in evaluating the pain during and after the procedures using Buzzy, bubble blowing, lidocaine, and aromatherapy were used in children undergoing phlebotomy, and they found that Buzzy and bubble blowing were more effective and that the control group felt more pain than the intervention groups. Although taking venous blood samples in children, it was observed that Buzzy, DistrACTION Cards, and balloon blowing groups

TABLE 4. Comparison of VAS/FPS-R Scores of Children Before and After the Procedure According to the Groups, Continued

^{1-2}P	^{1-3}P	^{1-4}P	^{2-3}P	^{2-4}P	^{3-4}P
$Z = -0.299$; 0.765†	$Z = -0.251$; 0.802†	$Z = -0.253$; 0.801†	Z = −0.005; 0.996†	Z = −0.043; 0.966†	Z = −0.090; 0.928†
$Z = -1.949$; 0.051†	$Z = -1.517$; 0.129†	$Z = -2.543$; 0.011†,§	Z = −0.476; 0.634†	$Z = -4.395$; 0.001†,‡	$Z = -3.993$; 0.001†,‡
$Z = -0.369$; 0.712†	$Z = -0.303$; 0.762†	$Z = -0.496$; 0.620†	Z = −0.104; 0.918†	Z = −0.208; 0.835†	Z = −0.286; 0.775†
$Z = -1.949$; 0.712†	$Z = -1.505$; 0.132†	$Z = -2.512$; 0.012†,§	Z = −0.482; 0.630†	$Z = -4.362$; 0.001†,‡	$Z = -3.937$; 0.001†,‡

experienced less pain compared with the control group, especially the Buzzy group.[22] Canbulat et al[29] found that children with diabetes experienced less pain and anxiety in the Buzzy and ShotBlocker groups compared with the control group. In addition, studies showed that DistrACTION Cards were effective in reducing pain during practices such as blood collection or vascular access in children.[10,22] Inal and Kelleci[15] found that children in the control group experienced more pain during blood sampling and that using these methods together (Buzzy and DistrACTION Cards) at the same time significantly reduced the child's pain. In our study, it was seen that the Buzzy and Dischart groups ($P < 0.001$) reduced pain more than the ShotBlocker ($P < 0.01$) compared with the control group (Table 4).

Our study and other studies show that these methods are effective in reducing pain and anxiety. For this reason, it is thought that the use of these methods in painful procedures in children may be effective in reducing the children's pain, helping the health care professional work more comfortably, and preventing unwanted situations such as needle and hospital phobia in children.

Limitations

A single researcher stayed with the children during the venous blood samples and later assessed the self-reported pain in children after the procedure. Having one person administer the intervention and evaluate the results may have induced bias in the children's answers.

CONCLUSIONS

- It was found that there was a similarity between the preprocedure anxiety score averages of the children in all groups, and that the anxiety level of the children in the control group was higher than the other groups after the procedure.
- Children in the control group experienced more pain than those in the ShotBlocker, Buzzy, and DistrACTION Cards groups during venous blood collection.
- It was found that there was no significant difference between the average pain scores of the 3 methods (Buzzy, ShotBlocker, DistrACTION Cards).
- It was seen that the Buzzy and Dischart groups ($P < 0.001$) reduced pain more than the ShotBlocker ($P < 0.01$) compared with the control group.
- Health care professionals can use to the 3 methods (Buzzy, ShotBlocker, DistrACTION Cards).
- In addition, further a randomized trial studies are needed, which should be conducted in different painful interventions and different age groups, to support the efficiency of these methods.

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