The Impact of 3 Different Distraction Techniques on the Pain and Anxiety Levels of Children During Venipuncture

A Clinical Trial

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Objectives: Invasive procedures are important causes of pain and anxiety during hospitalization. This study aimed to evaluate the effect of 3 different distraction methods on the pain and anxiety levels of children during venipuncture.

Methods: This was a randomized controlled trial conducted with 180 children of 6 to 10 years of age; data were collected in the months of August to November 2016. Participants were randomized in 4 groups; the children in group 1 watched cartoon movies (CM), the children in group 2 played video games (VG), the children in group 3 were distracted by their parents' verbal interactions (PI), whereas no distraction method was used on the children in group 4 (control group). The levels of anxiety and pain perception were evaluated independently based on the feedback from the children, the nurse observer, and the parents. The Children Fear Scale was used to evaluate anxiety levels and the Wong-Baker Pain Scale was used to evaluate the pain levels of the children.

Result: The difference between the groups based on both the anxiety levels and pain scores during venipuncture was statistically significant ($P < 0.05$). The lowest level of anxiety and pain perception was reported in the VG group. The scores observed both in the CM group and the PI group were significantly lower than in the control group ($P < 0.05$).

Discussion: The distraction techniques of playing VG, watching CM, and PI appear to be effective in reducing anxiety and pain perception in children during the procedure of venipuncture. The most effective method was playing VG.

Key Words: pain management, distraction, pediatric patient, video games, cartoon, parent

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If a child's pain is not treated quickly and effectively, this may lead to physical and psychological consequences in the long term.[1,2] Therefore, pediatric nurses need to make an effective evaluation of pain and manage it accordingly.[1,3,4]

Pharmacological and nonpharmacological methods are used to reduce pain and anxiety during painful invasive interventions such as venipuncture and vaccinations in children.[5,6] The most significant advantage of nonpharmacological methods is that they reduce the use of analgesics and increase the patient's quality of life by diminishing pain.[1,4,7–9]

The technique of distraction is one of the nonpharmacological methods that aims to reduce pain by encouraging a patient to turn his or her attention to something other than the ongoing procedure. Besides lessening pain and anxiety during painful invasive interventions, distraction methods reduce the number of interventions needed and provide the opportunity to handle interventions in a shorter period of time.[3,4]

Distraction methods can be classified as active and passive distraction. Active distraction includes methods such as video games (VG), virtual reality glass, controlled breathing, and relaxation. When these methods are used, the child becomes involved in some activity during a procedure. Passive distraction includes methods such as listening to music and watching television. This method is usually used when a child needs to remain calm and quiet during a procedure.[5,10–13]

Despite the fact that distraction is widely recognized as an effective acute pain management strategy for children during painful medical procedures such as venipuncture, recent research suggests that certain types of distraction tasks may be more effective than others. For instance, some studies have demonstrated that active distraction is more effective than passive distraction.[13]

A systematic review was conducted by Rezai et al[14] that indicated that distraction techniques can reduce children's venipuncture pain. It is suggested that these techniques can be made more effective if applied appropriately with regard to the child's age and mental and physical condition. Another systematic review was conducted by Heidari Gorji et al[15] who found that distraction methods are effective in pain management during bone marrow aspiration. Another study conducted by Bukola and Paula[16] demonstrates that distraction is a promising intervention for procedural pain.

There has been strong evidence supporting the efficacy of distraction for needle-related pain and distress in children and adolescents. However, the researchers indicated that the quality of available evidence was low. The quality of trials in this area needs to be improved.[17–19]

Studies also indicate that future research should assess the effectiveness of distraction in varied populations so that evidence of cultural influences on pain expression, measurement, and management approaches are further explored.[14,15]

In hospitals in Turkey, pediatric nurses work at a fast pace with a shortage of staff. Easily applicable distraction techniques should be more widely used to avoid increases in the workload requirements of health care professionals who work in busy settings.

There are various studies that explore the effects of reducing pain during venipuncture by having the patient

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watch a cartoon movie (CM),[10,20] play VG,[6,12] be distracted through interaction with a parent,[5] but there have been no studies detected that compare the effectiveness of these 3 different methods.

There is a need for randomized controlled studies that demonstrate the effectiveness of drawing a child's attention away from a procedure and determine whether one technique is superior over another.

OBJECTIVE

This study aimed to evaluate the effect of 3 different distraction methods on the pain and anxiety levels of children during venipuncture. One of these was an active distraction method (playing VG) and the other 2 were passive distraction methods (watching CM and parental interaction [PI]). The data obtained in this study, it is believed, will be a guide to pediatric nurses and other health care professionals in choosing an effective method of distraction. Also, the obtained data will contribute to the literature about active and passive distraction techniques.

This study had 4 hypotheses: (1) having a child play VG during venipuncture will reduce perceived pain and anxiety. (2) Having a child watch a CM during venipuncture will reduce perceived pain and anxiety. (3) Distracting a child through interaction with a parent during venipuncture will reduce perceived pain and anxiety. (4) VG will reduce perceived pain and anxiety more than CM and distraction by parents.

METHODS

The study was conducted over the period August 24 to November 30, 2016 as randomized controlled experimental research at a Training and Research Hospital in Istanbul. The study population consisted of pediatric patients between the ages of 6 to 10 who had presented at the hospital for any reason over the period of the study and had been referred by the pediatrician to the phlebotomy unit for blood sampling. This study was conducted with children aged 6 to 10 years. The pain and anxiety scales used in the study were valid and reliable for this age group.

Power analysis was performed using the G*Power (version 3.1.9) program to determine the number of the participants required. On the basis of previous research with a 1.5 SD for the experimental group and 2.0 for the control (c) group, at a power of 0.80 and an acceptable type I an error size of 0.05, each group required a minimum of 42 individuals. Considering possible case losses, the groups contained 45 children. Children were randomized into 4 groups: the VG group, the CM group, the PI group, and the control group (C) (Fig. 1). The children playing VG were assigned to the first group, children watching a CM comprised the second group, children who were distracted through interaction with their parents formed the third group, and the fourth group was made up of children who went through a routine blood-drawing procedure with no pain-reducing nonpharmacological technique (c group). All data were obtained by interviewing the children, their parents and the observer after the procedure. The phlebotomy process took an average of 3 minutes (minimum: 1, maximum: 5).

Sample Selection Criteria

These criteria were determined to be: being a child or parent who is willing to participate in the research, the child's not having taken an analgesic during the last 6 hours, the child's being between the ages of 6 to 10, having a cognitive level appropriate to implementing the scale; for the VG and CM group, the child's being of a cognitive level with a motor development conducive to playing VG or watching CM, having no visual or aural barrier to watching a CM or playing a VG.

Data Collection Instruments

The researchers used a data collection form comprised of 16 closed-ended and 7 open-ended questions that they drew up in the light of the literature.[3,21] The first 10 questions focused on the child's descriptive demographic characteristics, whereas the other questions dealt with identifying the variables that could affect the child's anxiety and pain levels.

The Children's Fear Scale (CFS) was used to determine the children's anxiety level before and during the procedure. CFS was developed in 2011.[22] This is a scale that is used to determine the anxiety/fear level of children between the ages 5 to 10. The scale comprises drawn pictures of 5 faces and is rated on a scale of 0 to 4. The first picture indicates a score of "0" or "no anxiety at all," the last picture is scored as "4," or "the most severe anxiety."

The Wong-Baker Faces Pain Scale revised (W-BFS)[23] was used to determine the level of pain during the procedure. The W-BFS is a scale that is most commonly used in identifying pain in children of the ages 3 to 18. It is reported that the scale is reliable when used with children older than the age of 3 who can verbally express the degree of pain they feel.[23] The scale is made up of faces and numbers. Pain is assessed on a scale of "0" to "10." Pain is described by selecting the facial expression depicting the degree of perceived pain.[6,23] Both scales were used in previous studies to measure the pain and anxiety experience of Turkish children.[24,25]

In the study, the children's anxiety and pain levels were evaluated on the basis of both the child's own report and the statements of the parents and the nurse observer, all taken independently and such that none of the reporting individuals heard or saw the assessments of the others. The researcher did not participate in the evaluation of pain and anxiety.

Study Plan

In the first phase of the study, the children matching the sample selection criteria were identified. A total of 196 children and their parents received a briefing on the purpose and scope of the study. The 180 children and parents who agreed to enter the study were randomly separated into 4 groups constituting experimental and control groups. The "data collection forms" were filled out before the randomization. We used the sealed envelope system, one of the most common methods for randomization. In this method, researchers are given randomly generated allocations within sealed opaque envelopes. We used a computer-generated allocation system for randomization. In the study, pictures depicting the groups were placed in an equal number of sealed opaque envelopes for each of the experimental and control groups (45 each, totaling 180). The envelopes were sequentially numbered. Because the children picked up the sequentially numbered envelopes in order, the order of randomization was not broken. The process was continued until all of the envelopes had been chosen.

The children in the CM group were asked to select the cartoon they would like to watch. Starting from 3 minutes before the blood-drawing up to the end of the procedure, the children in the CM group watched funny animated films. The venipuncture took place 3 minutes later. The cartoons

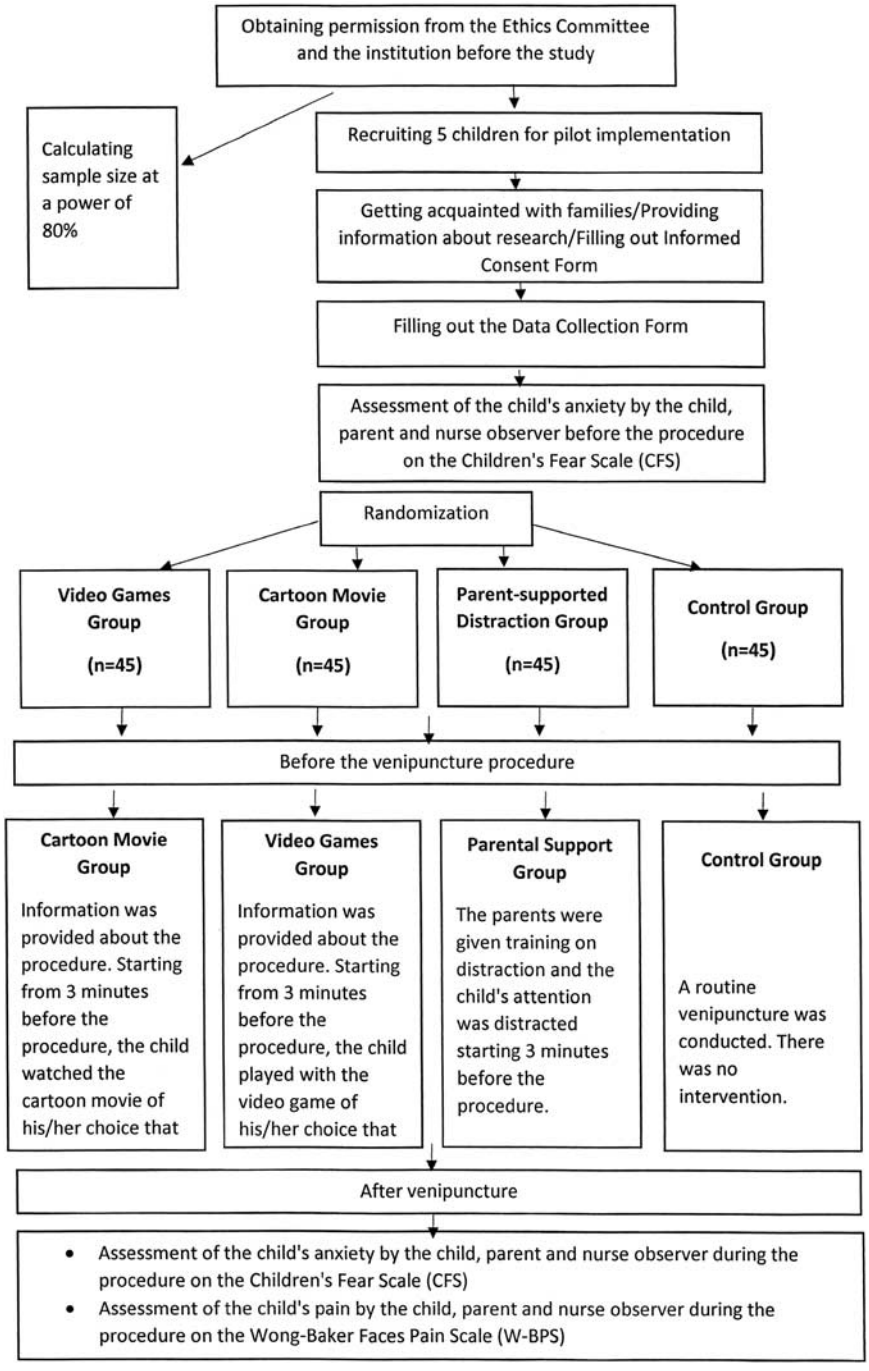

FIGURE 1. Flow chart.

the children watched were Feed the Cat, Little Mouse, The Happy Duck, A Row of Canaries, Food is Ready, Jump to the Ceiling, Donald Duck, and Speedy Gonzales. An Apple A1430 model iPad was used in showing the cartoons.

The children in the VG group were asked to select the VG they would like to play. Children were allowed to play a VG that they could play with 1 hand, starting from 3 minutes before the beginning of the blood-drawing and all through the procedure. The VG the children played were Aero Snow-Biker Cross, Penguin Save, Dragon Hills, Flappy Bird, Basketball, and Minion Rush. An Apple A1430 model iPad was used in the game playing.

Before the process of distracting started, the mothers in the PI were asked to talk to their children throughout the blood-drawing procedure about anything that would turn the child's attention away from the procedure. They were at the same time provided with information about the methods they could use to distract their children. These explanations took about a half-hour. There was no interference with what topics the mothers would talk to their children about. Some of

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the parents preferred telling a story or singing a song, others preferred talking about past happy experiences such as holidays, the cinema, pets, etc. The parents starting talking 3 minutes before the start of the procedure to try to distract their child's attention away from the venipuncture. It was thought that parents who did not use distraction during the procedure would be excluded from the study but all of the parents in this group used methods of distraction. There were no parents therefore excluded from the study.

No distraction technique was applied to the children in the C group during the venipuncture procedure. The venipuncture was performed according to the routine practices of the medical unit. The child was taken into the unit together with the parent, seated in the blood-drawing chair, and a sample of blood was subsequently taken. No method of distraction was applied to turn away the attention of the children in the C group. No constraints were put on the C group to reduce the likelihood that the staff interacting with this group would use some form of distraction. In contrast, we observed that the nurse who conducted the venipuncture did not attempt any distraction. The children in the c group were simply told that they would be feeling the prick of a needle. The nurse's failure to attempt to distract the child may be related to the heavy workload and the nurse's lack of knowledge about using distraction methods during venipuncture.

The same pediatric nurse performed the venipuncture in each group. This pediatric nurse had 7 years of experience in pediatric care and IV interventions. In all the groups, the parents remained with their children during the procedure. The parents who were not in the PI group were asked not to do anything to distract the child during the procedure.

The nurse gave explanations to the children in both the study group and the C group before the procedure. The child was told that a blood sample would be taken. The nurse put on the tourniquet and took the sample. At the end of the procedure, cotton was pressed down on the puncture. The nurse made no effort to distract the child in any of the groups.

Ethical and Legal Considerations

Before starting the study, the approval of the Ethics Committee of Medeniyet University Göztepe Training and Research Hospital (Decision dated March 22, 2016; no. 2016/0078) as well as written permission from the Public Hospitals Institution of Turkey Istanbul Province Anatolia North Association of Public Hospitals (July 26, 2016; no. 77517973-770) were obtained. In addition, the pediatric patients and their parents participating in the study were informed about the purpose and methodology of the research and their verbal and written consent was obtained. Unwilling pediatric patients and their parents were excluded from the study.

Statistical Analysis

The Number Cruncher Statistical System (NCSS) 2007 (Kaysville, UT) program was used in the statistical analysis. Besides the descriptive statistical methods (means, SD, medians, frequency, percentages, minimum, maximum values) used in assessing the data, the study made use of the Kruskal-Wallis test, which is used in comparing ≥ 3 groups that do not display normal distribution, to determine the anxiety and pain scores of the children according to self-reports, parents, and observer reports. The Friedman Test was used in the comparison of intragroup parameters such as the self-reported, parent-reported, and observer-reported anxiety scores of children who did not display normal distribution. In the comparison of qualitative data such as sex, previous venipuncture experience, hospitalization, and painful medical experience, the study made use of the Pearson χ^2 test and the Fisher-Freeman-Halton test. The intraclass correlation coefficient was used to assess the interrater agreement of the children, their parents, and the observer. Significance was accepted as $P < 0.05$.

RESULTS

The study was conducted with a total of 180 children over the period August 24 to November 30, 2016; 50.6% (n = 91) were girls and 49.4% (n = 89) were boys (Table 1). No differences were detected between the groups in terms of variables that could affect the levels of anxiety and pain such as preprocedural anxiety, age, sex, presence of illness, previous venipuncture experience, previous blood-drawing experience, and hospitalization ($P > 0.5$) (Table 1).

When the anxiety scores of the children were compared by groups, it was observed that there were significant differences, both according to the children's own reports (C) and according to the statements of the parents (P) and observer (O) ($P < 0.01$). In the paired comparison performed to determine the group that caused the difference, it was found that the anxiety scores of the video VG (C: 0.27 ± 0.62; O: 0.58 ± 0.87; P: 0.51 ± 0.76) were lower than in the CM (C: 0.76 ± 1.15; O: 1.09 ± 1.28; P: 0.82 ± 1.15) ($P = 0.016$), PI (C: 1.24 ± 1.45; O: 1.62 ± 1.50; P: 1.60 ± 1.53), and C (C: 2.22 ± 1.76; O: 2.51 ± 1.67; P: 2.40 ± 1.68) groups. The scores of the CM ($P = 0.001$) and PI groups ($P = 0.007$) were lower than in the c group. No significant differences were found in the other paired comparisons ($P > 0.05$) (Table 2).

Statistically significant differences were found between the pain scores in the comparison of the children's pain scores during the procedures by group ($P = 0.001$; <0.01). In the paired comparison performed to determine the group responsible for the difference, the pain scores of the VG group were lower than the CM ($P = 0.003$), PI ($P = 0.019$), and c ($P = 0.001$) groups, both according to the children's own reports (VG: 1.42 ± 1.74; CM: 3.02 ± 2.94; PI: 2.89 ± 3.00; c: 5.11 ± 3.78) and according to the statements of the parents (VG: 1.69 ± 1.86; CM: 3.07 ± 2.91; PI: 3.56 ± 2.89; c: 5.29 ± 3.89) and observer (VG: 1.96 ± 1.88; CM: 3.20 ± 2.81; PI: 4.22 ± 3.20; c: 6.13 ± 3.99) ($P < 0.05$). These results confirm hypothesis 4. Also, the scores of the CM ($P = 0.008$) and PI ($P = 0.005$) groups were lower than in the C group ($P < 0.01$). No significant differences were found in the other paired comparisons ($P > 0.05$) (Table 3). These results confirm the hypotheses 1, 2, and 3.

We used self-reporting, observer's reports, and parental reporting in assessing the pain and anxiety levels of the children. We found parental reporting, self-reporting by the children, and the independent observer's reports about the children's pain and anxiety levels to be highly correlated. The intraclass correlation coefficient was 0.67 to 0.924 ($P < 0.01$).

DISCUSSION

In the present study, 3 different distraction methods (VG playing, CM viewing, and distraction through PI) were evaluated in terms of their effect on children's pain and anxiety levels during blood-drawing. These methods were tested because they were non–time-consuming and needed

TABLE 1. Comparison of Groups in Terms of Variables That May Affect Anxiety and Pain Levels (N = 180)

	VG (n = 45)	CM (n = 45)	PI (n = 45)	c (n = 45)	*P*
Age (y)					
Mean ± SD (median)	7.82 ± 1.21 (8)	7.58 ± 1.25 (8)	7.58 ± 1.41 (8)	8.11 ± 1.21 (8)	0.137†
Sex n (%), Mean ± SD					
Girls	21 (46.7)	23 (51.1)	22 (48.9)	25 (55.6)	0.882‡
Boys	24 (53.3)	22 (48.9)	23 (51.1)	20 (44.4)	—
Illness	25 (55.6)	17 (37.8)	16 (35.6)	23 (51.1)	0.156
Previous venipuncture experience n (%), Mean ± SD					
≤ 5 times	19 (42.2)	15 (33.3)	19 (42.2)	15 (33.3)	0.907
6-10 times	9 (20.0)	10 (22.2)	11 (24.4)	12 (26.7)	—
≥ 11 times	17 (37.8)	20 (44.4)	15 (33.3)	18 (40)	—
Previous blood sampling experiencen (%), Mean ± SD					
In the last week	5 (11.1)	3 (6.7)	4 (8.9)	5 (11.1)	0.979§
In the last month	12 (26.7)	8 (17.8)	8 (17.8)	10 (22.2)	—
In the last 6 mo	13 (28.9)	19 (42.2)	17 (37.8)	13 (28.9)	—
In the last year	7 (15.6)	7 (15.6)	8 (17.8)	10 (22.2)	—
> 1 y ago	8 (17.8)	8 (17.8)	8 (17.8)	7 (15.6)	—
Previous venipuncturen (%), Mean ± SD	42 (93.3)	43 (95.6)	41 (91.1)	41 (91.1)	0.927§
Previous hospitalizationn (%), Mean ± SD	22 (48.9)	27 (60.0)	17 (37.8)	25 (56.8)	0.151
Previous surgeryn (%), Mean ± SD	12 (26.7)	13 (28.9)	11 (24.4)	16 (35.6)	0.738
Previous painful medical experiencen (%), Mean ± SD	18 (40.0)	20 (44.4)	15 (33.3)	19 (42.2)	0.782
Preprocedural anxiety Mean ± SD (median)					
Child report	2.69 ± 1.36 (3)	2.78 ± 1.17 (3)	2.84 ± 1.19 (3)	2.69 ± 1.24 (3)	0.947†
Parent report	2.67 ± 1.30 (3)	2.80 ± 1.14 (3)	2.69 ± 1.20 (3)	2.49 ± 1.29 (3)	0.736†
Observer report	2.87 ± 1.18 (3)	2.87 ± 1.14 (3)	2.91 ± 1.08 (3)	2.71 ± 1.18 (3)	0.843†

†The Kruskal-Wallis test.
‡The Pearson χ^2 test.
§The Fisher-Freeman-Halton test.
c indicates control; CM, cartoon movies; PI, parental interaction; VG, video games.

TABLE 2. Comparison of Groups in Terms of Children's Anxiety Scores During Venipuncture Procedure (N = 180)

	Mean ± SD (Median)				
Anxiety Scores	**VG (n = 45)**	**CM (n = 45)**	**PI (n = 45)**	**c (n = 45)**	***P*†**
Child report	0.27 ± 0.62 (0)	0.76 ± 1.15 (0)	1.24 ± 1.45 (1)	2.22 ± 1.76 (2)	0.001*
Parent report	0.51 ± 0.76 (0)	0.82 ± 1.15 (0)	1.60 ± 1.53 (2)	2.40 ± 1.68 (3)	0.001*
Observer report	0.58 ± 0.87 (0)	1.09 ± 1.28 (1)	1.62 ± 1.50 (2)	2.51 ± 1.67 (3)	0.001*
P‡	0.001*	0.001*	0.001*	0.001*	—

†The Kruskal-Wallis test.
‡The Friedman test.
PI indicates parental interaction; VG, video games.
*$P < 0.01$.

TABLE 3. Comparison of Groups in Terms of Children's Pain Scores During Venipuncture Procedure (N = 180)

	Mean ± SD (Median)				
Pain Score	**VG (n = 45)**	**CM (n = 45)**	**PI (n = 45)**	**c (n = 45)**	***P*†**
Child report	1.42 ± 1.74 (2)	3.02 ± 2.94 (2)	2.89 ± 3.00 (2)	5.11 ± 3.78 (4)	0.001**
Parent report	1.69 ± 1.86 (2)	3.07 ± 2.91 (2)	3.56 ± 2.89 (4)	5.29 ± 3.89 (4)	0.001**
Observer report	1.96 ± 1.88 (2)	3.20 ± 2.81 (2)	4.22 ± 3.20 (4)	6.13 ± 3.99 (8)	0.001**

†The Kruskal-Wallis test.
c indicates control; CM, cartoon movies; PI, parental interaction; VG, video games.
**$P < 0.01$.

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no long-term training, and were thus convenient for application in busy hospital units such as the phlebotomy unit.

The level of children's pain and anxiety is affected by variables such as age, sex, past experiences with pain, and hospitalization history.[5,10–12] The results of the study revealed that there were no statistically significant differences between the experimental and control groups in terms of the demographic and descriptive characteristics that could affect the experience of pain and the anxiety levels of children (Table 1).

Playing VG as a distraction technique is accepted as an easily accessible and effective method because these games are readily comprehensible and conveniently available on cell phones, digital video cameras, portable multimedia players, notebooks, and tablets.[23] In the evaluation, it was seen in the comparison of the groups in terms of the pain and anxiety scores obtained according to the statements of the child, the observer and the parent, that the pain and anxiety scores of the VG group were lower than those of the CM group ($P < 0.05$), parental support ($P < 0.05$) and C groups ($P < 0.05$) (Tables 2, 3). Moreover, the strong correlation between the children's, parents', and observer's scores is evidence of how strongly the assessments are consistent with each other.

A review of the literature uncovered a study that explored the effect of playing a VG during phlebotomy on levels of pain and anxiety. In a study conducted by Crevatin et al,[26] half of a total of 200 children were given a VG they could play with 1 hand. The other half was distracted by a trained nurse who applied the distraction techniques of playing with puppets, balloon-popping, and book reading. The researchers found that the pain levels of the children playing the VG were lower compared with the other children.

Furthermore, in randomized controlled studies exploring the effect of playing VG on children's pain and anxiety levels during burn dressing changes,[11,12] it was reported that playing VG reduced the pain the children felt during the burn dressing change procedure. In other studies on how playing VG affected the perception of pain in children undergoing dental treatment,[27] it was similarly observed that VG were effective in reducing children's fears and anxieties.

The results described above support our outcomes and suggest that playing VG can distract a child not only in the venipuncture procedure but also during more prolonged painful procedures such as burn dressing changes or dental treatment and can be used effectively to reduce pain and anxiety.

A study conducted by Wohlheiter and Dahlquist[17] suggests that younger preschoolers can benefit from interactive distraction to manage acute pain, provided that the distraction activity is developmentally appropriate. A meta-analyses study conducted by Birnie et al[18] showed strong support for distraction in reducing pain and distress during needle procedures. Another meta-analyses published in Cochrane (Uman) indicated that there was strong evidence supporting the efficacy of distraction for needle-related pain and distress in children and adolescents.[19] However, the researchers indicated that the quality of available evidence was low. The quality of trials in this area needs to be improved. Our findings support the literature showing that active distraction techniques such as playing VG are more effective than other passive distraction techniques such as viewing CM in pain management.

VG are multisensory toys involving audiovisual, kinesthetic, and tactile senses, requiring a player's active cognitive, motor, and visual skills. To be played successfully, avid attention is necessary, and it is common for children to become so engrossed in these games that their surroundings become nonexistent to them.[28] For this reason, VG are viewed as an active distraction technique with the potential of blocking multiple senses in the reduction of pain and anxiety.[28,29]

In the CM group in our study, it was seen that pain and anxiety scores were significantly lower than in the C group ($P < 0.01$) (Tables 2, 3). A review of the literature revealed studies that had explored the effectiveness of CM viewing during venipuncture procedures and achieving vascular access. In the studies of James et al[30] with 50 children of the ages 3 to 6, of Devi and Shinde[31] with 32 preschoolers, Yoo et al[32] with 40 children, ages 3 to 7, Miguez-Navarro and Guerrero Marquez[33] with 140 children, ages 3 to 11 in the emergency unit, Lobo and Umarani[34] with 60 children, ages 3 to 6, and Kuo et al[21] with children ages 3 to 7, it was reported that children watching CM during the procedure of achieving vascular access felt less pain and anxiety.

Furthermore, in studies by Lee et al[7] with 130 patients, ages 3 to 7, under anesthesia induction, by Gedam et al[35] with 350 infants about to be vaccinated, Cohen et al[20] with 92 children, ages 4 to 6, undergoing vaccinations, and Downey and Zun[10] with 100 pediatric patients in the emergency unit, it was similarly found that children watching CM had reduced pain and anxiety.

In contrast, Landolt et al[36] reported that the distraction technique of having children, ages 4 to 12, watch a CM during burn dressing changes was not a strong enough method to reduce the perception of pain in burn patients despite its being simple, easily applicable, and low cost. The reason Landolt et al's[36] study did not find CM to be effective may have been because the procedure of changing burn dressings is a longer process than venipuncture and the level of pain perceived is much higher. These results suggest that watching CM may be effective not only in short interventions using needles such as blood-drawing and achieving vascular access as well as in vaccinations, but that it may not be effective in longer procedures such as burn dressing changes that induce a higher level of pain.

Having a parent by the child's side during painful procedures is known to allow the child to more easily cope with pain and anxiety.[37] The results of our study show that distracting a child's attention through PI is effective in reducing pain and anxiety (Tables 2, 3). Pediatric nurses should ensure that parents stand beside their children during painful medical procedures and they should provide their support by teaching parents how to distract the child's attention away from the procedure.

In studies by McCarthy et al,[38] in which an IV intervention was carried out on 542 children between the ages of 4 to 10, and by Matziou et al,[39] in which an invasive intervention was conducted with 130 children, ages 7 to 10, it was observed that pain and anxiety was reduced in children whose parents had distracted their attention away from the procedure. Jung and Wurdisch[40] report that children's coping ability with pain is increased when they are in close contact with parents or friends. These results are consistent with the outcome of our own study.

In contrast, Güdücü et al,[41] in a study with 141 children, ages 6 to 14, Afshar et al[42] with 67 children having a dental examination, Shindova and Belcheva,[43] with 48

children, ages 6 to 12, undergoing a dental examination, reached the conclusion that the presence of parents did not affect the children's level of anxiety. It must be noted that in these studies, the parents only stood beside the child and did not engage in any form of distraction. This suggests that instead of having parents passively stand by their children, urging parents to engage in distraction techniques may be more effective in reducing pain and anxiety.

CONCLUSIONS

In conclusion, having children play VG is one of the first techniques demonstrated to reduce pain and anxiety in children during the procedure of venipuncture. CM viewing and distraction through PI may also be used to reduce pain and anxiety during the blood-drawing procedure.

Implication for Practice

In the light of these results, it might be recommended that the use of the distraction methods of having children play VG, watch CM, and be distracted through PI should be used more widely during venipuncture procedures.

The knowledge of pediatric nurses about these methods should be updated and their motivation to use these distraction techniques should be enhanced. Parents should be supported in standing beside their children during invasive procedures and a family-centered approach to health care should be adopted.

Limitations of the Research

There were some limitations in the current study. First, parents may have reported their children's anxiety levels to be lower than their actual anxiety levels due to cultural factors. To eliminate this bias, the children's anxiety levels were assessed using the observer's report as well as the parent's report. The parent and the observer were blinded to each other.

Second, this study was not conducted as a double-blind study. The researcher was aware of the groups to which the children were assigned. To reduce this limitation, children were assigned to the research group randomly and the researcher did not evaluate the pain and anxiety levels of the children.

Third, lack of blinding of the nurse who performed the blood-drawing procedure might have led to differences in what constituted usual care. Increased attention from the nurse who performed the blood-drawing procedure might have led to differences in what constituted usual care and consequently had an impact on the findings.

Fourth, anxiety associated with the blood-drawing procedure might have overridden the distracter's ability to engage with the individual and divert the children's attention from the pain.

Fifth, the C group did not receive any instructions. The children in the C group were simply told that they would feel the prick of a needle. In contrast, other factors outside of the discretion and control of the researchers may have had an impact, however slight, on the results.

A final limitation that needs to be mentioned is that to determine treatment fidelity, a pilot study was first carried out and the procedure was monitored in every group. Although the needed measures were taken to verify treatment fidelity, there might have been some unforeseen factors (eg, children being naturally distracted, difference in the perception of pain) that might have had an effect and contributed to the results of the study. All of the factors above might thus have impacted the results.

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