



ORJİNAL MAKALE / ORIGINAL ARTICLE

Balıkesir Sağlık Bilimleri Dergisi / BAUN Sağlık Bil Derg
Balıkesir Health Sciences Journal / BAUN Health Sci J
ISSN: 2146-9601- e ISSN: 2147-2238
Doi: <https://doi.org/10.53424/balikesirsbd.1582335>



The Effect of Play Dough Activities Before the Venipuncture Procedure on Pain and Anxiety Level in Children: A Randomized Controlled Study

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Geliş Tarihi / Received: 09.11.2024, Kabul Tarihi / Accepted: 01.01.2025

ABSTRACT

Objective: The aim of this study was to determine the effect of play dough activities applied before the venipuncture procedure on pain and anxiety levels in children. **Materials and Methods:** The study was a randomized controlled trial. The sample of the study is consisted of 68 children (experimental group=34; control group=34) who agreed to participate in the study and met the sample selection criteria, according to the result of the power analysis. Before the venipuncture process, the children in the experimental group played with play dough, while the children in the control group were only given routine venipuncture. Personal Information Form, Wong-Baker Facial Pain Rating Scale and Child Anxiety Scale-State were used to collect the data. **Results:** When the results of the research were evaluated, it was found that the Wong-Baker Facial Pain Rating Scale and Child Anxiety Scale-State scores of the children in the experimental group were found to be significantly lower than the ones of the children in the control group ($p<0.05$). **Conclusion:** Play dough activities are effective in reducing pain and anxiety before the venipuncture in children. In line with these results, it is recommended to use play dough activities to reduce the pain and anxiety level of children during venipuncture procedure. Play dough activities are simple, effective, feasible, rapid, easy-to-access, non-risk and cost-effective methods that nurses can safely implement. **Keywords:** Anxiety, Child, Pain, Play Dough, Venipuncture.

Çocuklara Kan Alma İşlemi Öncesi Uygulanan Oyun Hamuru Aktivitelerinin Ağrı ve Anksiyete Düzeyine Etkisi: Randomize Kontrollü Çalışma

ÖZ

Amaç: Araştırma çocuklarda kan alma işlemi öncesi uygulanan oyun hamuru aktivitelerinin ağrı ve anksiyete üzerindeki etkisini belirlemek amacı ile yapılmıştır. **Gereç ve Yöntem:** Araştırma randomize kontrollü deneysel çalışmadır. Araştırmanın örneklemini yapılan güç analizi sonucuna göre, çalışmaya katılmayı kabul eden ve örneklem seçim kriterlerini karşılayan 68 çocuk (deney grubu=34; kontrol grubu=34) oluşturulmuştur. Deney grubundaki çocuklara kan alma işlemi öncesi oyun hamuru oynatılmış, kontrol grubundaki çocuklara ise sadece rutin kan alma işlemi gerçekleştirilmiştir. Verilerin toplanmasında Kişisel Bilgi Formu, Wong-Baker Yüz İfadelerini Derecelendirme Ölçeği ve Çocuk Anksiyete Skalası-Durumluluk kullanılmıştır. **Bulgular:** Araştırma sonuçları değerlendirildiğinde, deney grubundaki çocukların Wong-Baker Yüz İfadelerini Derecelendirme Ölçeği ve Çocuk Anksiyete Skalası-Durumluluk puanlarının kontrol grubundaki çocukların puanlarından anlamlı düzeyde düşük olduğu belirlenmiştir ($p<0.05$). **Sonuç:** Çocuklara kan alma işlemi öncesi uygulanan oyun hamuru aktiviteleri ağrı ve anksiyeteyi azaltmada etkilidir. Bu sonuçlar doğrultusunda kan alma işlemi uygulanan çocukların ağrı ve anksiyete düzeyini azaltmak için oyun hamuru etkinliklerinin kullanılması önerilmektedir. Oyun hamuru aktiviteleri, hemşirelerin güvenle uygulayabileceği basit, etkili, uygulanabilir, hızlı, erişimi kolay, risksiz ve uygun maliyetli yöntemlerdir.

Anahtar Kelimeler: Anksiyete, Çocuk, Ağrı, Oyun Hamuru, Kan Alma.

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Bu makaleye atıf yapmak için / Cite this article: Akar, A., & Konuk Şener, D. (2025). The effect of play dough activities before the venipuncture procedure on pain and anxiety level in children: A randomized controlled study. *BAUN Health Sci J*, 14(1), 164-171. <https://doi.org/10.53424/balikesirsbd.1582335>



BAUN Health Sci J, OPEN ACCESS <https://dergipark.org.tr/tr/pub/balikesirsbd>

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INTRODUCTION

Pain is defined as “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” (IASP, 2020). Pain is a multidimensional phenomenon with sensory, physiological, cognitive, affective and behavioural components (Andersson et al., 2022). Pain is a traumatic experience that children also frequently suffer from and that can affect their physiological, psychological and cognitive functions (Martin, 2018; Rivi et al., 2023).

Children suffer from pain due to accidents, injuries, diseases, surgery, and interventional procedures such as suturing, injection and venipuncture (Andersson et al., 2022; Çetin & Çevik, 2019; Martin, 2018). Invasive procedures are one of the interventions in which children have the highest levels of pain, fear and anxiety. The fear and anxiety that arise after these interventions also negatively affect the future hospital experiences of the child and parents (Birnie et al., 2018; Özdemir & Kürtüncü, 2017). In a study conducted with adults in Canada, 25% of individuals were found to have a fear of injections that emerged during childhood (Taddio et al., 2010). In addition, pain negatively affects children's mood, behavior, relationships, nutrition, growth and development, family and other social interactions (Kudubeş et al., 2021; Rivi et al., 2023). For these reasons, it is important to diagnose and interpret children's pain and to implement the necessary interventions (Taddio et al., 2010).

Many pharmacological and nonpharmacological methods are used in pain management in children. It is also reported that the combination of both methods is more effective (Büyükgönenç & Törüner, 2018; Kudubeş et al., 2021). Nonpharmacological methods can help reduce pain and anxiety when used alone or in combination with medications. In these methods, which can be applied independently by nurses, effective pain control is provided by establishing a safe relationship with the child and their parents (İnal & Canbulat, 2015; Kudubeş et al., 2021; Kurban & Konuk Şener, 2024). The most important reasons for preferring non-pharmacologic methods are having no side effects, ease of implementation, low cost, increase in the effects of analgesics and nurse-friendliness (Büyükgönenç & Törüner, 2018; Kudubeş et al., 2021; Shen et al., 2022).

One of the non-pharmacological methods used in pain management in children is distraction (Kudubeş et al., 2021; Shen et al., 2022; Yazıcı et al., 2022). The aim of the distraction method is to increase children's sense of control over pain by getting them to pay attention to the things they like (Kudubeş et al., 2021; Yazıcı et al., 2022). Distraction methods used in children include activities such as inflating balloons, dreaming, rhythmic breathing, playing music, using virtual reality glasses and playing play dough (Karakaş et al., 2023; Kudubeş et al., 2021; Kurban & Konuk Şener, 2024; Yazıcı et al., 2022).

Pediatric nurses can benefit from play activities in reducing pain, stress, and anxiety that occur during the blood collection process in children and in allowing children to express their emotions (İnci & Günay, 2019; Karakaş et al., 2023; Sezici et al., 2017). Play dough activity is a visual, tactile and active sensory distraction for children (Karakaş et al., 2023). Play dough activities improve children's fine motor skills, increase their creativity and support their cognitive and emotional development (Karakaş et al., 2023; Sezici et al., 2017). When the literature is examined, it is seen that many different distraction methods such as distraction cards, virtual reality glasses, kaleidoscope, lighted toy, cartoon watching, bubble-blowing and buzzy are used to reduce the pain and anxiety during the blood collection procedure (Erdogan & Ozdemir, 2021; Karakaya, & Gözen, 2016; Özkan, & Polat, 2020; Turgut & Türkmen, 2023; Ugucu et al., 2022). However, there are a limited number of studies in the literature reporting the effectiveness of using the play dough technique in blood collection procedures (Maghsoudi et al., 2016). In line with the results of this study, it is thought that play dough activities applied before blood sampling will contribute to the reduction of pain and anxiety levels of children and improve the quality of care by improving children's ability to cope with pain. The aim of this study was to determine the effect of play dough activities, which is applied before the venipuncture procedure, on the pain and anxiety level of children aged between 4-7 years old.

MATERIALS AND METHODS

Study type

The study was conducted as a randomized controlled trial with a parallel design.

Study group

The population of the study consisted of children aged 4-7 years who were admitted to the Blood Collection Unit of Düzce Atatürk State Hospital. The sample was calculated with Gpower 3.1 package programme. The minimum number of patients to be included per group was determined to be 30 patients in each, with an effect size of 0.8 and a power of 0.90. Considering possible drop-outs during the study, it was decided to include 34 children in each group. The sample of the study consisted of a total of 68 children who met the inclusion criteria. The inclusion criteria for the children were determined as being aged between 4 and 7 years, having no acute pain complaints, being conscious and having no perception problem; having no visual, hearing, or neurologic impairment; undergoing venipuncture only once; and having no history of sedative, analgesic, or narcotic substance use within the 24 hours before admission.

Randomization

The children who participated in the study were divided into two groups by randomization method. Randomization was done by simple lottery method. While forming the groups, a lottery was drawn blindfolded by a nurse other than the research nurse

and the children was assigned to one of the study groups. Thus, a total of 68 children, including 34 in the play dough group, 34 in the control group were included in the study. A CONSORT 2010 flow

diagram of the study is shown in Figure 1 (Schulz, Altman, Moher, & CONSORT Group, 2010).

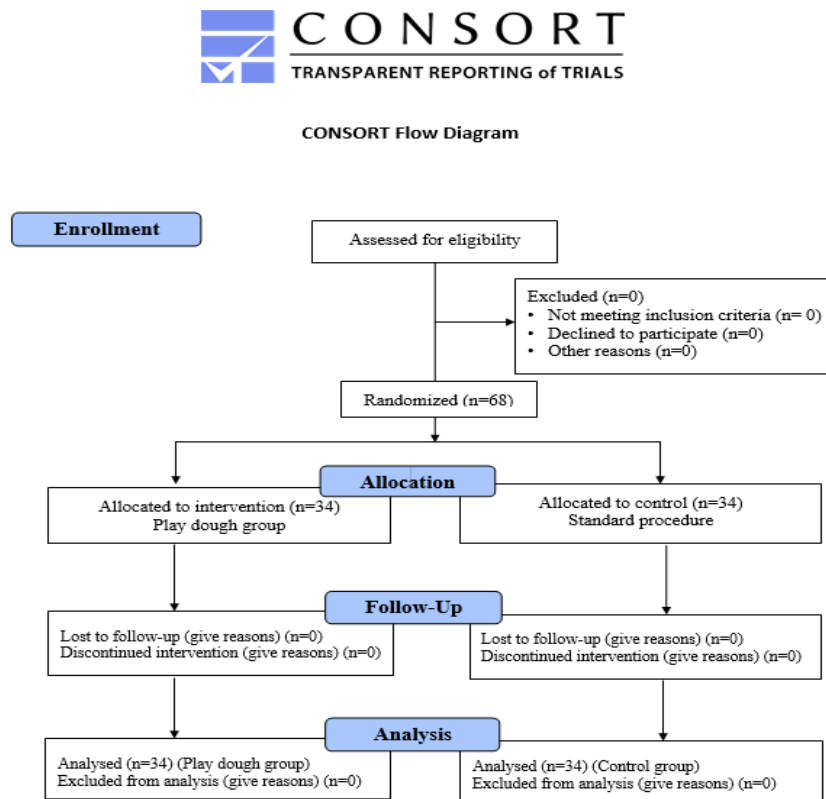


Figure 1. Consort flow diagram

Dependent and independent variables

The dependent variables of the study were children's pain and anxiety levels, and the independent variables were play dough activities.

Data collection instruments

Introductory Information Form

The introductory information form was developed by the researchers after a literature review (Karaca & Guner, 2022; Karakaya, & Gözen, 2016). The form consisted of a total of 13 questions about the child's age, gender, body measurements, chronic disease status, time of the last venipuncture, use of analgesic, and parent's age, educational level and number of children.

Wong-Baker FACES Pain Rating Scale (WB-FPRS)

Wong and Baker developed the scale in 1981 and revised it in 1983. This scale is used to assess the severity of pain in children aged 3–18 years. There are a total of six facial expressions in the scale and a smiling face (zero points) means no pain and a crying face (ten points) means unbearable pain. As the score on the scale increases, the level of pain increases (Wong & Baker, 1988).

Child Anxiety Scale-State (CAS-S)

The Child Anxiety Scale-Situation (CAS-S) was developed by Ersig et al in 2013. Turkish validity and reliability was conducted by Özalp Gerçeker et al in

2018. The scale was developed to measure anxiety levels of children aged 4-10 years. The scale is shaped like a thermometer with a light bulb at the bottom and horizontal lines at intervals going upwards. The bottom bulb chamber is '0' points. The top line is '10' points. While applying the scale, the children are asked to tick what they feel 'right now'. The CAS-S score can vary between 0 and 10 points. As the score on the scale increases, the level of anxiety increases. (Ersig et al., 2013; Özalp Gerçeker et al., 2018).

Implementation stages

Before the study, the parents of the children were interviewed and given the necessary information and asked to sign the informed consent forms. Since all the children came to the blood collection unit with their parents, interviews were conducted with the mothers and fathers. The introductory information form of the parents and children was filled in during this interview. The researchers measured the weight and height of the children before the procedure.

Pain and anxiety levels of the children were evaluated two times. The first evaluation was performed before the venipuncture procedure, and the second evaluation was performed after the completion of procedure.

After the first evaluation, play dough was given to the children in the experimental group and they played for

five minutes. Blood collection was started after the children played with play dough. After the procedure, pain and anxiety levels were evaluated for the last time. The control group was subjected to routine blood collection procedure without any practice. The children's parents were present at all stages of the procedure.

Statistical analysis

The analyses of this study were conducted using the IBM SPSS Statistics 26 package program. Descriptive statistics of the continuous variables included in the study are expressed in mean, standard deviation, minimum, and maximum values, and descriptive statistics of categorical variables are expressed in frequency and percentage. The normal distribution of the variables was analysed by Shapiro Wilk's test. When examining the differences between the groups, Chi-Square test was used when examining the relationships between two independent categorical variables. Independent Samples T-test was used when examining the differences between two independent groups. Dependent Samples T-test was used when examining the differences between two dependent numerical variables. The significance level was set at 0.05 (p-value) in statistical analyses.

Ethical considerations

Written approval was obtained from the Non-Interventional Health Research Ethics Committee of a University to conduct the study. Prior to the study, permission was obtained from the Governorship and

Health Directorate in the provincial center. The permission to use the CAS-S was obtained from Dr. Özalp Gerçeker who conducted the validity and reliability study. Since the answers should have been voluntarily given in all research for which data were gathered, the researcher attached importance to the voluntary participation of the children and their parents included in the study. Furthermore, after the children and their parents were informed about the purpose of the study and the purposes for which the collected data would be used, they gave their consent (informed consent principle) verbally and in writing. The researcher followed the "principle of confidentiality" by explaining to the participants that their personal data would not be disclosed to others.

RESULTS

When the descriptive characteristics of the children were compared in terms of the groups in Table 1, no statistically significant difference was found between the groups in terms of the variables of age, gender, height, weight, chronic disease status, time of the last venipuncture and use of analgesic ($p>0.05$), and they had homogeneous characteristics.

When the descriptive characteristics of the parents were compared in terms of the groups in Table 2, no statistically significant difference was found between the groups in terms of the variables of age, educational level, number of children ($p>0.05$), and they had homogeneous characteristic.

Table 1. Comparison of descriptive characteristics of the children in terms of the groups.

	Experimental Group (n=34)		Control Group (n=34)		Total (n=68)		t	p
	Mean	SD	Mean	SD	Mean	SD		
Age	5.50	0.99	5.41	0.89	5.46	0.94	0.38	0.70
Height (cm)	112.03	7.94	111.35	6.66	111.69	7.28	0.38	0.70
Weight (kg)	20.67	4.22	20.40	3.73	20.54	3.95	0.28	0.77
Chronic disease								
Yes	0	0.0	0	0.0	0	0.0	-	-
No	34	100.0	34	100.0	68	100.0		
Use of analgesic								
Yes	0	0.0	0	0.0	0	0.0	-	-
No	34	100.0	34	100.0	68	100.0		
Time of the last venipuncture								
0-1 months	7	21.85	6	18.15	13	20.01	0.68	0.95
1-3 months	6	18.78	6	18.21	12	18.46		
3-6 months	7	21.86	10	30.26	17	26.17		
6-12 months	6	18.75	6	18.16	12	18.45	-	-
12 months and ↑	6	18.76	5	15.22	11	16.91		
	n	%	n	%	n	%	χ²	p
Gender								
Female	7	20.55	6	17.60	13	19.15	0.09	0.75
Male	27	79.45	28	82.40	55	80.85		

SD: Standard deviation t: Independent Samples T-test

Table 2. Comparison of descriptive characteristics of the parents in terms of the group.

	Experimental Group (n=34)		Control Group (n=34)		Total (n=68)		t	p
	Mean	SD	Mean	SD	Mean	SD		
Age	35.00	4.64	33.94	5.79	34.47	5.24	0.83	0.41
	n	%	n	%	n	%	χ²	p
Parent								
Mother	26	76.50	29	85.30	55	80.90	0.85	0.35
Father	8	23.50	5	14.70	13	19.10		
Educational level								
Illiterate	0	0.00	1	2.89	1	1.52		
Primary School	13	38.19	11	32.41	24	35.28	4.02	0.54
Secondary School	2	5.94	4	11.82	6	8.79		
High School	13	38.24	13	38.18	26	38.21		
University	6	17.63	4	11.81	10	14.74		
Master's degree	0	0.00	1	2.89	1	1.46		
Number of Children								
1 Child	1	2.92	3	8.79	4	5.92		
2 Child	24	70.56	24	70.64	48	70.56	1.46	0.69
3 Child	7	20.63	6	17.63	13	19.11		
4 Child	2	5.89	1	2.94	3	4.41		

SD: Standard deviation t: Independent Samples T-test

When the mean scores of the WB-FPRS used to assess the pain levels that the children were analyzed in Table 3, it was determined that there was no statistically significant difference between the experimental and control groups in terms of WB-FPRS scores before the procedure ($p > 0.05$), while there was a statistically significant difference in terms

of WB-FPRS scores after the procedure ($p < 0.001$, Table 3). It was found that the WB-FPRS mean scores of the children in the experimental group after the procedure (1.09 ± 0.45) were significantly lower than the scores of the children in the control group (2.09 ± 1.14).

Table 3. Comparison of WB-FPRS scores according to groups and processing time.

		Experimental Group (n=34)		Control Group (n=34)		t ^a	p
		Mean	SD	Mean	SD		
WB-FPRS	Before procedure	0.03	0.17	0.06	0.34	-0.44	0.65
	After procedure	1.09	0.45	2.09	1.14	-4.76	0.000**
	t ^b ; p	-12,633; 0,000**		-10,370; 0,000**			

SD: Standard deviation **: $p < 0.001$ t^a: Independent Samples T-test (differences between groups)t^b: Dependent Samples T-test (pretest-posttest differences within groups)

When the mean scores of the CAS-S used to assess the anxiety levels that the children were analyzed in Table 4, it was determined that there was no statistically significant difference between the experimental and control groups in terms of CAS-S scores before the procedure ($p > 0.05$), while there was a statistically significant difference in terms of CAS-S scores after the procedure ($p < 0.001$, Table 4). It was found that the CAS-S mean scores of the children in the experimental group after the procedure

(2.97 ± 1.49) were significantly lower than the scores of the children in the control group (6.44 ± 1.74). In addition, while the after procedure CAS-S scores of the children in the experimental group decreased significantly compared to the before procedure ($p < 0.001$), there was no statistically significant difference between the before procedure and after procedure CAS-S scores of the children in the control group ($p > 0.05$).

Table 4. Comparison of CAS-S scores according to groups and processing time.

		Experimental Group (n=34)		Control Group (n=34)		t ^a	p
		Mean	SD	Mean	SD		
CAS-S	Before procedure	6.68	2.34	6.94	2.33	-0.46	0.64
	After procedure	2.97	1.49	6.44	1.74	-8.82	0.000**
	t ^b ; p	11.100; 0.000**		1.513; 0.140			

SD: Standard deviation **: $p < 0.001$ t^a: Independent Samples T-test (differences between groups)t^b: Dependent Samples T-test (pretest-posttest differences within groups)

DISCUSSION

In this study, it was aimed to determine the effect of play dough activities before the venipuncture procedure on pain and anxiety level in children. Children are exposed to many painful procedures throughout their developmental process (Erdogan & Ozdemir, 2021). The perception of pain varies in children, and the reactions to pain may differ from one child to another. Factors such as age, gender, BMI, developmental level, previous pain experiences, emotional state, level of understanding, learning ability, genetic differences, type and duration of pain, parental feelings and expectations, social and cultural characteristics may affect children's perception of pain (Büyükgönenç & Törüner, 2018; Çalı, 2020; Güngör & Öztürk Şahin, 2021). When the descriptive characteristics of the children and their parents in the experimental and control groups were analyzed, no statistically significant difference was found between the groups ($p > 0.05$) (Table 1, Table 2). This shows that the children and parents in the experimental and control groups had similar descriptive characteristics, which increased the reliability of the research by reducing bias. In this study, homogeneity was ensured between the groups and the results of the research were not affected. When the literature is reviewed, it is seen that experimental studies conducted to evaluate pain in children are homogeneous between groups in terms of the same characteristics (Erdogan & Ozdemir, 2021; Karakaş et al., 2023; Karakaya, & Gözen, 2016; Kurban & Konuk Şener, 2024; Özkan, & Polat, 2020; Turgut & Türkmen, 2023; Ugucu et al., 2022). When the pain level of children's before the procedure was examined in the study, there was no statistically significant difference between the groups in terms of WB-FPRS scores and the groups were homogeneous ($p > 0.05$, Table 3). Similarity of characteristics between groups increases the reliability of the study and reduces bias. In the study, when the pain levels of children's were compared after the venipuncture procedure; it was determined that the pain level of children in the play dough group was lower than the control group, and the difference between them was found to be statistically significant ($p < 0.001$, Table 3). These findings show that the play dough activities applied to the intervention group was effective in drawing children's attention in different

directions and reduced the level of pain. It is thought that the use of cheap, simple and easy-to-access techniques such as play dough before blood sampling in children will reduce the level of pain.

Maghsoudi et al. (2016) reported similar results in their study. In their study, they examined the effects of play-dough, and bubble making methods on pain during venipuncture and found that the pain levels of children in the play-dough group were significantly lower than the other groups (Maghsoudi et al. (2016). When the literature is examined, no other study was found that examined the effect of using the play dough method on pain during the blood collection procedure. However, it was observed that there were studies reporting that the use of different distraction methods such as distraction cards, virtual reality glasses, kaleidoscope, lighted toy, cartoon watching, bubble-blowing and buzzy during blood collection procedure reduces the level of pain (Erdogan & Ozdemir, 2021; Karakaya, & Gözen, 2016; Özkan, & Polat, 2020; Turgut & Türkmen, 2023; Ugucu et al., 2022).

When the anxiety level of children's before the procedure was examined in the study, there was no statistically significant difference between the groups in terms of CAS-S scores and the groups were homogeneous ($p > 0.05$, Table 4). In the study, when the anxiety levels of children's were compared after the procedure; it was determined that the anxiety level of children in the play dough group was lower than the control group, and the difference between them was found to be statistically significant ($p < 0.001$, Table 4). In addition, the anxiety levels of children in the play dough group that were high before the procedure were significantly reduced after the procedure ($p < 0.001$), while there was no statistically significant difference between the before procedure and after procedure anxiety levels of the children in the control group ($p > 0.05$). This suggests that play dough activities provide relaxation and decrease in anxiety levels in children.

When the literature is examined, no study was found that examined the effect of using the play dough method on anxiety during the venipuncture procedure. However, it was observed that there were studies reporting that the use of play dough method decreased the anxiety level in invasive procedures such as dental examination and premedication

anxiety in children (Aydın et al., 2017; Karakaş et al., 2023). In the study of Karakaş et al. (2023) with children aged 3-6 years who came to dental examination for the first time, the children in the experimental group played with play dough before dental examination, while the control group was subjected to routine dental examination without any practice. It was determined that the anxiety levels of children in the play-dough group were significantly lower than the control group (Karakaş et al., 2023). A study by Aydın et al., (2017) found that playing with play dough reduces premedication anxiety in young children. In addition, it is seen that many different distraction methods such as distraction cards, virtual reality glasses, kaleidoscope, cartoon watching, bubble-blowing and buzzy are used to reduce the anxiety during the blood collection procedure (Erdogan & Ozdemir, 2021; Özkan, & Polat, 2020; Ugucu et al., 2022).

In this study, it is thought that it will make an important contribution to the literature because it is proved that the play dough activities has a positive effect on the pain and anxiety level of children and there are few studies on this subject. In addition, it is thought that the play dough activities would contribute to the nurses performing the procedure more safely by comforting the children during venipuncture procedures in order to alleviate the pain and anxiety of the children, and the use of these study results in interventions to be performed with children would also be beneficial for staff and patient safety.

Study limitations and strengths

The advantages of this study are the use of a randomized controlled trial design and that it is the first study to use play dough activities during venipuncture procedure in children. However, this study has some limitations. Since the study was conducted with children aged 4–7 years, it cannot be generalized to children in other stages of development.

CONCLUSION

The results of the present study showed that play dough activities applied to children during venipuncture procedures reduced pain and anxiety levels. In line with these results, it is recommended to include play dough activities into nursing practices and care in order to lower the level of pain and anxiety that develop during venipuncture procedures. For an effective pain and anxiety management in children, healthcare professionals should be trained, and the training should be repeated at certain times. Necessary materials should be provided for the widespread use of distraction methods in clinics. Furthermore, it is recommended that evidence-based studies on different age groups and different painful procedures support the effectiveness of play dough activities.

Acknowledgement

This study was accepted as a master's thesis in Department of Nursing of Düzce University Graduate Education Institute. The authors would like to extend their sincere thanks to anyone who contributed to this study.

Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: AA, DKŞ; **Material, methods and data collection:** AA, DKŞ; **Data analysis and comments:** AA, DKŞ; **Writing and corrections:** AA, DKŞ.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sector.

Ethical Approval

Institution: Düzce University Non-Interventional Health Research Ethics Committee

Date: 26.08.2019

Approval no: 2019/17

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