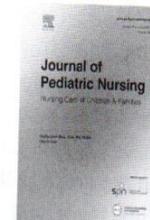




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# The effect of lighted toy on reducing pain and fear during blood collection in children between 3 and 6 years: A randomized control trial☆

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## ABSTRACT

**Background:** This study was carried out as an experimental research to determine the effect of the light toy on reducing pain and fear during blood collection in children.

**Methods:** The data were obtained 116 children. The "Interview and Observation Form Children's Fear Scale, Wong-Baker Faces, Luminous Toy and Stopwatch" was used for data collection. The data were evaluated using percentage, mean, standard deviation, chi-square, t-test, correlation analysis and Kruskal Wallis test in SPSS 21.0 package program.

**Findings:** The fear score average of the children in the lighted toy group was  $0.95 \pm 0.80$ , while it was  $3.00 \pm 0.74$  in the control group. The difference between the groups in terms of the fear score average of the children was found statistically significant ( $p < 0.05$ ). When the difference between groups in terms of pain status of children is examined, the pain level of children in the lighted toy group ( $2.83 \pm 2.82$ ) was found to be significantly lower than the pain level of the children in the control group ( $5.86 \pm 2.72$ ) ( $p < 0.05$ ).

**Discussion:** As a result of the study, it was found that the lighted toy given to the children during blood collection reduces their fear and pain levels. In the light of these findings, it is recommended to increase the use of lighted toys in blood collection.

**Application to practice:** The use of lighted toys as a distraction method during blood collection in children is an effective, easy-to-access and low-cost method. This method demonstrates that there is no need for expensive methods of distraction.

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## Introduction

All healthy/ill children can experience invasive procedures at least once in their life depending on several reasons. These procedures applied to children are performed in a hospital environment or health institution. Being exposed to various procedures in these healthcare institutions where children feel alienated may lead to numerous negative developments such as fear and pain (Atay et al., 2011). Therefore, the hospital environment is generally resonated with undesirable and painful experiences for the child, and this may continue in older ages (Törüner & Büyükgöçenç, 2012).

Phlebotomy is known as the most common invasive procedure for all healthy/ill children. Phlebotomy is one of the most feared practices,

particularly for children. Its widespread application magnifies the need for the application of methods that reduce side effects such as fear and pain after the procedure. The fear experienced due to invasive procedures can become more traumatic in higher ages. Thus, it is substantial to develop techniques to reduce the fear in children, especially in the younger age group. The scholarship hints at the fact that several pharmacological or non-pharmacological methods are used in the pain treatment in children elaboration on their results (Pandita et al., 2018; Sayar & Ergin, 2019). The non-pharmacological applications have an array including audio-visual system usage (Ardahan Akgül et al., 2018; Bergomi et al., 2018; Kaheni et al., 2016; Kuo et al., 2016; Maharjan et al., 2017), inflating balloons and foam balloons (Binay et al., 2019; Lilik Lestari et al., 2017; Maghsoudi et al., 2016), distraction by the parents (irrelevant conversations to the procedure) (İnan, 2017; İnan & İnal, 2019; Özdemir & Kürtüncü, 2017), using virtual reality glasses (Gerçeker et al., 2018), distraction cards (Canbulat Şahiner & Türkmen, 2019; Risaw et al., 2017; Tsao et al., 2017), and the Buzzy technique (Canbulat Şahiner et al., 2015; Canbulat Şahiner et al., 2018; Susam et al., 2018) to be utilized for distraction.

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Toys are preferred as the most suitable means of spending time for all children. Toys with social, emotional and physical educational, developing and supportive features are vital for children. Toys can be used for numerous purposes in home, school, hospital environment and may have different functions according to the intended usage. The benefits in the hospital environment are facilitating the child's adaptation to this space and enabling comfortable self-expression (Çavuşoğlu, 2013). It has been asserted by several scholars that a child who is adapted to the hospital responds faster to treatment and experiences less fear and pain (Bekmezci & Özkan, 2015).

The most important feature of non-pharmacological methods is their low cost and high efficiency. This study should reveal the effectiveness of light toy application, which can be considered among the methods of distraction in reducing the fear and pain experienced by children during the phlebotomy procedure. This study tries to offer an easy-to-use, cheap and effective method applicable during phlebotomy.

The contemporary scholarship argues that different methods of distraction are used during the phlebotomy procedure, but relevant studies for the 3–6 age group is inadequate. Therefore, this study aims to determine the effect of the light toys in reducing the pain and fear experienced during the phlebotomy procedure in children aged 3–6 years.

**Methods**

The research population of this randomized controlled trial consists of children aged 3–6 years who visited the x Hospital Pediatric Phlebotomy Unit between 1 September and 31 October 2019. 10 children were included in the pilot test to assess the perception and acceptance of the

light toy and the clarity of the questionnaire form. The children and parents who were included in the pilot test were not included in the research population.

The sample size was calculated with the known score (4.53 + 3.23) with G\*Power 3.1.5 program, with 95% confidence, 0.05 significance level, and 10% difference. The adequate sample size was determined as a total of 116 children, including 58 children for each group.

**Randomization**

The status of the children to be included in the study in the control or cartoon group was determined by using "stratification and randomization methods with blocks". In the literature, it has been reported that among the factors affecting the fear and anxiety experienced by children in interventional procedures, variables such as age, gender and fear of interventional procedure are included (Çavuşoğlu, 2013; Törüner & Büyükgöncü, 2012). Accordingly, the children were stratified as "girl and boy" for the gender variable and "afraid and not afraid years" for fear of interventional procedure variable, and randomization with blocks was applied. 58 children were included in each of the research groups. During the data collection process, each child and his/her family were taken to the operating room waiting room one by one (Figs 1 and 2).

The phlebotomy procedure of all children included in the lighted toy and control groups were performed by the same nurse. A specific section where the lighted toy was hidden was prepared in the child phlebotomy unit. The children were divided into groups using the odd-even method, considering the application order. Odd-numbered

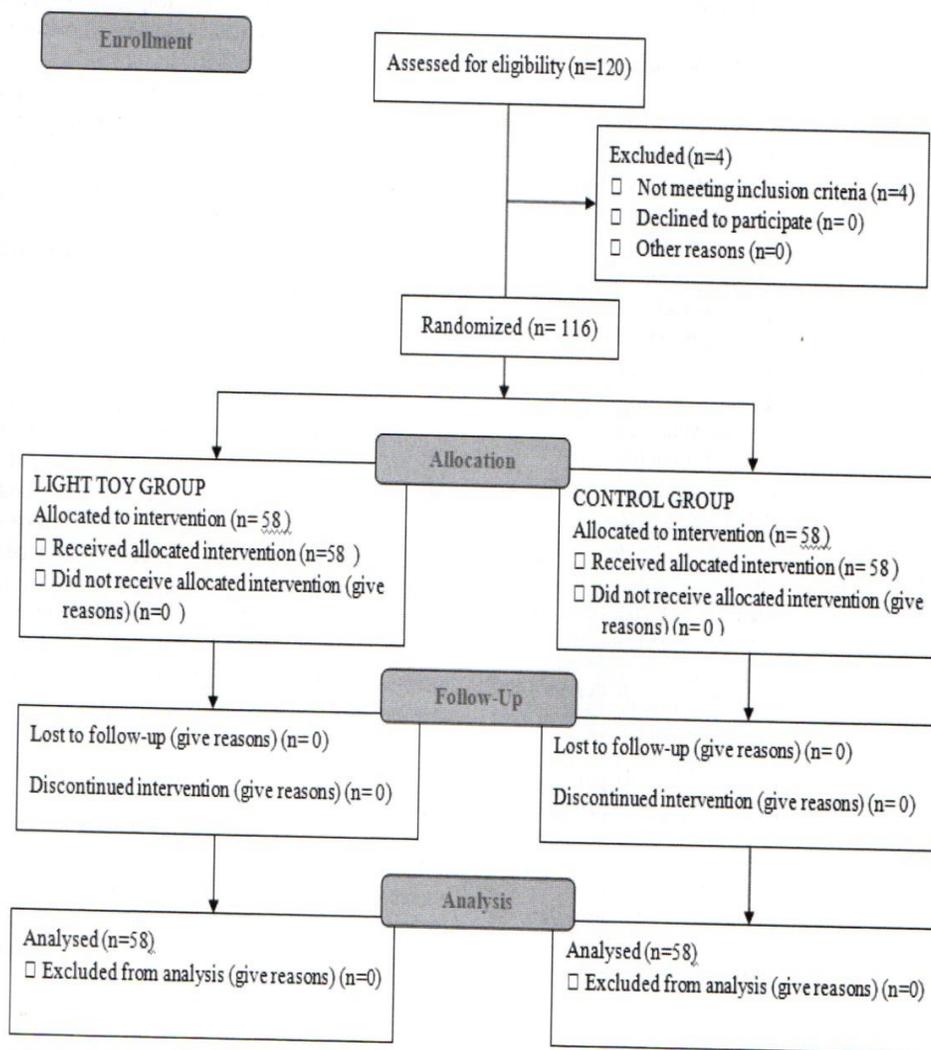


Fig. 1. Consort Diagram of this study.

- Have taken analgesics in the last six hours.
- The presence of any health problems that may affect the child's perception of pain.

## Results

A total of 116 children, 57 girls and 59 boys, were reached in this study. The average age of the children was  $4.57 \pm 1.13$  years (3–6 years). The children included in the study were randomly divided into two as lighted toy ( $n = 58$ ) and control ( $n = 58$ ) groups. The demographic characteristics of the children are provided in Table 1. It is observable that the children in both groups are similar regarding demographic characteristics.

The fear of children was assessed before the procedure. For most of the children in both the lighted toy and control groups ( $n_{\text{lightedtoy}} = 52$ ,  $n_{\text{control}} = 57$ ), it was observed that they had fears before the procedure. However, most mothers stated that they had no fear themselves before the procedure.

The average time to perform the phlebotomy procedure was 82.03 s for the lighted toy group and 73.91 s for the control group.

The comparison of the pain levels of the groups is presented in Table 2. It was found that there was a significant difference between the groups regarding parent, observer, and child assessments ( $p = 0.000$ ). The pain levels of the children in the control group were higher than the lighted toy group.

The fear levels of the study group units according to the parents', observers' and children's own assessment; there is no significant difference between the groups before the procedure. There is a significant difference found between the fear levels related to the procedure

**Table 1**

Comparison of some demographic characteristics of the children in the lighted toy and control groups, the status of previous invasive intervention and the pre-procedure anxiety states of the child and mother ( $N = 116$ ).

	Lighted Toy Group ( $n = 58$ )	Control Group ( $n = 58$ )	$\chi^2$ p
Gender			
Girl	31 (53.4)	26 (45)	0.862
Male	27 (46.4)	32 (55)	0.353
Earlier Invasive Intervention Application Condition			
Never applied	4 (6.9)	3 (5.2)	5.040
1–3 times applied	25 (43.1)	37 (63.8)	0.080
Over 4 Times	29 (50)	18 (31)	
Done			
Before Transaction Fear Presence			
Yes	52 (89.7)	57 (98.3)	3.801
No	6 (10.3)	1 (1.7)	0.051
Before Transaction Fear in the Mother Presence			
Yes	14 (24.1)	10 (17.2)	0.841
No	44 (75.9)	48 (82.8)	0.246
	Lighted Toy Group ( $n = 58$ )	Control Group ( $n = 58$ )	t p
Age	$4.62 \pm 1.19$	$4.52 \pm 1.08$	-0.489 0.626
BMI	$14.59 \pm 1.25$	$14.95 \pm 1.23$	1.538 0.127
Maternal Age	$31.90 \pm 5.27$	$31.67 \pm 5.18$	-0.231 0.818
Father Age	$34.78 \pm 5.34$	$34.52 \pm 5.57$	-0.255 0.799
App Realization Time	$82.03 \pm 30.06$	$73.91 \pm 36.20$	-1.314 0.191

Data are given as number (percentage) or mean  $\pm$  standard deviation. BMI: Body Mass Index.

**Table 2**

Comparison of research groups pain levels related to the procedure ( $N = 116$ ).

WB-FACES Procedural Pain Levels by Scale	Lighted Toy Group ( $n = 58$ )	Control Group ( $n = 58$ )	t p
Child's Assessment	$2.83 \pm 2.82$	$5.86 \pm 2.72$	5.8840 .000*
Parental Rating	$2.10 \pm 2.55$	$5.00 \pm 2.60$	6.0520 .000*
Observer Evaluation	$1.55 \pm 2.40$	$4.69 \pm 2.81$	6.457.000*

Data are given as mean  $\pm$  standard deviation.

WB-FACES, Wong Baker Faces.

\* Since  $p < 0.05$ , it is statistically significant.

according to the parents', observers' and the child's own assessment ( $p = 0.000$ ). Children in the control group had higher levels of fear than the lighted toy group (Table 3).

There was no statistically significant difference between the fear of the mother and the child before the procedure ( $p > 0.05$ ). There is no significant difference between the groups by the pre-procedure fear level of the child, the number of previous invasive procedures, gender, previous hospitalization, surgery status, age, and BMI ( $p > 0.05$ ). There is no statistically significant difference between the duration of the procedure and the child's fear level after the procedure ( $p > 0.05$ ).

## Discussion

There is no statistically significant difference is between the lighted toy and control groups regarding the demographic characteristics of the children participated in this study which is conducted to examine the effect of the light toy in reducing the pain and fear that is experienced during phlebotomy. This result shows that the groups have a homogeneous distribution and demographic characteristics do not have any effect on the groups.

Research groups was analyzed through the Wong-Baker Faces Scale for pain, and the pain level of the lighted toy group ( $2.83 \pm 2.82$ ,  $2.10 \pm 2.55$ ,  $1.55 \pm 2.40$ ) for the child, parent and observer respectively is found to be statistically significantly lower than the control group (It was  $5.86 \pm 2.72$ ,  $5.00 \pm 2.60$ ,  $4.69 \pm 2.81$ ) ranked in the same order ( $p = 0.000$ ). It has been revealed that the light toy is effective in reducing the pain for the child during the phlebotomy process.

There is no published study examining effectiveness of the light toys as a method of distraction during phlebotomy. However, there are studies that focus on different methods (Bergomi et al., 2018; Binay et al., 2019; Canbulat Şahiner et al., 2015; Canbulat Şahiner et al., 2018; Canbulat Şahiner & Türkmen, 2019; Gerçeker et al., 2018; İnan & İnal, 2019; Kaheni et al., 2016; Karakaya & Gözen, 2016; Maghsoudi et al., 2016). The results indicate that other methods analyzed in the literature also reduce the pain level of children. The most important feature expected from these methods used in pain reduction is that efficiency and accessibility. The light toy seems to be very cheap and has easy accessibility in comparison to other methods.

There is no significant difference was found in this study between the fear levels before the procedure ( $p = 0.000$ ,  $p = 0.111$  and  $p = 0.203$ , respectively). It was found that both groups had fear of the procedure, but there is no statistical difference between the groups regarding pre-procedure stage. This situation was considered beneficial for a more accurate assessment of the fear towards the procedure.

One of the most important factors that affect children's procedure fear is their mothers' level of fear. The fear levels of the mothers participated in the study were compared between the groups and it was determined that the fear levels were similar ( $p > 0.05$ ). The fact that the groups exhibited similar results regarding this parameter, which can be regarded as an external factor, is considered beneficial and desired to analyze the effectiveness of the application. Therefore, the impact of the mother's level of fear was nulled.

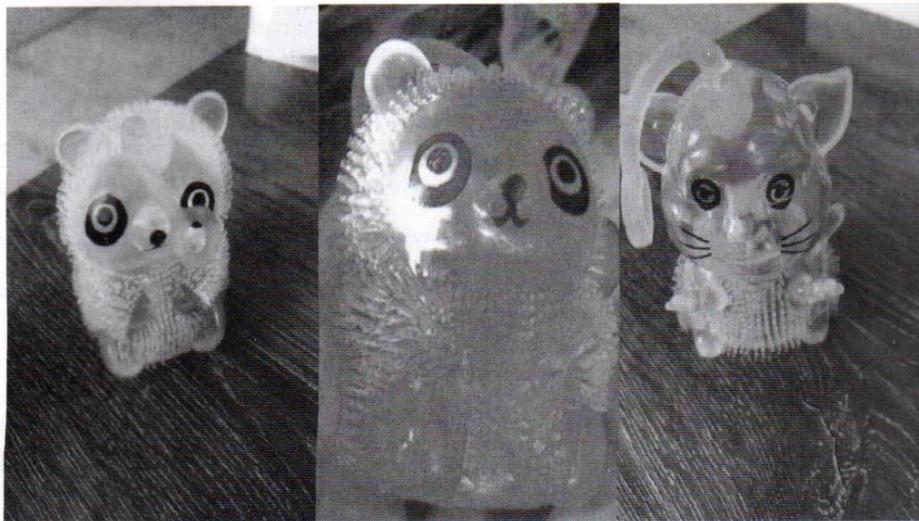


Fig. 2. Lighted Toys.

applications were included in the lighted toy group, and even ones were included in the control group. The phlebotomy procedure was initiated by introducing toys to the children included in the lighted toy group. The children in the control group were given a light toy after the procedure as all children left the phlebotomy unit with a toy.

The research was conducted in the following order.

1. Verbal and written consent was obtained from the parents before the data collection phase by informing the children and parents who met the sample selection criteria about the purpose and content of the study.
2. The materials were prepared beforehand (data collection tools, light toy, stopwatch).
3. Individual characteristics were obtained from children and family members and recorded in the interview and observation forms. The fear level of the children about the procedure was recorded using the Children's Fear Scale (CFS) by asking the child, the parent and the observer separately before the procedure.
4. The child's, whose blood sample was to be taken, status in terms of being in the lighted toy or control group was randomly determined.
5. Children in the control group were taken to the phlebotomy unit and the procedure was initiated. During the procedure, one parent attended the child. As soon as the children started crying during the procedure, the stopwatch was started and counted during the crying. The child's fear (Children's Fear Scale (CFS)) and pain (Wong-Baker FACES) related to the procedure were assessed and recorded separately after the procedure for the child, parent and observer.
6. The children in the lighted toy group were introduced to the light toy and asked to hold it in their hands (on the free arm) before the phlebotomy process started. The children who volunteered to play the toy were given one after explaining how it works, and phlebotomy was initiated a few seconds after they started playing. During the procedure, one parent attended the child. As soon as the children started crying during the procedure, the stopwatch was started and counted during the crying. The child's procedure fear (Children's Fear Scale (CFS)) and pain (Wong-Baker FACES) were assessed and recorded separately after the procedure for the child, parent and observer.

Five tools, namely "Questionnaire", "Children's Fear Scale (CFS)", Wong-Baker FACES, Light Toy and Stopwatch, were used to obtain research data.

**Question form:** Information was obtained from the children in the sample group through the "Question Form" prepared by the author based on the literature (Aydın et al., 2016; Canbulat Şahiner et al., 2015; Şahiner Canbulat & Bal, 2016). The questionnaire is a form with 22 questions, 11 of which are open-ended.

**Children's Fear Scale (CFS):** First used in 2003, it is a valid and reliable scale developed to evaluate the child's fear/anxiety level. There are five different facial expressions with no fear/anxiety at one end of the spectrum and very intense fear/anxiety at the other end which are scored between 0 and 4 points. 0 means no fear/anxiety as 4 indicates extreme fear/anxiety (McKinley et al., 2003; McMurtry et al., 2011).

**Wong-Baker Faces:** Wong-Baker FACES was first developed in 1981 by Donna Wong and Connie Morain Baker. However, it was modified in 1983. The scale is used in the diagnosis of pain in children aged 3–18. It was argued that children enjoyed the facial expressions rating scale in a recent study where this scale was evaluated in terms of children. It has also been noted that this scale is the most accurate method for measuring pain in children. There are five different facial expressions on the scale. There is a pain score under each facial expression. A pain score is specified according to the numerical values attributed to these faces on the scale. The lowest and highest score is "1" and "5", respectively. The higher the scale score the lower the pain tolerance and vice versa (Anonim, 2005).

**Light Toy:** It has a comfortable, plastic and soft structure. Each toy is approximately five cm long and three cm wide. It does not contain any risk for children (not consisting of small parts that can be swallowed). This toy which has different animal figures usually known to children has a total of three color options in pink, orange and green. Two different lights beam inside each toy. The light starts to glow as the child shakes the toy. The duration of the beam is approximately 10 s and the same process must be repeated to turn the light back on. There is a soft rubber ring on the top that children can hold in their hands or put their fingers on. There is a sound-making material at the bottom of the toy. So, a single monotone sound that can attract the attention of children can be produced. The toys were used separately for each child and were given as gifts to the children after the procedure.

#### Limitations

This study was only applied to the Karaman State Hospital Pediatric Blood Collection Unit.

The application was restricted to children aged 3–6 years.

In addition, children with any of the following characteristics were not included in the study.

- Child's inability to communicate.
- Presence of a hearing, speech or vision disorder.
- The child has a long-cell infection.
- Availability of a drug that is used regularly.

**Table 3**  
Comparison of the fear levels of research groups before and during the procedure (N = 116).

Pre-Process Fear Levels (CFS)	Lighted Toy Group (n = 58)	Control Group (n = 58)	t p	Operation-Related Fear Levels (CFS)	Lighted Toy Group (n = 58)	Control Group (n = 58)	t p
Self-report	3.45 ± 0.56	3.59 ± 0.59	1.2800 .203	Child's Assessment	0.95 ± 0.80	3.00 ± 0.74	14.2180 .000*
Parent report	3.24 ± 0.75	3.24 ± 0.75	0.000 1.000	Parental Rating	1.05 ± 0.82	2.74 ± 0.71	11.7840 .000*
Observer report	2.98 ± 0.96	3.24 ± 0.75	1.6070 .111	Observer Evaluation	0.59 ± 0.75	2.59 ± 0.91	12.8460 .000*

Data are given as mean ± standard deviation. \*Since  $p < 0.05$ , it is statistically significant.

There is no significant difference between the groups by the pre-procedure fear level of the child, the number of previous invasive procedures, gender, previous hospitalization, surgery status, age, and BMI ( $p > 0.05$ ).

It was observed that there is a significant difference between the groups regarding the fear levels of the children after the procedure, and the fear levels of the children in the lighted toy group were lower. There is no study analyzing the effect of light toys on children's procedure fears. However, there are studies evaluating the effectiveness of different distraction methods and similar results were obtained (Aydın et al., 2016; Bergomi et al., 2018; Canbulat Şahiner & Türkmen, 2019; Lilik Lestari et al., 2017; Tsao et al., 2017). In this context, it can be asserted that the light toy played during the phlebotomy process is an effective method in reducing post-procedure pain in children.

### Conclusion and recommendations

This study on effectiveness of light toy application during phlebotomy procedure on 3–6 aged children revealed that this method has positive effects. Therefore, it is recommended to use light toys, which are advantageous in terms of logistics and cost, and can attract the attention of the younger age group, in all child phlebotomy units. Moreover, it is recommended to develop different techniques that can attract the attention of children, and are cheap and available.

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### Ethical approval /patient consent

Verbal and written consent was obtained from the parents before the data collection phase by informing the children and parents who met the sample selection criteria about the purpose and content of the study.

### CREDIT statement

XThe authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### References

- Anonim (2005). Faces pain rating scale: Development of Wong-baker faces pain rating scale. *Elsevier*. <http://www3.us.elsevierhealth.com/wow/faces.html> (erişim tarihi: 28.01.2020).
- Ardahan Akgül, E., Karahan, Y., Başoğlu, F., Oğul, A., Özgüven Öztornacı, B., Yetim, P., & Yıldırım San, H. (2018). Effects of watching cartoons on pain scores in children undergoing venepuncture. *Nursing Children and Young People*, 32(3). <https://doi.org/10.7748/ncyp.2018.e913>.
- Atay, G., Eras, Z., & Ertem, İ. (2011). Çocuk hastaların hastane yatışları sırasında gelişimlerinin desteklenmesi. *Çocuk Dergisi*, 11(1), 1–4. <https://doi.org/10.5222/j.child.2011.001>.
- Aydın, D., Canbulat Şahiner, N., & Karaca Çiftçi, E. (2016). Comparison of the effectiveness of three different methods in decreasing pain during venipuncture in children: Ball squeezing, balloon inflating and distraction cards. *Journal of Clinical Nursing*, 25(15–16), 2328–2335. <https://doi.org/10.1111/jocn.13321>.
- Bekmezci, H., & Özkan, H. (2015). Oyun ve oyuncağın çocuk sağlığına etkisi. *Izmir Dr. Behçet Uz Çocuk Hast. Dergisi*, 5(2), 81–87. <https://doi.org/10.5222/buchd.2015.081>.
- Bergomi, P., Scudeller, L., Pintaldi, S., & Dal Molin, A. (2018). Efficacy of non-pharmacological methods of pain management in children undergoing venipuncture in a pediatric outpatient clinic: A randomized controlled trial of audiovisual distraction and external cold and vibration. *Journal of Pediatric Nursing*, 42, 66–72. <https://doi.org/10.1016/j.pedn.2018.04.011>.
- Binay, Ş., Bilsin, E., Gerçekler, G.Ö., Kahraman, A., & Bal Yılmaz, H. (2019). Comparison of the effectiveness of two different methods of decreasing pain during phlebotomy in children: A randomized controlled trial. *Journal of Perianesthesia Nursing*, 34(4), 749–756. <https://doi.org/10.1016/j.jopan.2018.11.010>.
- Canbulat Şahiner, N., İnal, S., & Ayhan, F. (2015). Effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous in pediatric patients cannulation. *Pain Management Nursing*, 16(1), 33–39. <https://doi.org/10.1016/j.pmn.2014.03.003>.
- Canbulat Şahiner, N., & Türkmen, A. S. (2019). The effect of distraction cards on reducing pain and anxiety during intramuscular injection in children. *Worldviews on Evidence-Based Nursing*, 16(3), 230–235. <https://doi.org/10.1111/wvn.12359>.
- Canbulat Şahiner, N., Türkmen, A. S., Açıkgöz, A., Şimşek, E., & Kirel, B. (2018). Tip 1 diyabetli çocuklarda insülin enjeksiyonu sırasında ağrı azaltmada iki farklı yöntemin etkinliği: buz ve shotblocker. *Worldviews Evid Based Nur*, 15(6), 464–470.
- Çavuşoğlu, H. (2013). Çocuk Sağlığı Hemşireliği. *Ankara: Sistem Ofset Basımevi*, 67–69, Ankara, Türkiye.
- Gerçekler, G.Ö., Binay, Ş., Bilsin, E., Kahraman, A., & Bal Yılmaz, H. (2018). Effects of virtual reality and external cold and vibration on pain in 7- to 12- year-old children during phlebotomy: A randomized controlled trial. *Journal of Perianesthesia Nursing*, 33(6), 981–989. <https://doi.org/10.1016/j.jopan.2017.12.010>.
- İnan, G. (2017). *Kan alma işlemi sırasında uygulanan üç farklı dikkati başka yöne çekme yönteminin çocukların ağrı ve anksiyete düzeyine etkisi*. [Yayınlanmamış yüksek lisans tezi]. Haliç Üniversitesi Sağlık Bilimleri Enstitüsü, İstanbul.
- İnan, G., & İnal, S. (2019). The impact of 3 different distraction techniques on the pain and anxiety levels of children during venipuncture: A clinical trial. *The Clinical Journal of Pain*, 35(2), 140–147. <https://doi.org/10.1097/AJP.0000000000000666>.
- Kaheni, S., Bagheri-Nesami, M., Goudarziyan, A. H., & Rezaei, M. S. (2016). The effect of video game play technique on pain of venipuncture in children. *International Journal Of Pediatrics*, 4(5), 1795–1802. <https://doi.org/10.22038/ijp.2016.6770>.
- Karakaya, A., & Gözen, D. (2016). The effect of distraction on pain level felt by school-age children during venipuncture procedure-randomized controlled trial. *Pain Management Nursing*, 17, 47–53. <https://doi.org/10.1016/j.pmn.2015.08.005>.
- Kuo, H. C., Pan, H. H., Creedy, D. K., & Tsao, Y. (2016). Distraction-based interventions for children undergoing venipuncture procedures: A randomized controlled study. *Clinical Nursing Research*, 1–16. <https://doi.org/10.1177/1054773816686262>.
- Lilik Lestari, M. P., Wanda, D., & Hayati, H. (2017). The effectiveness of distraction (cartoon-patterned clothes and bubble-blowing) on pain and anxiety in preschool children during venipuncture in the emergency department. *Compr Child Adolesc Nurs*, 40(1), 22–28. <https://doi.org/10.1080/24694193.2017.1386967>.
- Maghsoudi, S., Sajjadi, Z., Vashani, H. B., Nekah, S. M. A., & Manzari, Z. S. (2016). Comparison of the effects of play dough and bubble making distraction techniques on venepuncture pain intensity in children. *Evidence Based Care Journal*, 5(4), 25–32. <https://doi.org/10.22038/EBCJ.2015.6279>.
- Maharjan, S., Maheswari, B., & Maharjan, M. (2017). Effectiveness of animated cartoon as a distraction strategy on level of pain among children undergoing venipuncture at selected hospital. *International Journal of Health Sciences & Research*, 7(8), 248–252.

- McKinley, S., Coote, K., & Stein-Parbury, J. S. (2003). Development and testing of a faces scale for the assessment of anxiety in critically ill patients. *Journal of Advanced Nursing*, 41, 73–79. <https://doi.org/10.1046/j.1365-2648.2003.02508.x>
- McMurtry, C. M., Noel, M., Chambers, C. T., & McGrath, P. J. (2011). Children's fear during procedural pain: Preliminary investigation of the children's fear scale. *Health Psychology*, 30(6), 780–788. <https://doi.org/10.1037/a0024817>
- Özdemir, A., & Kürtüncü, M. (2017). Çocuklarda invaziv işlemler sırasında dikkati başka yöne çekme tekniklerinin kullanımı. *Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Bilimleri Dergisi*, 23, 48–60. <https://doi.org/10.17363/SSTB.2017.3.5>
- Pandita, A., Panghal, A., Gupta, G., Verma, A., Pillai, A., Singh, A., & Naranje, K. (2018). Is kangaroo mother care effective in alleviating vaccination associated pain in early infantile period? *Early Human Development*, 127, 69–73. <https://doi.org/10.1016/j.earlhumdev.2018.10.001>
- Risaw, L., Narang, K., Thakur, J. S., Ghai, S., Kaur, S., & Bharti, B. (2017). Efficacy of flippits to reduce pain in children during venipuncture - a randomized controlled trial. *Indian Journal of Pediatrics*, 84(8), 597–600. <https://doi.org/10.1007/s12098-017-2335-z>
- Şahiner Canbulat, N., & Bal, M. D. (2016). The effects of three different distraction methods on pain and anxiety in children. *Journal of Child Health Care*, 20(3), 277–285. <https://doi.org/10.1177/1367493515587062>
- Sayar, S., & Ergin, D. (2019). Ortopedi servisinde yatan çocuk hastalarda ameliyat sonrası ağrı yönetiminde müziğin etkisinin incelenmesi. *Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi*, 12(1), 67–73. <https://dergipark.org.tr/pub/deuhfed/issue/53195/705971>
- Susam, V., Friedel, M., Basile, P., Ferri, P., & Bonetti, L. (2018). Efficacy of the buzzy system for pain relief during venipuncture in children: A randomized controlled trial. *Acta Biomed for Health Professions*, 89(6), 6–16. <https://doi.org/10.23750/abm.v89i6-S.7378>
- Törüner, E. K., & Büyükgöncü, L. (2012). Çocuk Sağlığı Temel Hemşirelik Yaklaşımları. *Cöktüç Yayıncılık*, 1054, Amasya, Türkiye.
- Tsao, Y., Kuo, H. C., Lee, H. C., & Yiin, S. J. (2017). Developing a medical picture book for reducing venipuncture distress in preschool-aged children. *International Journal of Nursing Practice*, 23(5). <https://doi.org/10.1111/ijn.12569>