

# Paternal and Maternal Holding-Cuddling for Procedural Pain in Healthy Term Neonates

## Sağlıklı Term Bebeklerde Tıbbi İşlem Kaynaklı Akut Ağrı Yönetiminde Anne Kucağı ve Baba Kucağı

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### ABSTRACT

**Objective:** Holding-cuddling helps reduce procedural pain. Studies have focused on the effect of the maternal holding-cuddling (MHC) method on heel prick pain in healthy-term neonates. However, there is limited study on the impact of paternal holding-cuddling (PHC) on procedural pain during heel pricks in neonates. This paper looked into the impact of MHC and PHC on heel prick pain and crying duration in healthy-term neonates.

**Methods:** This quasi-experimental study occurred in the obstetrics clinic of a university hospital in western Türkiye. The sample comprised 92 full-term neonates and their parents, divided into three groups: control (n=32), MHC (n=30), and PHC (n=30). The data were collected using a personal information form, a Neonatal Follow-up Form, and the Neonatal Infant Pain Scale (NIPS). The study received approval from an ethics committee.

**Results:** The MHC and PHC groups had a lower NIPS score than the control group during and after the procedure ( $P<.05$ ). The MHC and PHC groups had a lower crying duration than the control group ( $P<.05$ ). There was no difference in NIPS scores and crying duration between the MHC and PHC groups ( $P>.05$ ).

**Conclusion:** Full-term infants held and cuddled by their parents tend to feel less pain and cry less during heel pricks. Nurses should use MHC and PHC to help infants have less pain during heel pricks.

**Keywords:** Infant, Nurse, Parent participation, Procedural pain

### ÖZ

**Amaç:** Kucağa alma/ kucakta tutma pozisyonu, bebeklerde tıbbi işlemlerle ilişkili ağrıyı azaltmada etkili nonfarmakolojik yöntemlerden biridir. Çalışmalar sağlıklı term bebeklerde topuk kanı alma işlemi sırasında bebeğin anne kucağında tutulmasının etkisine odaklanmıştır. Bebeğin babasının kucağında olmasının tıbbi işlem kaynaklı ağrıya etkisini inceleyen sınırlı sayıda çalışma bulunmaktadır. Bu çalışma, sağlıklı term bebeklerde topuk kanı alma işlemi sırasında anne kucağı ve baba kucağında olma yöntemlerinin ağrı düzeyi ve ağlama süresi üzerine etkisini incelemek amacıyla yapıldı.

**Yöntemler:** Bu yarı deneysel çalışma, Türkiye'nin batısında bir üniversite hastanesinin kadın doğum kliniğinde yapıldı. Örneklemi, araştırma grubu seçim kriterlerini taşıyan 92 term bebek ve ebeveyni oluşturdu. Katılımcılar üç gruba atandı: Kontrol (n=32), anne kucağı (n=30) ve baba kucağı (n=30). Veriler Tanıtıcı Bilgi Formu, Yenidoğan Ağrı Ölçeği (NIPS) ve Yenidoğan Bebek İzlem Formu ile toplandı. Araştırmanın yapılabilmesi için etik onay, resmi izin ve ailelerden yazılı onam alındı.

**Bulgular:** İşlem sırasında ve sonrasında anne kucağı ve baba kucağı gruplarının NIPS puanları kontrol grubundan istatistiksel olarak daha düşüktü ( $P<.05$ ). Anne kucağı ve baba kucağı gruplarının ağlama süresi kontrol grubundan istatistiksel olarak daha düşüktü ( $P<.05$ ). Anne kucağı ve baba kucağı gruplarının NIPS puanları ve ağlama süreleri birbirine benzerdi ( $P>.05$ ).

**Sonuç:** Topuk kanı alma işlemi sırasında anne veya babalarının kucağında tutulan term bebekler kontrol grubuna göre daha az ağrı yaşadı ve daha az ağladı. Hemşireler topuk kanı alma ile ilişkili ağrı yönetiminde anne kucağı ve baba kucağı yöntemlerini kullanabilirler.

**Anahtar Kelimeler:** Ebeveyn katılımı, Hemşire, Term bebek, Tıbbi işlem ağrısı

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## INTRODUCTION

Newborns undergo many painful procedures.<sup>1</sup> Acute procedural pain causes behavioral stress and unstable hemodynamics. These problems negatively affect adaptation, growth, development, and parent-infant interaction.<sup>2-6</sup> The heel prick is a painful procedure used for newborn screening tests and is more painful than other blood collection procedures.<sup>7</sup>

Healthcare professionals should prioritize pain management during heel pricks for two reasons. Firstly, they have an ethical obligation to minimize the pain neonates experience during medical procedures. Secondly, it has been reported that repeated painful exposures can have harmful consequences.<sup>2</sup> The American Academy of Pediatrics (2016) drew up a report on preventing and managing procedural pain in newborns and made some recommendations for neonatal healthcare institutions. First, healthcare institutions should develop a pain prevention program to minimize the number of painful procedures on neonates. Second, healthcare institutions should formulate a pain assessment and management plan to help healthcare professionals assess pain routinely and choose pharmacological and non-pharmacological treatments to help patients avoid the pain associated with minor procedures.<sup>2</sup> The International Guide to Pediatric Anesthesia (Good Practice in Postoperative and Procedural Pain) recommends both pharmacological and non-pharmacological methods for preventing and effectively managing acute procedural pain in children.<sup>8</sup> However, pharmacological methods for pain management in neonates can have side effects.<sup>9</sup> On the other hand, non-pharmacological methods are easy to use, affordable, time-effective, and have no side effects.<sup>10</sup>

Some popular non-pharmacological methods including environmental control interventions for pain management during heel pricks in healthy term neonates are swaddling,<sup>11,12</sup> skin-to-skin contact,<sup>13,14</sup> holding,<sup>11,12</sup> heel warming,<sup>15,16</sup> positioning methods (facilitated tucking, rocking, etc.),<sup>13,17</sup> therapeutic touch.<sup>18</sup> Healthcare professionals avoid non-pharmacological methods that are expensive, difficult to apply, and time-consuming.<sup>10</sup>

Holding-cuddling helps reduce procedural pain. Holding-cuddling is an easy to use, practical, non-invasive and inexpensive practice. Holding-cuddling is a non-pharmacological method that uses tactile stimulation to reduce pain by soothing the baby with rhythmic and repetitive movements. neonates held or cuddled by their mothers are likely to have less pain<sup>4,12,19,20</sup> and cry less<sup>20-22</sup> during heel pricks. The maternal holding and cuddling (MHC) and paternal holding and cuddling (PHC) methods

provide multisensory inputs that enhance analgesic effects. These multisensory methods can reduce the infant's signs of pain during minor painful procedures and shorten the crying time.<sup>4,23</sup> Bembich et al.<sup>24</sup> reported that MHC is related to bilateral somatosensory and right inferior frontal cortex activation during heel pricks in term neonates. This type of analgesia may be mediated by multisensory stimulation linked to the mother-infant attachment.<sup>24</sup> Therefore, this study focused on MHC and PHC to prevent procedural pain in neonates during heel pricks.

Many researchers have focused on the impact of MHC on procedural pain during heel pricks in neonates. Studies indicate that the MHC method helps neonates have less pain and cry less during heel pricks.<sup>4,11,12,19,20,24,25</sup> However, no studies were found on the impact of the PHC method on procedural pain during heel pricks in neonates. In many societies, mothers are primary caregivers for sociocultural reasons. Healthcare professionals generally leave out fathers during painful medical procedures on neonates. Fathers feel powerless, inadequate, and stressed because they cannot participate in the care of their babies who undergo medical procedures.<sup>26,27</sup> However, fathers who are there for their babies during medical procedures develop a bond with them and experience less anxiety and inadequacy. In addition, when mothers are not available due to medical emergencies, fatigue, or cesarean sections (C-sections), fathers can be a valuable alternative to help their babies go through minor painful procedures.<sup>28,29</sup>

## AIM

Therefore, this study investigated whether the MHC and PCH methods helped neonates feel less pain and cry during heel pricks.

## Research hypothesis

We hypothesized the following:

- H1 The MHC and PHC groups would have lower mean NIPS scores during and after the procedure than the control group.
- H2 The MHC and PHC groups would have lower mean crying duration than the control group.

## METHODS

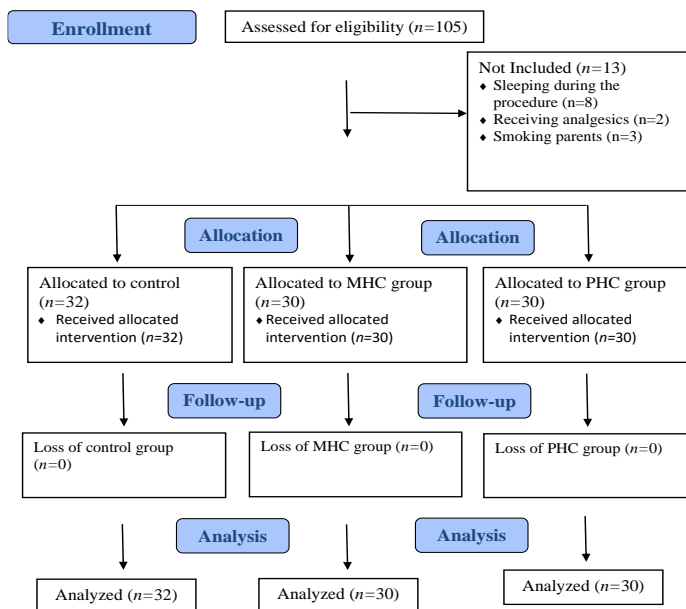
### Place of study

This quasi-experimental study was conducted between February 4 and August 20, 2016, in the obstetrics clinic of a baby-friendly certificated university hospital in western Türkiye. The clinic has 15 physicians, nine nurses, and 22 inpatient beds.

### Participants

The study population included all women who gave birth in

the clinic and their babies. Power analysis (G\*Power) was performed to determine the sampling adequacy. The results revealed a power of 0.89 at a significance level of 0.05, a confidence interval of 0.98, and an effect size of 0.37 ( $n_1=32$ ,  $Mean_1=6.93$ ;  $n_2=30$ ,  $Mean_2=5.76$ ;  $n_3=30$ ,  $Mean_3=5.83$ ;  $SD=1.45$ ). The initial sample consisted of 105 neonates. Thirteen participants were excluded due to the exclusion criteria [( $n=8$ ) sleeping during the procedure, ( $n=2$ ) receiving analgesics up to 24 hours before the procedure, ( $n=3$ ) smoking parents]. The sample consisted of 92 neonates divided into three groups: control ( $n=32$ ), MHC ( $n=30$ ), and PHC ( $n=30$ ). The group assignment was determined using the closed envelope method. Therefore, data were collected first from the MHC group, followed by the PHC and control groups. Figure 1 shows the flow diagram for recruitment.



**Figure 1.** CONSORT Diagram of The Study.

The inclusion criteria were as follows: (1) healthy term neonates, (2) birth weight between 2500 and 4000 g, (3) 38-42 gestational week, (4) postnatal age of 48-72 hours, (5) a 5-minute APGAR score of  $\geq 8$ , (6) having had no experience of any painful interventions other than vitamin K and hepatitis B vaccine at birth, (7) fed between 30 and 60 min before the procedure, (8) undergoing heel prick only once, (9) blood collection for the Guthrie test, (10) willing to hold their babies during the procedure. The exclusion criteria were as follows: (1) sleeping during the procedure, (2) receiving analgesics up to 24 hours before the procedure, and (3) smoking parents.

## Data collection tools

The data were collected using a personal information form, a Neonatal Follow-up Form, and the Neonatal Infant Pain Scale (NIPS).

*Personal Information Form:* The personal information form was developed by the researchers.<sup>20,30,31</sup> The form consisted of items on neonatal gender, birth age, birth weight, APGAR score, delivery and feeding type, number of children, etc. After the form was prepared, opinions were received from three specialist nurses whose field of study was newborns, and the form was finalized in line with their opinions.

*Neonatal Follow-Up Form:* The neonatal follow-up form was developed by the researchers. The form was used to record the procedure time, crying time, etc.

*Video Recorder:* The procedures were recorded using a Samsung Galaxy Note 5 N920 (Operating System: Android 5.1.1 (Lollipop) Processor: Quad-core 1.5 GHz Cortex-A53 & Quad-core 2.1 GHz Cortex-A57).

*Neonatal Infant Pain Scale (NIPS):* The scale is a six-item measure developed by Lawrence et al.<sup>32</sup> and adapted into Turkish by Akdovan.<sup>33</sup> The instrument assesses procedural pain in neonates. It is a behavioral scale assessing five behavioral indicators (facial expression, crying, arms, legs, and state of alertness) and one physiological indicator (breathing patterns). Five items (facial expression, breathing pattern, arms, legs, and state of alertness) are scored as 0 (Good) or 1 (Bad), while one item (crying) is scored as 0 (Good), 1, or 2 (Bad). The total scale score ranges from 0 to 7, with higher scores indicating more pain.<sup>33</sup> The original scale has a Cronbach's alpha of 0.92 to 0.97.<sup>32</sup> At the same time, the Turkish version has a Cronbach's alpha of 0.92 to 0.97.<sup>33</sup> In the present study, the scale had a Cronbach's alpha of 0.81 and 0.94 during and after the procedure, respectively.

## Procedure

The researcher conducted face-to-face interviews with participants to determine their socio-demographic characteristics. The interviews were held in the procedure room. The data collection took around five minutes. The researcher informed all parents about the research purpose and procedure and received written consent from all participants.

Blood samples were collected (procedure) in the intervention room of the clinic between 9:00 am and 11:00 am. The clinic nurse, with at least five years of experience, collected all the samples in accordance with the routine clinical procedures. The nurse had no conflict of interest. A

pediatrician decided on the procedure. Swaddling is used for pain management in neonates whose heel blood is collected during the clinical procedure. Therefore, all neonates were swaddled. All neonates were monitored for two minutes before the procedure, during the procedure, and three minutes after the procedure.

**Routine procedure:** Each neonate was fed 30-60 minutes before the procedure. Its diaper was changed just before the procedure. The same procedure was applied to all neonates. The nurse swaddled the baby with her own blanket with the right leg out. The nurse wiped the outer lateral side of the baby's right heel with 70% alcohol. She waited 30 seconds for the alcohol to dry. She used the same type of automatic lancet to prick the heel. She dropped a few drops of blood on a filter paper for the Guthrie screening test. She then covered the injection point with a dry cotton pad. The same environmental conditions (room temperature, light, and noise control) were provided for all neonates.

The control group participants (n=32) underwent the procedure according to routine clinical practice. Either parent brought the baby into the procedure room and laid it on the procedure table in the supine position. The nurse collected the blood sample. The parent was present in the room and communicated with the baby only verbally during the procedure. The parent picked up the baby after the procedure.

Each MHC group participant (n=30) was brought to the procedure room by its mother. The mother sat in a comfortable chair with back support. She held her baby close to her chest, with the baby's head in a crossed position so that it could see its mother. The same nurse collected the blood sample. The mother communicated with the baby verbally and made eye contact with it to calm it down during the procedure. She was holding the baby both during and after the procedure.

Each PHC group participant (n=30) was brought to the procedure room by its father. The father sat in a comfortable chair with back support. He held his baby close to his chest, with the baby's head in a crossed position so that it could see its father. The same nurse collected the blood sample. The father communicated with the baby verbally and made eye contact with it to calm it down during the procedure. He was holding the baby both during and after the procedure.

The researcher recorded all neonates for two minutes before the procedure, during the procedure, and three minutes after the procedure. Their pain scores and crying times were determined using the videos. Two independent observers with PhDs in pediatric nursing filled out the NIPS simultaneously. Interrater reliability analysis was performed to determine whether there was consistency between their scores. The results showed an intraclass correlation coefficient of 0.94. The results were 0.96, 0.92, and 0.89 before, during, and after the procedure. These results indicated a robust agreement between the two observers.<sup>34</sup> The arithmetic mean of the two scores was calculated.

The total crying time during the procedure is between when the heel is pricked, and the injection site is covered with a cotton pad. The total crying time after the procedure is between when the procedure is completed and when the baby calms down. The researcher watched the videos to calculate the crying times.

#### **Ethical considerations**

The study received ethical approval from the ethics committee of the Faculty of Medicine of Çanakkale Onsekiz March University (Date: 03.02.2016 & No: 2016/13173). Informed consent was obtained from all participants. The study was registered at Clinical-Trials.gov (NCT06111534).

#### **Statistical analysis**

The data were analyzed using the SPSS (Chicago, IL, USA for Windows, version 18.0) at a significance level of 0.05. Means, standard deviation, medians, frequencies, rates, minimum and maximum values, and Cronbach's alpha values were used for data analysis. The one-way ANOVA test was used to compare the three groups for the normally distributed data. The Kruskal–Wallis test was used to compare the three groups for the non-normally distributed data. The Mann–Whitney U test was used to determine the source of significant differences. Pearson's Chi-square test was used to compare quantitative data. In addition, intraclass correlation coefficients were used to assess agreement between two independent observers.

#### **RESULTS**

The MHC, PHC, and control groups had a mean gestational age of  $38.10 \pm 7.07$ ,  $39.03 \pm 1.06$ , and  $39.12 \pm 0.79$  weeks, respectively. The groups were similar regarding gestational age, birth weight, height, 5-minute APGAR score, gender, delivery type, and the number of children ( $P > .05$ ; Table 1).

**Table 1. Descriptive Characteristics of Neonates and Parents (n = 92)**

Characteristics	Control (n=32)		MHC (n=30)		PHC (n=30)		F <sup>a</sup>	P
	Mean ± SD		Mean ± SD		Mean ± SD			
Gestational age (week)	39.12±0.79		38.10±7.07		39.03±1.06		.579	.563
Birth weight (g)	3272.18±373.92		3261.66±420.11		3198.33±406.30		.304	.739
Height (cm)	49.91±1.12		50.36±1.09		49.90±1.24		1.632	.201
5 <sup>th</sup> min APGAR scores	9.25±0.43		9.36±0.55		9.33±0.47		.464	.631
	n	%	n	%	n	%	χ <sup>2b</sup>	P
<b>Gender</b>								
Female	21	65.6	16	53.3	18	60.0	.974	.615
Male	11	34.4	14	46.7	12	40.0		
<b>Delivery type</b>								
Vaginal	21	65.6	17	56.7	18	60.0	.536	.765
Caesarean	11	34.4	13	43.3	12	40.0		
<b>Number of children</b>								
1	16	50.0	14	46.7	19	63.3	1.883	.390
2 and more	16	50.0	16	53.3	11	36.7		

<sup>a</sup>ANOVA test; <sup>b</sup>Chi-square test; SD, standard deviation; MHC, maternal holding-cuddling; PHC, paternal holding-cuddling.

Table 2 shows the NIPS scores during and after the procedure. The MHC, PHC, and control groups had a mean procedural NIPS score of 5.76 ± 1.85, 5.83 ± 1.48, and 6.93 ± 0.24, respectively. The MHC, PHC, and control groups had a mean post-procedural NIPS score of 1.46 ± 2.11, 1.73 ± 2.28, and 3.59 ± 3.34, respectively. There was a significant

difference between the procedural and post-procedural NIPS scores ( $P < .05$ ). The MHC group had a significantly lower mean NIPS score than the control group during and after the procedure ( $P < .05$ ). The PHC group had a significantly lower mean NIPS score than the control group during and after the procedure ( $P < .05$ ; Table 2).

**Table 2. Comparison of NIPS Scores During and After Painful Procedure (n = 92)**

NIPS	Control (n = 32)	MHC (n = 30)	PHC (n = 30)	<sup>a</sup> P	<sup>b</sup> P (Group 1-2)	<sup>b</sup> P (Group 1-3)	<sup>b</sup> P (Group 2-3)
<b>During the procedure</b>							
Min-Max (Median)	6-7 (7)	1-7 (6,5)	2-7 (6)	< .001	< .001	< .001	.745
Mean±SD	6.93±0.24	5.76±1.85	5.83±1.48				
<b>After the procedure (2. min)</b>							
Min-Max (Median)	0-7 (4)	0-7 (0)	0-6 (0)	.016	.015	.015	.655
Mean±SD	3.59±3.34	1.46±2.11	1.73±2.28				

SD, standard deviation; MHC, maternal holding-cuddling; PHC, paternal holding-cuddling; NIPS, Neonatal infant pain scale.

<sup>a</sup>P, for Kruskal-Wallis Test; <sup>b</sup>P, for Mann-Whitney U Test

Table 3 compares the crying times during and after the procedure. The control group participants cried the most during (59.25 ± 1.72 sec) and after the procedure (41.66 ± 4.08 sec). The MHC group participants cried the least during the procedure (42.67 ± 7.99 sec). The PHC group participants cried the shortest after the procedure (35.00 ±

6.45 sec). The groups had no significant difference in the post-procedural crying times ( $P > .05$ ). However, there was a significant difference in the procedural crying times between the groups ( $P < .05$ ). MHC and PHC group participants cried significantly less during the procedure than the control group participants (Table 3).

**Table 3. Comparison of Crying Times During and After the Painful Procedure (n = 92)**

Crying times (sec)	Control (n = 32)	MHC (n = 30)	PHC (n = 30)	<sup>a</sup> P	<sup>b</sup> P (Group 1-2)	<sup>b</sup> P (Group 1-3)	<sup>b</sup> P (Group 2-3)
<b>During the procedure</b>							
Min-Max (Median)	55-60 (60)	20-60 (45)	20-60 (52.5)	< .001	< .001	< .001	.003
Mean±SD	59.25±1.72	42.67±7.99	48.92±10.43				
<b>After the procedure</b>							
Min-Max (Median)	35-45 (42.5)	25-45 (40)	25-45 (35)	.177	.497	.55	.403
Mean±SD	41.66±4.08	38.00±8.36	35.00±6.45				

SD, standard deviation; MHC, maternal holding-cuddling; PHC, paternal holding-cuddling. <sup>a</sup>P, for Kruskal-Wallis Test; <sup>b</sup>P, for Mann-Whitney U Test.



## DISCUSSION

The heel prick, or heel lancing, is a painful procedure. All our participants had high NIPS scores. While experts advise using pharmacological and non-pharmacological methods to prevent or lessen heel prick pain, pharmacological methods have side effects. Healthcare professionals also do not prefer non-pharmacological methods because they are costly and impractical procedures that take time.<sup>10</sup> However, cost-effective and practical non-pharmacological methods are becoming popular for painful procedures. One of those methods is parental holding-cuddling. This study compared the effect of maternal holding-cuddling (MHC) and paternal holding-cuddling (PHC) methods on heel prick pain in neonates. Our results showed that both methods helped neonates show less pain ( $P < .05$ ).

Maternal holding-cuddling is an effective non-pharmacologic method to relieve pain perception.<sup>20</sup> Our MHC group had lower pain scores and cried less during the procedure than the control group. Our MHC group had lower pain scores after the procedure than the control group. Karakoç and Türker<sup>20</sup> conducted a study with 120 newborns to investigate the effect of the MHC method and white noise on pain perceptions and crying during heel pricks. They found that the white noise group had lower pain scores and cried less during the procedure than the MHC group ( $P < .05$ ). Obeidat and Shurique<sup>4</sup> compared the efficacy of MHC with breastfeeding (Group 1) and MHC without breastfeeding (Group 2) in relieving painful responses during heel pricks in full-term neonates. They reported that Group 1 had lower pain scores than Group 2 ( $P < .05$ ). Yilmaz and Inal<sup>13</sup> looked into the effects of (1) swaddling, (2) swaddling and maternal holding, and (3) swaddling, maternal holding, and breastfeeding on heel prick pain levels in healthy term neonates and determined that the third method was more effective than the others ( $P < .05$ ). However, the groups had no significant difference in total crying times. Bembich et al.<sup>19</sup> conducted a study with 80 healthy term newborns divided into four groups: (1) oral glucose, (2) expressed breast milk, (3) maternal holding plus oral glucose, and (4) breastfeeding. They concluded that Group 3 had lower pain scores than Group 1 ( $P < .05$ ). Inal et al.<sup>11</sup> investigated how effectively swaddling and maternal holding reduce pain levels during heel pricks in healthy-term newborns. They recruited 105 healthy neonates divided into swaddling (S), maternal holding (MH), and control (C) groups. They found that Group MH had a significantly lower mean procedural and post-procedural NIPS score than the control group ( $P < .05$ ). However, they did not detect a difference in the total crying times between the groups.<sup>11</sup> Our results also showed that

the MHC group had a lower mean NIPS score than the control group, supporting the results of previous studies.

Healthcare professionals should encourage fathers to participate in medical procedures to make neonatal care more family-centered. Fathers can play as effective a role as mothers in painful minor medical procedures. For example, PHC can relieve the pain of neonates during heel pricks. Our PHC group had lower pain scores and cried less during the procedure than the control group. In addition, our PHC group had lower pain scores after the procedure than the control group. Earlier research has shown that the kangaroo father care method can help reduce neonates' pain levels during heel pricks.<sup>27,30,35</sup>

The MHC and PHC group participants cried less during the procedure than the control group participants. However, there was no significant difference in the total crying times between the groups after the procedure. This is probably because the control group participants were calmed down by their parents as they were held by them after the procedure. However, the fact that there was no significant difference in the total crying times between the groups after the procedure indicates that the PHC method effectively reduces the pain and anxiety levels of neonates during heel pricks.

The results showed that the MHC and PHC groups had lower pain levels and cried less during the procedure than the control group. There was no difference in the NIPS scores between the MHC and PHC groups. We think this is the most important finding because fathers are more actively engaged in caring for their babies and are more interested in being there for them during medical procedures than they used to. Moreover, some mothers cannot be there for their babies due to postpartum medical complications. Therefore, fathers play a crucial role in relieving the pain levels of their babies undergoing medical procedures. Our results indicate that the PHC method is as effective as the MHC method in reducing the pain levels of neonates during heel pricks. This study focused on the effect of both MHC and PHC on pain levels and crying times of neonates undergoing heel pricks. The MHC group participants cried less than the PHC group participants during the procedure ( $P < .05$ ). There was no difference in the total crying times between the two groups after the procedure ( $P > .05$ ). Johnston et al.<sup>30</sup> examined the impact of maternal kangaroo care (MKC) and paternal kangaroo care (PKC) on the pain levels of preterm neonates during heel pricks. They scored pain at 30, 60, 90, and 120 seconds. They found that the MKC group had a lower mean pain score at 30 and 60 seconds than the PKC group. The two had no significant difference in the pain scores at 90

and 120 seconds.<sup>30</sup> Our result suggests mothers are better at soothing and calming their babies than fathers. This is probably because mothers have a unique relationship with their babies and are more experienced in calming them down than fathers.

### Limitations

The study has three limitations. First, due to the nature of the trial, researcher blinding could not be performed. The researcher knew to which group the neonates would be assigned. Two observers assessed the primary variable to reduce investigator bias. Additionally, statistical blinding was performed. Second, the intervention could not be blinded. The two observers who watched the video recordings saw the whole body of the newborn to observe the behavioral responses to the painful intervention. Thus, they could see which intervention (MHC, PHC, control) was given to the neonate. Third, the control group underwent no active intervention to detect the effectiveness of the MHC and PHC methods during the procedure. The control group only received routine swaddling.

Full-term neonates held and cuddled by their parents (MHC and PHC) have less procedural pain and cry less than those who are not. MHC and PHC methods effectively reduce the procedural pain of neonates during heel pricks. However, full-term neonates held and cuddled by their mothers cry less during heel pricks than those held and cuddled by their fathers. Our results indicate that the PHC method is as effective as the MHC method in managing procedural pain in neonates undergoing heel pricks. Healthcare professionals can safely use the MHC and PHC methods to relieve the pain levels of neonates undergoing heel pricks. Our results showed that the MHC and PHC methods helped neonates to have fewer signs of pain and cry less during the procedure. Our results indicate that the PHC method is as effective as the MHC method in managing procedural pain. More research is needed to explore the impact of these methods on painful procedures.

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**Hasta Onamı:** Bu çalışmaya katılan tüm katılımcılardan yazılı bilgilendirilmiş onam alınmıştır.

**Hakem Değerlendirmesi:** Dış bağımsızdır.

**Yazar Katkıları:** Fikir- FYK, AAÖ, SK, SA; Tasarım- FYK, AAÖ, SK, SA, NA,HA; Denetleme- FYK, AAÖ, SK, SA; Kaynaklar- FYK, AAÖ, SK, SA, HA; Veri Toplanması ve/veya İşlemesi- FYK, AAÖ, SK, SA, NA; Analiz ve/veya Yorum- FYK, AAÖ, SK, SA, NA,HA; Literatür Taraması- FYK, AAÖ, SK, SA, NA,HA; Yazıyı Yazan- FYK, AAÖ, SK, SA, HA; Eleştirel İnceleme- FYK, AAÖ, SK, SA, NA,HA.

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**Author Contributions:** Concept- FYK, AAÖ, SK, SA; Design- FYK, AAÖ, SK, SA, NA,HA; Supervision-FYK, AAÖ, SK, SA; Resources- FYK, AAÖ, SK, SA, HA; Data Collection and/or Processing- FYK, AAÖ, SK, SA, NA; Analysis and/or Interpretation- FYK, AAÖ, SK, SA, NA,HA; Literature Search- FYK, AAÖ, SK, SA, NA,HA; Writing Manuscript- FYK, AAÖ, SK, SA, HA; Critical Review- FYK, AAÖ, SK, SA, HA.

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