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The Effect of Warm Foot Bath Applied Before Capillary Heel Blood Sampling for Term Newborns: A Randomized Controlled Trial

Term Yenidoğanlarda Kapiller Topuk Kanı Alınmadan Önce Uygulanan Ilık Ayak Banyosunun Etkisi: Randomize Kontrollü Çalışma

Fahriye PAZARCIKCI[a], Ayla KAYA[b]

[a]Isparta University of Applied Sciences Vocational School of Technical Sciences, Department of Medical Services and Techniques, Isparta, Türkiye
[b]Akdeniz University Faculty of Nursing, Department of Pediatric Nursing, Antalya, Türkiye

ABSTRACT Objective: This research aimed to assess the effect of warm foot bath applied before capillary heel blood sampling for newborns on pain level and procedure duration. **Material and Methods:** In this randomized controlled trial, eighty term neonates were randomly assigned to a hot foot bath group (n=40) and a control group (n=40). The warm foot bath's effectiveness was evaluated at four time points: basal/one minute before the heel puncture (T1), during the heel puncture (T2), 1 minute after the heel puncture (T3), and 5 minutes after the heel puncture (T4). In the study, to determine the efficacy of the warm foot bath, neonates were recorded for six minutes before heel puncture and five minutes after heel puncture with a video camera. The video camera data were assessed using the Neonatal Infant Pain Scale by two specialists who were independent of the study. **Results:** Pain scores in the warm foot bath group were significantly lower than the control group both during heel puncture and one minute after heel puncture ($p<0.01$). In addition, the total procedure time was significantly shorter in the intervention than in the control group ($p<0.001$). **Conclusion:** Warm foot bath before capillary heel blood sampling reduces acute pain, and shortens the total procedure time in term newborns. This study was registered at ClinicalTrials.gov (NCT05220930) https://clinicaltrials.gov/ct2/show/NCT05220930.

Keywords: Foot bath; pain; heel blood sampling; newborn; warm application

ÖZET Amaç: Bu çalışmanın amacı, yenidoğanlar için kapiller topuk kanı alınmadan önce uygulanan ılık ayak banyosunun ağrı düzeyi ve işlem süresi üzerine etkisini belirlemektir. **Gereç ve Yöntemler:** Bu randomize kontrollü çalışmada, 80 term yenidoğan ılık ayak banyosu grubuna (n=40) ve kontrol grubuna (n=40) rastgele atanmıştır. Ilık ayak banyosunun etkinliği 4 zaman noktasında değerlendirilmiştir: bazal/topuk ponksiyonundan bir dakika önce (T1), topuk ponksiyonu sırasında (T2), topuk ponksiyonundan 1 dakika sonra (T3) ve topuk ponksiyonundan 5 dakika sonra (T4). Çalışmada, ılık ayak banyosunun etkinliğini belirlemek için yenidoğanlar topuk ponksiyonundan önce 6 dakika ve topuk ponksiyonundan sonra 5 dakika boyunca video kamera ile kaydedilmiştir. Video kamera verileri, çalışmadan bağımsız iki uzman tarafından Yenidoğan Bebek Ağrı Ölçeği kullanılarak değerlendirilmiştir. **Bulgular:** Ilık ayak banyosu grubundaki ağrı skorları hem topuk ponksiyonu sırasında hem de topuk ponksiyonundan 1 dakika sonra kontrol grubuna göre anlamlı derecede düşüktür ($p<0,01$). Ayrıca toplam işlem süresi girişim grubunda kontrol grubuna göre anlamlı derecede kısadır ($p<0,001$). **Sonuç:** Kapiller topuk kanı örneklemesinden önce ılık ayak banyosu, term yenidoğanlarda akut ağrıyı azaltır ve toplam işlem süresini kısaltır. Bu çalışma, ClinicalTrials.gov (NCT05220930) https://clinicaltrials.gov/ct2/show/NCT05220930 adresinde kayıtlıdır.

Anahtar Kelimeler: Ayak banyosu; ağrı; topuk kanı örneği toplama; yenidoğan; ılık uygulama

Heel blood sampling within the scope of the neonatal metabolic screening program is a frequently applied capillary blood sampling procedure that causes acute pain.[1-3] In addition, inhibitory mechanisms that reduce pain in newborns are immature. Therefore, newborns may feel pain more severely

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Correspondence: Ayla KAYA
Akdeniz University Faculty of Nursing, Department of Pediatric Nursing, Antalya, Türkiye
E-mail: aylakaya@akdeniz.edu.tr

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than others.[4] Exposure to pain can adversely affect brain development and organization in newborns.[5] Moreover, exposure to pain in the early stages of life can negatively affect the newborn's behavior, mother-infant interaction, feeding pattern, and sense development.[6] Many non-painful practices in routine care can trigger a stress response in newborns.[7] Pain experiences in newborns may affect their response to pain in the future, causing them to have pain sensitivity throughout their lives.[3] In addition, it may be difficult to obtain a capillary blood sample from the heel of some newborns. Therefore, healthcare professionals apply more pressure to the heel to obtain sufficient blood for the test, causing newborns to experience more pain and bruised or swollen heels, and leading to poor-quality blood samples.[5,8,9] Therefore, newborns need support and protection during this procedure.[10] The literature emphasizes minimizing the number of painful procedures newborns undergo and applying pain-reducing interventions as much as possible during a procedure when invasive intervention is required.[8,11]

Previous studies have reported the effects of non-pharmacological interventions applied before capillary heel blood sampling or during the procedure on pain, and total procedure time in newborns.[3,6,12-14] Heat application (heel warming) before the heel blood sampling procedure is one non-pharmacological method that can reduce the pain of heel blood collection, increase comfort, and shorten procedure time.[2,6,7,9,15-17] Heat application induces proximal vasodilation by elevating the skin surface temperature. Consequently, blood flow accelerates, leading to increased circulation.[7] This heightened blood circulation may alleviate the pressure on the newborn's heel, potentially shortening the procedure duration and mitigating the perception of pain.[6,9] It is hypothesised that increased blood flow and reduced pressure applied by heel squeezing will minimise the risk of haemolysis.[7,15] Haemolysis results in the inability to measure biochemical tests.[7] Heel heating has been reported to improve the quality of both the procedure and the specimen.[7]

Foot baths, widely recognized as a common complementary practice, play a crucial role in improving compliance with pain management strategies.[18] This uncomplicated method of applying heat not only induces a sense of comfort but is also acknowledged in the literature for its positive impact on overall health.[19] Studies are reporting the benefits of warm foot baths for different age and patient groups.[18-26] This is the first study to investigate the effect of warm foot baths before capillary heel blood sampling for newborn metabolic screening on acute pain level and total procedure time in newborns. This study provides clinical practitioners with evidence for the effects of a warm foot bath, an inexpensive, non-invasive, non-pharmacological, and easy-to-apply intervention. Therefore, we conducted a randomized controlled study to evaluate the effect of a warm foot bath applied before capillary heel blood sampling for newborn metabolic screening on acute pain level (H1) and procedure duration (H2) in newborns under the leadership of an experienced PhD pediatric nurse.

MATERIAL AND METHODS

STUDY DESIGN

A randomized, double-blind controlled trial was performed between May 11 and September 21, 2022. The study was approved by ClinicalTrials.gov (NCT05220930). This study reports data according to the Consolidated Standards of Reporting Trials (CONSORT) 2010 checklist for a randomized trial.

SETTING AND SAMPLE

This study was conducted in one of the largest public hospitals in the region, with approximately 1,000 beds. Approximately 1,500 births occur annually in the hospital. The target subjects were healthy term newborns who were to undergo capillary heel blood sampling within the scope of the neonatal metabolic screening program.

Inclusion criteria

- Infants delivered within the gestational age range of 38-42 weeks (term newborns)
- Neonates weighing between 2,500 and 4,400 grams at birth
- Newborns exhibiting stable physiological parameters and overall well-being

■ Newborns who received vitamin K and hepatitis B vaccination in the delivery room

■ Neonates achieving Apgar scores of ≥8 in both the first and fifth minutes

Exclusion criteria

■ Neonates experiencing complications during pregnancy, labor, or postpartum

■ Newborns diagnosed with congenital anomalies

■ Infants undergoing pharmacological or non-pharmacological pain management interventions before the procedure

■ Neonates requiring oxygen therapy

■ Newborns who have undergone a surgical procedure

■ Infants with confirmed or suspected sepsis

■ Neonates whose parents explicitly expressed their intention to withdraw from the study before its completion

The G*Power 3.1 (Franz Faul, Universität Kiel, Kiel, Almanya) program was used to calculate the study's sample size. The Neonatal Infant Pain Scale (NIPS) scores of a similar study were used as the reference in the sample calculation.[6] The effect size was calculated as 0.59 using the independent samples *t*-test for the control (NIPS score=4.64±2.02) and intervention (NIPS score=3.40±2.22) groups.[9] Therefore, the power analysis was performed based on a 0.59 effect size, a 5% error margin, and 80% power. It was determined that a sample size of 37 in each group would be sufficient. Since some missing cases may arise, 80 participants were included (warm foot bath group=40, control group=40) in this study (Figure 1).

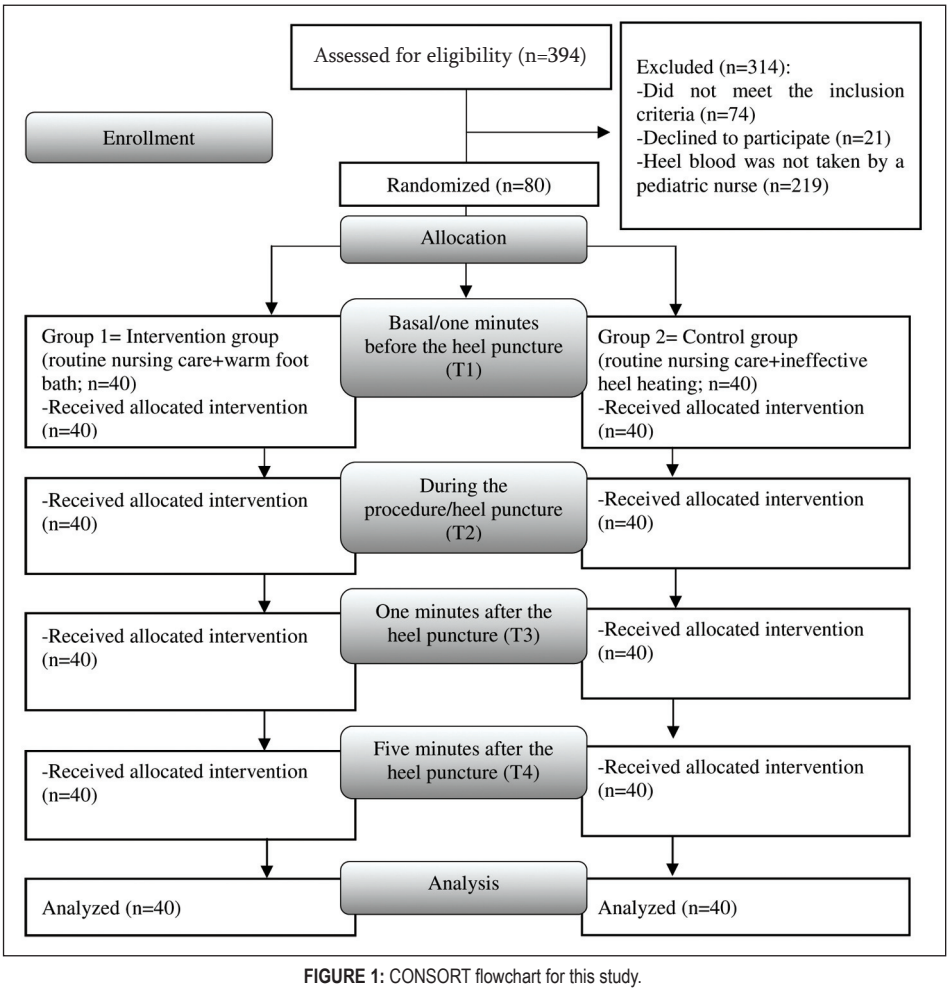

FIGURE 1: CONSORT flowchart for this study.

Randomization, Allocation, and Blinding

Participants were assigned to their groups using a simple randomization method. Eighty small envelopes were placed in an opaque envelope, 40 containing the words "Group 1" and 40 "Group 2." Later, a parent of each participant who met the inclusion criteria was asked to choose a small envelope from the opaque envelope. Consequently, participants were randomly assigned to one of the two groups. The CONSORT 2010 flow diagram was followed to manage the random allocation (Figure 1). Since the participants were newborns, they had no idea about the interventions. In this study, NIPS scores and total processing time were determined by two independent pain specialists based on watching the video recording data. Therefore, the health professionals who evaluated the study data were blinded. The study database was created as "Group 1" and "Group 2" by a healthcare professional blind to this study. The data were evaluated by an expert statistician blind to the study. Therefore, double blinding was achieved.

Pilot Study

A pilot study was conducted with 10 participants between May 1 and 9, 2022, to evaluate the data collection tools and potential intervention effects. Participants included in the pilot study were not included in the sample. Based on the pilot study, it was decided to: (1) put a different disposable plastic bag into the basin where the foot bath was applied for each attempt; (2) put the thermophore providing ineffective heel heating in a different disposable plastic bag for each attempt.

Interventions

In the study, all group received routine nursing care during heel stick sampling. In addition to routine nursing care, Group 1 received warm foot bath and Group 2 (control group) received ineffective heel warming with 28 °C water. The same clinic nurse provided routine nursing care and performed blood draws for both groups. A PhD researcher in pediatric nursing gave the warm foot bath and an ineffective heel-warming applications. Heel blood sampling is performed in the patient's room, which is 25 ºC-26 ºC and has an ambient humidity of 40% on average. The filter paper on which the heel blood is taken has 5 circles. The study protocol is shown in Figure 2.

Routine Nursing Care

Capillary heel blood samples are routinely obtained from every newborn in the hospital where the research was conducted, typically 24-48 hours after the initiation of oral feeding and before discharge. This

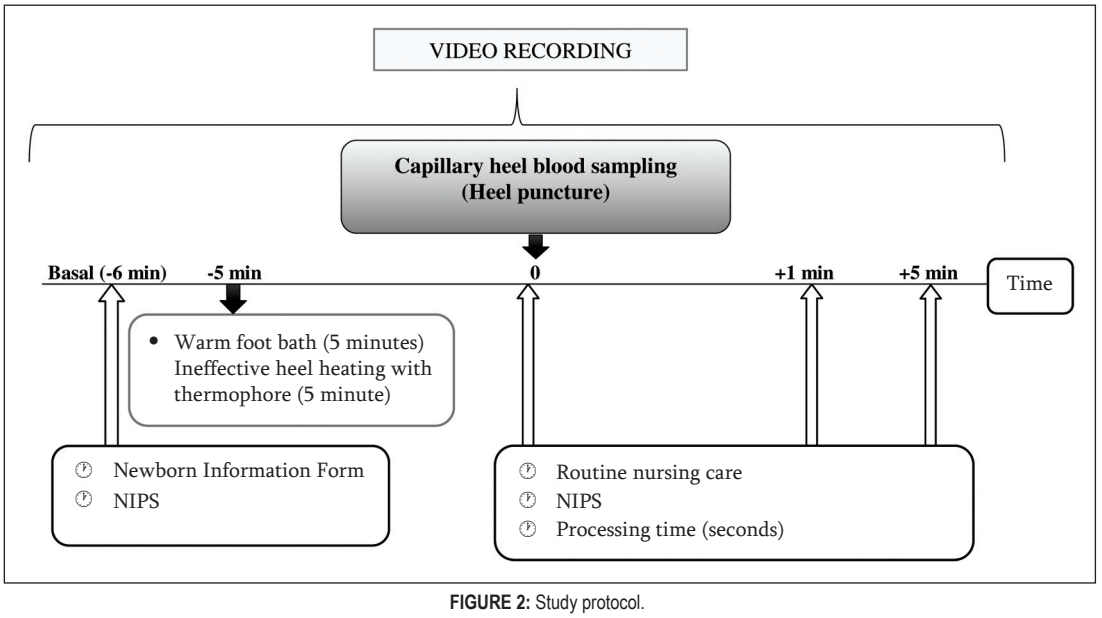

FIGURE 2: Study protocol.
NIPS: Neonatal Infant Pain Scale.

procedure is commonly performed between 08.00 and noon. During the heel prick and sampling process, neonates are held in the arms of their mother or father. To enhance venous pressure, the neonate's legs are positioned below heart level. Parents are encouraged to speak to their baby in a calm and pleasant tone during the heel stick and sampling. Throughout the procedure, the neonate is securely wrapped, leaving only their foot exposed. Before collecting the capillary heel blood sample, the heel skin is cleansed with 70% alcohol and dried using sterile gauze. The blood sample is then taken from either the medial or lateral outer edge of the heel's flat surface. A disposable sterile lancet is used during the heel piercing, and the heel is pierced ≤2.5 mm. The newborns were breastfed from their mothers after the capillary heel blood samples procedure.

Warm Foot Bath

Foot baths are among the most commonly utilized complementary therapies for enhancing adherence to pain management, promoting a sense of comfort, and positively impacting health.[18,24] It is performed simply by immersing the feet or legs in a basin filled with 15-20 cm of water at 38ºC-42ºC, starting just below the knee level. This heat application method is simple and cost-effective.[18,19,22] The literature review determined that in previous capillary heel blood sampling studies, the heat application was performed 5-10 minutes before heel puncture using some physical agents that emit heat at 34ºC-40ºC.[2,6,9] Therefore, in this study, the warm foot bath was applied 5 minutes before capillary heel blood sampling. The newborn's legs were immersed in a 15-20 cm basin filled with 40ºC water, starting just below the knee level. Each collection had a different disposable plastic bag inserted into the basin to avoid cross-contamination. The temperature of the foot bath water was checked using a specially calibrated Celsi TP101 water thermometer with a 15 cm long immersion probe, capable of measuring temperatures between -50ºC and 300ºC. After the foot bath, the newborn's heels were dried with their blanket or towel. The newborn's general condition and skin changes were observed closely during and after capillary heel blood sampling and during the foot bath.

Ineffective Heel Warming

To maintain the blinding of neonates in the control group during the study, an additional procedure was implemented alongside the routine nursing care standardly provided on the ward. This involved the application of ineffective heel warming using a thermophore containing water at 28°C for a duration of 5 minutes before the heel stick sampling procedure. The temperature of the water placed in the thermophore was controlled using a specially calibrated Celsi TP101 water thermometer with a 15 cm long immersion-type probe capable of measuring temperatures between -50ºC and 300ºC. The thermophore was filled up to two-thirds with water, all air was expelled, and the cap was securely sealed. A thorough check for any potential leaks was conducted. The thermophore was placed in a different disposable plastic bag for each attempt to avoid cross-contamination. Infants retained their clothing while undergoing ineffective warming, ensuring that the thermophore did not come into direct contact with their skin. They were closely monitored while lying on their backs, covered with their own blankets throughout the ineffective heel warming procedures.

Instruments

Newborn Information Form

The researchers prepared the form consistent with the literature to obtain information about the newborns selected for sampling.[2,6,27] The form contained 5 questions asking the newborn's sex, birth type, week of gestation, mean body weight, and mean birth length.

NIPS

The NIPS was developed by Lawrence et al. in 1993 to assess pain and translated into Turkish by Akdovan in 1999.[28] This scale is used to assess interventional pain in premature and term neonates. This scale comprises five behavioral indicators (facial expression, leg movement, arm movement, crying, and wakefulness) and one physiological indicator (respiratory rhythm). Total scores range from 0 to 7. Higher scores indicate higher pain intensity. The NIPS' internal consistency was reported to be 0.95 before the transaction, 0.87 during the transaction, and 0.88 after

the transaction. In this study, its Cronbach's alpha was 0.63.

DATA COLLECTION PROCEDURE

In this study, the intervention's efficacy was evaluated at 4 time points determined from the literature: one minute before/basal (T1), during the procedure/heel puncture (T2), 1 minute after the heel puncture (T3), and 5 minutes after the heel puncture (T4).[2,6,9] The capillary heel blood sampling procedure was video-recorded from the pre-evaluation stage to the fifth minute after the procedure (Figure 2). The video recording was monitored by two independent specialists unaware of this study's purpose to determine NIPS scores at each time point and total procedure time.

DATA ANALYSIS

Statistical analyses were performed using SPSS 23.0 (IBM Corporation, Armonk, NY, USA), considering a statistical significance of $p<0.05$. Cronbach's alpha coefficient was used in the scale's reliability analysis. The Kolmogorov-Smirnov test was used to assess the normality of the data. Descriptive data are presented as numbers and percentages and were compared between groups using Pearson's chi-square (χ^2) test and the t-test for independent samples. Continuous data are presented as means with standard deviations and were compared between groups using analyses of variance (ANOVA) test for repeated measures, effect size (η^2), and the t-test for independent samples. Observed power was calculated using the t-test for independent samples.

ETHICAL CONSIDERATIONS

This study was approved by the Süleyman Demirel University Clinical Trials Ethics Committee (date: December 23, 2021; number: 23/359). It was performed according to the ethical principles in the Declaration of Helsinki. During registration, the parents of potential participants were informed about anonymity and that they could freely choose or decline to participate in the study. Written informed consent was obtained from the parents of participants who met the inclusion criteria.

RESULTS

INFANT CHARACTERISTICS

This study included 80 term newborns with a mean gestational age of 39.20±1.02 weeks, of which 43.8% were female and 56.2% were male. In addition, 36.3% by cesarean section and 63.7% were born by vaginal delivery. Infant sex, gestational age, delivery method, mean birth length, and mean body weight did not differ significantly between groups at baseline (Table 1).

COMPARISON OF NIPS SCORES

Table 2 shows the distribution of the mean NIPS scores for both raters in each group at each time point.

TABLE 1: Participant characteristics in each group.

Variable	Total (n=80) n (%)	Warm foot bath group (n=40) n (%)	Control group (n=40) n (%)	χ^2	p value
Sex					
Female	35 (43.8)	17 (42.5)	18 (45.0)	0.051	0.822
Male	45 (56.2)	23 (57.5)	22 (55.0)		
Delivery method					
Vaginal birth	51 (63.7)	28 (70.0)	23 (57.5)	1.352	0.245
Cesarean	29 (36.3)	12 (30.0)	17 (42.5)		
	$\bar{X}$±SD	$\bar{X}$±SD	$\bar{X}$±SD	t	p value
Gestational age (week)	39.20±1.02	39.07±0.97	39.32±1.07	-1.093	0.278
Body weight (g)	3271.15±358.86	3297.25±394.82	3245.05±321.84	0.648	0.519
Birth length (cm)	49.90±0.77	49.95±0.90	49.85±0.62	0.576	0.566

χ^2: Pearson's chi-square test; t: Independent samples t-test; SD: Standard deviation.

TABLE 2: Comparison of term infants' NIPS scores by groups and time point.

Variable	Warm foot baht group (n=40) X̄±SD	Control group (n=40) X̄±SD	95% CI (lower, upper)	t	p value	d		SS	df	MS	F	p value	Partial η^2	Observed power
NIPS1														
T1	0.52±0.71	0.50±0.59	-0.26, 0.31	0.169	0.866	0.03	Group:	2.363	1	2.363	6.762	0.011	0.080	0.728
T2	4.72±0.99	5.40±0.98	-1.11, -0.23	-3.067	**0.003**	**0.69**	Error:	27.261	78	0.349				
T3	1.05±0.90	1.60±1.29	-1.04, -0.05	-2.200	**0.031**	**0.49**								
T4	0.50±0.84	0.67±0.91	-0.56, 0.21	-0.887	0.378	0.19								
NIPS2														
T1	0.50±0.67	0.45±0.59	-0.23, 0.33	0.350	0.728	0.07	Group:	1.953	1	1.953	6.368	0.014	0.075	0.703
T2	4.82±0.87	5.45±0.93	-1.02, -0.22	-3.094	**0.003**	**0.69**	Error:	23.922	78	0.233				
T3	1.02±0.89	1.55±1.23	-1.00, -0.04	-2.175	**0.033**	**0.49**								
T4	0.52±0.84	0.67±0.85	-0.52, 0.22	-0.786	0.434	0.17								

NIPS: Neonatal Infant Pain Scale; NIPS1: Evaluator 1 average NIPS scores; T1: Basal; T2: During heel puncture; T3: One minutes post-heel puncture; T4: Five minutes post-heel puncture; NIPS2: Evaluator 2 average NIPS scores; SD: Standard deviation; CI: Confidence interval; t: Independent samples t-test; d: Cohen's d; SS: Sum of squares; df: Degrees of freedom; MS: Mean square; F: Repeated measures analysis of variance; η^2: Effect size.

The NIPS scores of both groups were statistically similar at baseline before the warm foot bath or control group according to both evaluators [NIPS1T1: t=0.169, p>0.05, 95% confidence interval (CI): -0.26, 0.31; NIPS2T1: t=0.350, p>0.05, 95% CI: -0.23, 0.33]. However, both evaluators' NIPS scores were significantly lower in the intervention group than in the control group during heel puncture (NIPS1T2: t=-3.067, p=0.003, 95% CI: -1.11, -0.23, d=0.69; NIPS2T2: t=-3.094, p=0.003, 95% CI:-1.02, -0.22, d=0.69) and one minute after the heel puncture (NIPS1T3: t=-2.200, p=0.031, 95% CI: -1.04, -0.05, d=0.49; NIPS2T3: t=-2.175, p=0.033, 95% CI:-1.00, -0.04, d=0.49). However, at the final time point 5 minutes after the heel puncture, both evaluators' NIPS scores did not differ significantly between groups (NIPS1T4: t=-0.887, p>0.05, 95% CI:-0.56, 0.21; NIPS2T4: t=-0.786, p>0.05, 95% CI:-0.52, 0.22). In addition, a repeated measurement ANOVA between groups showed significantly lower NIPS scores in the intervention group than in the control group (NIPS1: $F_{(1-78)}$=6.762, p=0.011, η^2=0.080, observed power=0.728; NIPS2: $F_{(1-78)}$=6.368, p=0.014, η^2=0.075, observed power=0.703).

COMPARISON OF PROCEDURE TIME

Table 3 shows the average procedure time distributions for each group. Treatment time was significantly shorter in the intervention group than in the control group for evaluators 1 (t=-5.826, p=0.000, 95% CI:-93.85, -46.04, d=1.30) and 2 (t=-5.855, p=0.000, 95% CI:-93.46, -46.03, d=1.30).

DISCUSSION

Reducing the pain experienced by newborns in routine invasive procedures and maintaining their comfort provides various significant benefits.[3,10,15] Therefore, newborns should be supported and protected during invasive procedures.[10] Widely acknowledged as a prevalent complementary practice, warm foot baths involve a straightforward application of heat, generating a sense of comfort and showcasing positive health effects, as evidenced in the literature.[18,19] The benefits of warm foot baths have been tested for different age and patient groups.[19-26] However, this is the first study to investigate the ef-

TABLE 3: Comparison of total procedure time in each group.

Variable	Warm foot bath group (n=40) X̄±SD	Control group (n=40) X̄±SD	95% CI (lower, upper)	t	p value	d
Evaluator 1 procedure time (seconds)	66.07±21.03	136.02±72.96	-93.85, -46.04	-5.826	**0.000**	**1.30**
Evaluator 2 procedure time (seconds)	65.95±20.74	135.70±72.43	-93.46, -46.03	-5.855	**0.000**	**1.30**

t: Independent samples t-test; d: Cohen's d; SD: Standard deviation; CI: Confidence interval.

fect of warm foot baths applied before capillary heel blood sampling for newborn metabolic screening on the pain level and procedure time of term newborns. This study demonstrated the effectiveness of warm foot bathing in managing procedural pain during capillary heel blood sampling, as well as reducing the procedure time. This study results support hypothesis 1, and 2.

In this study, term newborns who received a foot bath had lower pain levels during heel puncture and one minute after the heel puncture and shorter procedure times than those who received control group. These results are similar to other studies that examined acute pain and total procedure time in newborns given heat applications before capillary heel blood sampling. One study reported that heating the heel with a hot water bag reduced procedural pain, increased comfort, and shortened total procedure time during capillary heel blood sampling.[6] Similarly, another study found that heating the heel with a hot water bag reduced procedural pain in newborns during capillary heel blood sampling.[9] Cong found that heel warming effectively reduces infant pain during heel stick tests for blood sampling and can be used as pain interventions in routine neonatal practice.[16] Pazarcıkcı and Aydınlı demonstrated that the total procedure time and crying duration were statistically significantly shorter in healthy term newborns whose heels were warmed with a hot water bag containing water at 38-40 degrees Celsius before heel stick sampling compared to the control group.[15] Sapkota et al. reported that heel warming with an electro-thermal water bag reduced procedural pain in newborns during capillary heel blood sampling.[2] Buyuk illustrated that applying heat before capillary heel blood sampling shortened crying lengths and total procedure time in babies.[27] There are limited studies investigating the effects of heat application in reducing procedural pain during capillary heel blood sampling. Pasha et al. investigated the effect of heat application on acute pain during invasive procedures by placing a 37°C hot water bag on the vastus lateralis muscle for 5, 10, or 15 minutes before the vitamin K injection.[29] They found that the pain scores of infants decreased as the local heating time increased. Cong reported that the mechanisms underlying the reduction of pain with heel warming should be investigated in future studies.[16] However, unlike our study, Mir et al. reported that warming the heel prior to capillary heel blood sampling only increased blood flow in newborns for easier blood sampling and did not affect pain.[17]

A warm foot bath is a cost-effective and easy-to-apply method. Therefore, it can be applied by nurses in routine clinical care. It is anticipated that this initiative will contribute to protecting infants' health and reduce nurses' workload. Since the neonatal period is when the foundations of healthy childhood and adulthood are laid, the importance of the practice becomes even more important.

STRENGTHS AND LIMITATIONS

This study has several strengths. It is the first with a randomized control design to test the effect of a warm foot bath before capillary heel blood sampling on procedural pain and total procedure time in term newborns. The study had a sufficient sample size. Despite its strengths, this study also had some limitations. It was a single-center study. Only newborns born at one hospital in Türkiye Mediterranean Region who underwent heel blood sampling within the scope of the newborn metabolic screening program were included in this study.

CONCLUSION

Pediatric nurses play a crucial role in managing pain during procedures that may impact healthy developmental processes. This study showed that a warm foot bath applied before capillary heel blood sampling effectively reduces procedural pain and shortens the procedure time in healthy term newborns. It is believed that reducing acute pain during this process and shortening the procedure time will contribute to improving infants' health outcomes. It is recommended that a warm foot bath should be applied to all term newborns undergoing capillary heel blood sampling within the scope of the newborn metabolic screening program. It should be introduced to nurses and added to guidelines. In future studies, it is recommended that a warm foot bath be tested for capillary heel blood sampling in preterm newborns.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Fahriye Pazarcıkcı, Ayla Kaya;* ***Design:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Control/Supervision:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Data Collection and/or Processing:*** *Fahriye Pazarcıkcı;* ***Analysis and/or Interpretation:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Literature Review:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Writing the Article:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Critical Review:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***References and Fundings:*** *Fahriye Pazarcıkcı, Ayla Kaya;* ***Materials:*** *Fahriye Pazarcıkcı, Ayla Kaya.*

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