

ORIGINAL ARTICLE / ORJİNAL MAKALE

The Effect of Yakson Touch on Pain and Physiological Parameters of the Newborn

Yakson Dokunmanın Yenidoğanın Ağrı ve Fizyolojik Parametreleri Üzerine Etkisi

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Abstract

Background: The stressors faced by the newborn can directly affect the newborn's sensory development, brain development and organization by causing pain in the newborn. Yakson touch, a traditional Korean cultural practice, is known to reduce the pain in the newborn.

Aims: The aim of this study is to examine the effect of Yakson touch applied to the newborn on pain and physiological parameters during the heel prick procedure.

Methods: The study was conducted using a randomized controlled trial design (experimental, control). The study sample consisted of 80 newborns (experimental group = 40, control group = 40), all born between 35-40 gestational weeks and considered suitable for clinical conditions. Yakson touch is a technique that involves warm, pressure less, slow, and compassionate touch, following a fixed fifteen-minute protocol. The Yakson touch protocol was initiated for the experimental group before the heel prick procedure. Research data were obtained using the Parent and Baby Information Form, Physiological Parameters Observation Form and Newborn Baby Pain Scale. Data analysis was performed using IBM SPSS V23 and the significance level was taken as $p < .05$.

Results: There was no difference between the experimental and control groups in terms of neonatal oxygen saturation, heart rate, and pain score before, during, and after the procedure ($p > .05$). There was no difference in cry duration between the two groups before and after the heel prick procedure, but the newborns in the experimental group cried less during the heel prick procedure compared to the control group ($p = .007$).

Conclusion: The newborns in the experimental group, who receives Yakson touch during the heel pricking procedure, had shorter crying times than those in the control group. Therefore, it is recommended to include Yakson touch in nursing interventions during this procedure.

Keywords: Pain, Newborn, Yakson Touch, Heel Blood, Nursing

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Öz

Giriş: Yenidoğanın karşılaştığı stresörler yenidoğanda ağrı algısı oluşturmakla birlikte duyu gelişimini, beyin gelişimini ve organizasyonunu doğrudan etkileyebilmektedir. Geleneksel Kore kültüründen gelen Yakson dokunmanın yenidoğanın ağrı tepkilerini azaltmada yardımcı olduğu bilinmektedir.

Amaç: Bu çalışmanın amacı topuktan kan alınması sırasında yenidoğana uygulanan Yakson dokunmanın ağrı ve fizyolojik parametreler üzerine etkisinin incelenmesidir.

Yöntem: Araştırma, randomize kontrollü deneysel desende (deney-kontrol) gerçekleştirilmiştir. Araştırmanın örneklemini, klinik koşuldaki bebeklerin uygunluğu düşünülerek 35-40 gestasyonel haftasına sahip toplam 80 yenidoğan (deney= 40, kontrol= 40) oluşturmuştur. Yakson, belirlenmiş on beş dakikalık bir protokolü olan sıcak, basınçsız, yavaş ve şefkatli dokunma tekniğidir. Deney grubuna topuk kanı alınmadan önce Yakson dokunma protokolüne başlanmıştır. Araştırma verileri Ebeveyn ve Bebek Bilgi Formu, Fizyolojik Parametreler Gözlem Formu ve Yenidoğan Bebek Ağrı Ölçeği kullanılarak elde edilmiştir. Verilerin analizi IBM SPSS V23 kullanılarak yapılmış ve anlamlılık düzeyi $p < .05$ olarak alınmıştır.

Bulgular: Deney ve kontrol grupları arasında işlem öncesi, işlem sırası ve işlem sonrasında yenidoğanın oksijen saturasyonu, kalp hızı ve ağrı skoru açısından fark yoktu ($p > .05$). Topuk kanı alma işlemi öncesi ve sonrası ağlama süresi açısından iki grup arasında fark bulunmazken, topuk kanı alma işlemi sırasında deney grubu bebeklerin ağlama süresi kontrol grubundan daha düşük bulunmuştur ($p = .007$).

Sonuç: İşlem sırasında Yakson dokunma uygulanan deney grubundaki yenidoğanların ağlama sürelerinin kontrol grubuna göre daha kısa olduğu görüldü. Yakson' un topuktan kan alma sürecinde hemşirelik girişimlerine dahil edilmesi önerilir.

Anahtar Kelimeler: Ağrı, Yenidoğan, Yakson Dokunma, Topuk Kanı, Hemşirelik

INTRODUCTION

The initial 28-day period, during which the newborn is sensitive and dynamic while striving to adapt to extrauterine life, is defined as the neonatal period (Arıkan, Çelebioğlu & Tüfekçi, 2018; Karabudak & Ergün, 2018; Yiğit & Ügücü, 2019). Most newborn deaths worldwide occur during the neonatal period (TUIK, 2020). To reduce preventable neonatal deaths and enhance the quality of life for newborns, premature or unstable newborns requiring special and continuous care are treated in intensive care units (Kaynak, Yılmaz, Başbakkal & Yardımcı, 2020).

In Turkey, as part of preventive and protective health care services, heel blood is drawn within the first 48 hours and during the first week after birth to screen for some metabolic, genetic, and endocrine diseases (Erdim & İnal,

2018). According to the guide published by the Turkish Neonatology Association (TND, 2021) on neonatal pain and its management, the heel-prick procedure is among the most common painful procedures encountered by newborns treated in neonatal intensive care units. Pain is highly stressful for newborns, significantly affecting their sensory development, nervous system, and even their whole life (Çelebioğlu & Ügücü, 2019; Hockenberry, Wilson & Rodgers, 2017). Therefore, awareness, approach, and management of pain in newborns are crucial (TND, 2021).

Touch, recognized as one of the practices to reduce pain perception and promote neonatal development when properly stimulated, is significant as it is the first and best developed sensory system in newborns (Güven & Dalgıç, 2017; Sarı & Çiğdem, 2013). Touch positively

affects the psychosocial development of the newborn, supporting the establishment of a basic sense of trust and the development of a healthy personality (Can & Kaya, 2018).

One of these experiences defined as therapeutic touch is Yakson touch, which comes from traditional Korean culture. Yakson is when mothers affectionately caress the painful areas of newborns with the belief that it will heal the painful areas (Im, 2005). Although Yakson is a concept from Korean culture, studies on newborns and caregivers (usually mothers) have been conducted in other cultures (such as Iran, India, Turkey). Yakson was applied by mothers or researchers in studies, and it is noted that Yakson can also be administered by other family members (grandparents etc.). Reviewing the literature reveals that it is effective in providing pain control in newborns and has a calming effect. It also seems that it increases sleep state, motor development, oral intake, attachment to the mother and the amount of breast milk (Im, 2006; Bijari et al., 2012; Çağlayan & Oskay 2015; Dur, Çağlar, Yıldız, Doğan & Varal, 2020; Parashar, Samuel, Bansal & Aranka, 2016).

Parashar et al. (2016) conducted a meta-analysis on the effect of Yakson touch. The results of eight studies suggest that new experimental studies are needed. In addition, there are few studies on the heel prick procedure in the literature (Dur et al., 2020; Park et al., 2006; Im, Kim, Sung & Oh, 2007; Mir, Vashani, Sadeghi, Boskabadi & Khorshahi, 2018). The Yakson touch protocol takes a total of 15 minutes. In studies conducted before the protocol was determined (Park et al., 2006; Im et al., 2007), Yakson touch was applied for a short time until the completion of the heel prick procedure. It seems that there is a need for studies examining the effect of touch on the newborn by applying touch for 15 minutes

according to the Yakson protocol.

This study aims to examine the effect of Yakson touch on pain and physiological parameters during the heel-prick procedure in newborns.

The hypotheses of this study:

H1: There is a difference in mean pain scale scores between the experimental and control groups during and after the intervention.

H2: There is a difference in oxygen saturations between the experimental and control groups during and after the intervention.

H3: There is a difference in the heart rate between the experimental and control groups during and after the intervention.

H4: There is a difference in the duration of crying between the experimental and control groups during and after the intervention.

METHODS

Type of research

This study employed a randomized controlled trial design with both experimental and control groups.

Place of Research

The study was conducted in a secondary care neonatal intensive care unit in southeastern Turkey between June and August 2021.

Universe/Sample of Research

The study sample was calculated by G power analysis based on a similar study (Dur et al., 2020) in the literature. As a result of the analysis, with 95% confidence ($1-\alpha$), 80% test power ($1-\beta$) and $d=0.424$ effect size, the sample size to be taken was determined to be 36 in each group. Considering the possibility of data loss, 80 newborns were recruited, 40 in the experimental group and 40 in the control group. The website <https://www.random.org/sequences/> was used

to determine the newborns to be included in the experimental or control group, and the newborns were assigned to the relevant group in the table according to the order of arrival (Figure 1: CONSORT Diagram). There was no blinding in this study. No newborns were excluded from the study.

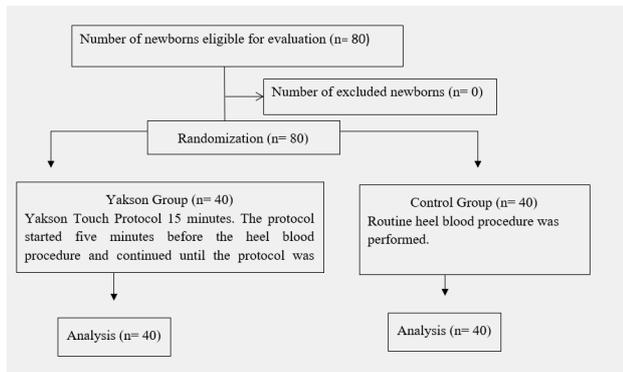


Figure 1. CONSORT Diagram

Studies in the literature have been conducted on preterm or term newborns according to the week of gestation. No study was found that included both groups. Therefore, this study was conducted on term and preterm newborns. Newborns without congenital anomalies, not dependent on mechanical ventilation, not diagnosed with sepsis or hemorrhagic disease, not undergoing surgery, not likely to be exposed to frequent painful procedures (e.g., jaundiced newborns), and not receiving analgesics or sedatives in the previous 24 hours were included in the study.

Data Collection Instrument-Validity and reliability information

The study data were obtained using the Parent and Baby Information Form, the Physiological Parameters Observation Form, and the Neonatal Infant Pain Scale.

Parent and Baby Information Form: The form contains descriptive information about the newborn (10 questions) and the mother (7 questions), prepared by the researchers in line with the relevant literature.

Physiological Parameters Observation Form:

The heel-prick procedure was developed by the researchers to record the physiological parameters of newborns from five minutes before the procedure until after the procedure. In the form, the newborn's oxygen saturation, peak heart rate, and crying duration variables were recorded. However, other parametric variables like blood pressure and respiratory rate could not be measured. Blood pressure could not be measured due to the lack of adequate equipment in the clinic. The respiration rate could not be measured due to the hands being placed on the newborn's chest and abdomen during the Yakson touch. The respirations could not be counted from the video recordings, and there was no device to measure the respiration rate for each newborn.

Video recordings were made for all parameters, and then the video recordings were viewed, and the values observed on the form were written by two independent observers for all newborns. The recordings were made using a Huawei P30 Lite mobile phone connected to a Bosh tripod.

The newborn's oxygen saturation and peak heart rate values were recorded five minutes before the heel-prick procedure, during the procedure, and until five minutes after the procedure using the Nellcor brand monitor device shown in the video recording. The periods during which the newborn cried five minutes before, during, and five minutes after the procedure were recorded. The short intervals in which the newborn was tired of crying and rested were included in the full-time. In the case of long intermittent crying of the newborn, the "crying intervals" were collected and included in the crying period.

Neonatal Infant Pain Scale (NIPS): The scale was developed by Lawrence et al. (1993). The validity and reliability of the scale were

determined by Akdovan (1999). It is a pain assessment scale developed for preterm and term newborns that behaviorally assesses the response to pain during invasive procedures. The total score of the pain scale ranges from 0 to 7, and a score higher than 3 indicates the presence of pain (Ozçevik & Ocakcı, 2019). In this study, video recordings were made to monitor the pain responses of infants. The recordings were viewed by two independent observers, one of whom was a nurse practitioner, and the other was a neonatal nurse, and the NIPS scale was scored. Table 1 shows the data related to the two observers (V1, V2).

Data Collection Procedures – Intervention

Before starting the data collection in this study, the necessary permissions were obtained from the parents of the newborns to be included in the study. In addition, before the study, an attempt was made to communicate with the authors of the study on Yakson training. One of the authors of the study helped to access the video by stating that Yakson was trained through the practice video. The use of the video was also approved by H.Im via e-mail. The researcher attended the “Basics of Therapeutic Touch” course and received a certificate to be able to transfer Ki energy, to aim for the health and well-being of the newborn, and to learn to focus. In addition, the researcher made a preliminary application on two newborns to apply the Yakson touch protocol correctly by exchanging ideas with an expert academician in the field of child health nursing.

Standard precautions were taken for all newborns before the procedure. The newborns were brought to radiant warmers by adjusting the radiant heater temperature, and they were connected to a pulse oximeter device to see the peak heart rate and oxygen saturation value. All newborns had their heel blood drawn by their shift nurse that day,

as a change of nurses were not allowed due to the Covid-19 pandemic. However, the procedure was performed according to clinical conditions and the heel prick procedure checklist.

The heel-prick procedure was performed on all newborns on the fifth postnatal day, between 10:00 and 12:00 in the morning. Needle tip, 70% alcohol, cotton, filter paper, and 21-gauge needle tip were used for the heel-prick procedure. To ensure the comfort of all newborns before the procedure, their diapers were changed, and they were fed half an hour before the procedure. It was confirmed whether any other painful procedures were performed on the newborns 7-8 hours before the procedure. After the necessary materials and environment were created, the researcher connected the phone to the tripod device and set the appropriate angle for video recording.

To administer Yakson to all newborns, the same researcher (nurse) prepared before administration. The researcher wore a sterile nursing gown, and a medical hair cap, and washed his hands with antimicrobial agents to maintain hygienic conditions following the Yakson touch protocol. After ensuring sterilized conditions, he warmed his hands under a radiant heater to 34°C before touching the newborn. Yakson touch was applied according to the protocol developed by Im and Kim (2009). The researcher applied the Yakson touch by covering the abdomen and chest of the newborn with his right hand (dominant hand) while the newborn was in the supine position and supporting the newborn's back and hips with his left hand. The hands were kept in constant contact without pressure for the Yakson touch. The technique begins with five minutes of inactive touching, followed by five minutes of active touching (clockwise, one minute of caressing, 30 seconds of rest, one minute of caressing, 30

seconds of rest, and two minutes of caressing), and concludes with five more minutes of inactive touching.

The experimental group was subjected to the entire Yakson protocol, while the control group underwent the heel prick procedure as a routine practice in the clinic. All newborns in the experimental and control groups were given non-nutritive sucking after the procedure as a routine practice of the clinic.

All groups in the experimental and control groups were videotaped. The heel prick procedure was started in the experimental group immediately after the first five minutes (fixed touch) of the Yakson protocol. When the heel prick procedure was finished, it continued until the Yakson protocol was completed. Parametric values before, during, and five minutes after the heel prick procedure were considered as measurements for all newborns. The video recordings were then recorded as two separate measurements by the researcher and the trained neonatal intensive care nurse.

Data Analysis

Data were analyzed using IBM SPSS V23. The intraclass correlation coefficient was used to assess interobserver agreement. As a result of a statistically significant agreement between the first and second nurse observers, the analysis was carried out by taking the average of the parametric values evaluated by the observers. Compliance with normal distribution was examined by Kolmogorov Smirnov. Independent samples t-test was used to compare the normally distributed data according to the experimental and control groups. Mann Whitney U test was used to compare the data that did not fit the normal distribution according to the experimental

and control groups. The chi-square test was used to compare categorical data. Categorical data are presented as frequencies (percentages). The Friedman test was used to determine whether the intra-group temporal variation was significant or not. Analysis results are presented as mean \pm s. deviation, median (min-max). The significance level was set at $p < .05$.

Evaluation of the Data

The research hypothesis was that there would be a difference between the experimental and control groups in terms of pain score, oxygen saturation, pulse rate, and crying time during and after the heel prick procedure. The independent variable of the study was the Yakson touch. The dependent variables of the study were the mean pain scale score, oxygen saturation, heart rate and duration of crying.

Variables of the Research and Ethical Aspect of the Research

The study was conducted in accordance with research and publication ethics. The written approval was obtained from the Ethics Committee of Harran University (Ethics Committee approval dated 07.12.2020 and number 21) and the Provincial Health Directorate (21.04.2021/27487). Before the study, the parents were informed, and their verbal and written consent was obtained before the study. Permission and instructions for use of the Neonatal Infant Pain Scale (NIPS) were received by Cigdem.

RESULTS

Table 1 shows no statistically significant difference between the experimental and control groups according to the descriptive characteristics of newborns ($p > .05$, Table 1).

Table 1. Comparison of descriptive features by groups (n = 80)

Newborn	Experimental (n=40)		Control (n=40)		Total (n=80)		Test statistics	p
	n	%	n	%	n	%		
Newborn's Gender								
Girl	23	57.5	14	35	37	46.3	=3.218	.073
Boy	17	42.5	26	65	43	53.8		
Newborn's birth type								
Normal delivery	9	22.5	15	37.5	24	30	=1.488	.223
Caesarean section	31	77.5	25	62.5	56	70		
	Median	Min-max	Median	Min-max	Median	Min-max		
Gestational age	37	35-40	37	35-40	37	35-40	781 ¹	.851
Birth weight	2530	1500-5050	2635	1870-3650	2610	1500- 5050	-.087 ²	.931
Birth height	48.5	40-55	48	40-52	48	40-55	775.5 ¹	.812
Current body weight	2505	1420-5120	2540	1800- 3700	2520	1420- 5120	.085 ²	.932
Current height	48.5	40-55	48	40-52	48	40-55	779 ¹	.838
Apgar score	9	7-10	9	7-10	9	7-10	780 ¹	.830
V1(second)	173	68-520	225	64-475	211.5	64-520	612 ¹	.070
V2(second)	171.5	68-520	225	64-475	211	64-520	610.5 ¹	.068

* Chi-square test, V1: First observer nurse V2: Second observer nurse, ¹: Mann Whitney U test, ²: Independent samples t-test

Table 2 indicates that the median pain scores five minutes before, during, and five minutes after the application do not differ between the experimental and control groups (p values of .063, .051, and .937, respectively). The median

values in the experimental and control groups differ over time (p < .001). While there was no difference between the NIPS values before and after five minutes, the median value obtained during the application was higher than the others.

Table 2. Comparison of the newborns' pain score (NIPS) values according to the groups (n = 80)

	Experimental (n=40)		Control (n=40)		Test statistics.**	p
	Mean ± S. deviation	Median (min-max)	Mean ± S. deviation	Median (min-max)		
5 minutes ago	0.51 ± 1.13	0 (0 - 4.5) ^a	0.18 ± 0.68	0 (0 - 3) ^a	680.000	.063
During intervention	5.94 ± 1.82	7 (0.5 - 7) ^b	6.49 ± 1.36	7 (1 - 7) ^b	631.000	.051
5 minutes later	1.06 ± 1.94	0 (0 - 7) ^a	1.3 ± 2.3	0 (0 - 7) ^a	793.000	.937
Test statistics*	69.662		72.045			
p	< .001		< .001			

*Friedman test; **Mann Whitney U test; ^{a,b} There is no difference between tenses with the same letter within each group.

Table 3 shows that the median values of oxygen saturation five minutes before, during, and five minutes after the procedure did not differ between the experimental and control groups (p values of .522, .572, and .228, respectively). The median values varied over time in the experimental and control groups (p < .001). The median value was 97 five minutes before, 96 at the time of

application, and 98 after five minutes. While there was no difference between the oxygen saturation values before and after five minutes, the median value obtained during the application was lower than the others. The median values in the control group varied over time (p < .001). The median value was 98 five minutes before, 94.75 at the time of application, and 97 after

five minutes. While there was no difference in oxygen saturation values before and after five

minutes, the median value obtained during the application was lower than the others.

Table 3. Comparison of oxygen saturation values of newborns according to groups (n = 80)

	Experimental (n=40)		Control (n=40)		Test statistics.**	p
	Mean ± S. deviation	Median (min-max)	Mean ± S. deviation	Mean ± S. deviation		
5 minutes ago	96.51 ± 2.98	97 (89 - 100) ^a	96.85 ± 2.9	98 (90 - 100) ^a	734.000	.522
During intervention	95 ± 3.55	96 (86 - 100) ^b	94.63 ± 3.84	94.75 (85 - 100) ^b	741.500	.572
5 minutes later	96.91 ± 4.11	98 (77.5 - 100) ^a	95.38 ± 7.05	97 (57 - 100) ^a	675.500	.228
Test statistics*	17.892		13.609			
p	< .001		< .001			

*Friedman test; **Mann Whitney U test; ^{a,b} There is no difference between tenses with the same letter within each group.

Table 4 shows the comparison of the heart rate (pulse) values of the newborns according to the groups. The median heart rate values five minutes before, during, and five minutes after the procedure did not differ between the experimental and control groups (p values were .176, .141, and .223, respectively). The median values varied over time in the experimental group (p= .030). The median value was 145.5 five minutes before the application, 144 during the application, and 140 five minutes after the procedure. There was

a difference between the median value obtained during the application and the median value acquired after five minutes. The median values in the control group differed according to time (p < .001). The median value was 139.5 five minutes before application, 155 at the time of application, and 147 after five minutes. The median values obtained five minutes before and during the application differed. The values obtained after five minutes did not differ from the other times.

Table 4. Comparison of the heart rate (pulse) values of newborns according to the groups (n = 80)

	Experimental (n=40)		Control (n=40)		Test statistics.**	p
	Mean ± S. deviation	Median (min-max)	Mean ± S. deviation	Median (min-max)		
5 minutes ago	144.39 ± 18.46	145.5 (101 - 180) ^{ab}	139.68 ± 14.57	139.5 (109 - 169) ^a	659.500	.176
During intervention	145.34 ± 18.64	144 (107 - 192) ^a	149.23 ± 18.71	155 (86 - 178) ^b	647.000	.141
5 minutes later	142.68 ± 20.19	140 (110 - 210.5) ^b	147.04 ± 20.59	147 (113 - 211) ^{ab}	673.500	.223
Test statistics*	7.031		17.439			
p	.030		< .001			

*Friedman test; **Mann Whitney U test; ^{a,b} There is no difference between tenses with the same letter within each group.

Table 5 shows the comparison of the crying duration of newborns according to the groups. The median values of crying duration five minutes before and five minutes after the procedure did not differ between the groups (p values .966 and .536, respectively). The median values obtained

during the application differ (p = .007). While the median value in the experimental group was 84 seconds, the median value in the control group was 193 seconds. The median crying durations obtained in the experimental group differ over time (p < .001). While the median value was 0

seconds before five minutes, it was 84 seconds during the application and 9.25 seconds after five minutes. A statistical difference was found between all-time points. The median crying durations obtained in the control group differed

over time ($p < .001$). While the median value was 0 seconds before five minutes, it was 193 seconds during the application and 10.75 seconds after five minutes.

Table 5. Comparison of newborns crying time by groups (seconds) (n = 80)

	Experimental (n=40)		Control (n=40)		Test statistics.**	p
	Mean \pm S. deviation	Median (min-max)	Mean \pm S. deviation	Median (min-max)		
5 minutes ago	2.49 \pm 14.41	0 (0 - 91) ^a	0.11 \pm 0.5	0 (0 - 3) ^a	798.000	.966
During intervention	117.65 \pm 96.51	84 (0 - 401) ^b	179 \pm 104.65	193 (0 - 398) ^b	521.500	.007
5 minutes later	47.26 \pm 84.72	9.25 (0 - 294.5) ^c	37.38 \pm 58.9	10.75 (0 - 245) ^c	736.500	.536
Test statistics*		58.686		65.26		
p		< .001		< .001		

*Friedman test; **Mann Whitney U test; ^{ac} There is no difference between tenses with the same letter within each group.

DISCUSSION

Newborns experience pain sensation due to various stressors in intensive care units. Evidence-based non-pharmacological nursing interventions are used to control the pain experience (Çelebioğlu & Üğücü, 2019; Kemer & Dalgıç 2020). It has been explained that touch, which is among the evidence-based nursing interventions, has a relaxing effect on the newborn when it is arranged according to the newborn's gestational age and individual reactions. It has been reported that gentle touch is an acceptable touch for newborns whose gestational age is 23 weeks and above (Çağlayan & Oskay, 2015; Denghani et al, 2019; Liu et al., 2007). Yakson touch is also a kind of gentle, measured, and light touch technique.

The study compared the median values of the NIPS score before, during, and after the heel-prick procedure and found no statistically significant difference between the experimental and control groups. Previous studies have shown that Yakson touch is effective in reducing the pain scores in newborns. Park et al. (2006) evaluated

the difference in pain scores after the heel-prick procedure of Yakson touch applied in preterm newborns, Mir et al. (2018) in term newborns, and Dur et al. (2020) in preterm newborns, and the pain score was found to be lower than the control group. Denghani et al. (2019) stated that Yakson touch applied to preterm newborns was effective in reducing the pain score after phlebotomy. In this study, although the post-procedure pain score was lower in the experimental group than in the control group, no statistically significant difference was found.

Im et al. (2007) examined the effect of Yakson touch after the heel-prick procedure in term newborns, and they found that it was not effective in reducing pain scores. Semnani et al. (2020) evaluated the effect of nasogastric intubation and Yakson touch, applied once a day for 15 minutes over five consecutive days, on pain control in preterms. They observed that the pain decreased over time, but there was no significant difference between the groups. In this study, similar results were obtained to those of Im et al. (2007) and Semnani et al. (2020).

It was determined that Yakson touch did not affect oxygen saturation. Although the oxygen saturation of the experimental group was better preserved than the control group after the procedure (p-value of .228), there was no statistically significant difference. Previous studies by Park et al. (2006) and Im et al. (2007) have shown that the oxygen saturation of newborns who received Yakson touch was better preserved than the control group. Dur et al. (2020) found that although the oxygen saturation values were better preserved during and after the procedure compared to the control group, no significant difference was observed. Kim (2016) stated that acceptance of touch and touching styles are influenced by religious and cultural norms. Studies on the effect of Yakson's touch on oxygen saturation during painful procedures are limited, it is thought that studies conducted in different cultures are needed.

It is stated that in the presence of pain and inappropriate tactile stimuli in newborns, the peak heart rate increases (Hockenberry et al., 2017). The study found that the experimental group's peak heart rate (median 144) was lower than the control group's (median 155) peak heart rate, but the difference was not statistically significant. Park et al. (2006), Im et al. (2007), and Mir et al. (2018) found no different heart rate values between the experimental and control groups during painful procedures. Dur et al. (2020) found that the Yakson touch was effective in reducing the peak heart rate values during the procedure. This study differs from the study findings of Dur et al. (2020) and supports the results of other studies.

Crying has been expressed as a common behavioral indicator in the presence of pain. The intensity of crying depends on the severity of the pain. Therefore, crying is widely accepted as a

strong indicator of pain in studies, and crying duration is used as a pain measurement tool (Im et al., 2007; Im & Kim, 2009). There are limited studies in the literature that examine the effect of Yakson touch on crying time. This study found that Yakson touch did not affect the crying duration before and after the procedure but did have a significant effect during the procedure. Mir et al. (2018) evaluated the crying duration of term newborns during the heel-prick procedure and the results showed that the crying time decreased after the procedure.

IMPLICATION FOR NURSING PRACTICE

The study found no significant difference found between the experimental and control groups in terms of mean pain scale scores, oxygen saturation, and peak heart rate during and after the procedure. However, a significant difference was found during the procedure in terms of crying duration.

In previous studies, it has been reported to reduce pain, improve sleep quality, provide relaxation, and benefit growth and development (Parashar et al, 2016). Yakson touch can be used in practice as a nonpharmacological method to reduce the pain of newborns and infants. There are further studies need that examining crying duration in Yakson touch studies and to determine its effect on other painful invasive procedures other than heel pricking. It is recommended to conduct studies in which Yakson is applied to newborns in different cultures since touch is affected by cultural norms, to compare different practitioners such as mothers and nurses, to apply it to children in different age groups, and to train nurses about the effectiveness of Yakson.

Limitations

In this study was conducted during the pandemic period, there was difficulty in reaching mothers.

For this reason, Yakson touch was administered by the researcher. Another limitation of the study was that the person responsible for the heel-prick procedure was not assigned in the unit where the study was conducted, hence the heel-prick application of each newborn was performed by the caregiver nurse.

The study sample included preterm and term infants. Data collection tools suitable for the sample were used. Due to the study hypotheses, the data of preterm and term infants were evaluated according to the experimental and control groups. The results of preterm and term infants were not compared.

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