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PRETERM YENİDOĞANLARDA BESLENME SONDASI TAKILMASI SIRASINDA NON-FARMAKOLOJİK YÖNTEMLERİN AĞRI VE STRES DÜZEYİNE ETKİSİ: RANDOMİZE KONTROLLÜ DENEYSEL BİR ÇALIŞMA

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Özet

Yenidoğan yoğun bakım ünitelerinde oral yoldan yeterli beslenemeyen yenidoğan bebeklerin beslenmesi ve tedavileri sırasında orogastrik sonda veya nazogastrik sonda kullanılabilir. Araştırma, preterm yenidoğanlarda orogastrik tüp takılması sırasında anne sütü ve %25 dekstroz kullanımının ağrı ve strese etkisini incelemek amacıyla randomize kontrollü deneysel çalışma olarak tasarlanmıştır. Araştırmanın evrenini, Nisan 2021-Nisan 2022 tarihleri arasında İstanbul'daki bir kamu hastanesinin yenidoğan yoğun bakım ünitesinde yatan postnatal yaşları 32+0-36+6 arasında olan preterm yenidoğanlar oluşturmaktadır. İşlem öncesi bebeklerin N-PASS, yenidoğan stres ölçeği, kalp tepe hızı ve oksijen satürasyon skorları gruplara göre anlamlı farklılık göstermemektedir (p>0,05). Orogastrik tüp takılması ile ilgili olarak, preterm yenidoğanların işlem sırasında ve sonrasında davranışsal tepkileri incelendiğinde ağrı ve stres skorları kontrol ve anne sütü gruplarında benzerlik göstermiştir. Buna karşılık dekstroz grubunun ağrı ve stres skoru anlamlı olarak daha düşük bulunmuştur. Orogastrik tüp yerleştirilmesinden iki dakika önce lingual bölgeye verilen %25 dekstrozun anne sütü ve kontrol grubu ile karşılaştırıldığında ağrı skoru, stres skoru ve fizyolojik parametreleri olumlu etkilediği bulundu. Çalışmada gruplar arası ağrı ve stres skorları incelendiğinde işlem öncesi skorlar gruplar arasında anlamlı farklılık göstermemektedir (p>0,05). Sonuç olarak OGS takma işleminden 2 dakika önce lingual bölgeye verilen %25 dekstrozun anne sütü ve kontrol grubuna kıyasla ağrı puanı, stres puanı ve fizyolojik parametreler üzerine olumlu etkisi olduğu gözlemlenmiştir.

Anahtar Kelimeler: Prematüre, Ağrı, Stres, Anne Sütü, Dekstroz

THE EFFECT of NONPHARMACOLOGICAL METHODS on PAİN and STRESS LEVEL DURİNG OROGASTRIC TUBE INSERTION in PRETERM NEONATES: A RANDOMIZED CONTROLLED EXPERIMENTAL STUDY

ABSTRACT

Orogastric probe or nasogastric probe can be used in neonatal intensive care units for the nutrition of newborn babies who cannot be fed enough orally and during their treatment. The research was designed as a randomized controlled experimental study to examine the effect of breast milk and 25% dextrose use on pain and stress during orogastric tube insertion in preterm neonates. The research population consists of preterm neonates whose postnatal ages are between 32^{+0}-36^{+6} in the neonatal intensive care unit at a public hospital in Istanbul between April 2021 and April 2022. N-PASS, newborn stress scale, peak heart rate, and oxygen saturation scores of infants before the procedure do not differ significantly according to the groups (p>0.05). Regarding the orogastric tube insertion, upon examination of the behavioral responses of preterm neonates during and after the procedure, pain and stress scores showed similarities in the control and breast milk groups. In contrast, the dextrose group had a significantly lower pain and stress score. It was found that 25% dextrose given to the lingual site two minutes before orogastric tube insertion positively affected pain score, stress score, and physiological parameters compared to breast milk and the control group. Upon the scrutinization of the pain and stress scores between the groups in the study, the scores before the procedure do not show significant differences between the groups (p>0.05). As a result, it was observed that 25% dextrose given in the lingual region 2 minutes before the OGS insertion rate had a positive effect on the maternal cycle and control group rate rate, stress score and outcome.

Key Words: Premature, Pain, Stress, Breast Milk, Dextrose

1. LITERATURE

Orogastric Tube (OGT) or nasogastric probe (NGT) can be used in neonatal intensive care units (NICU) for the nutrition of newborn babies who cannot be fed enough orally and during their treatment. The insertion, maintenance, and follow-up of OGT and NGT have been stated to be under the responsibility of nursing in the official gazette in Turkey (1). Neonates feel pain more severely compared to adults. As a result of long-term pain, their behavior and neurological development might be negatively affected in the later period. Pain procedures are performed less frequently in infants than in other patients. Such parameters evaluate pain in the newborn as restlessness, agitation, continuous crying, inability to feed, increased blood pressure and respiratory rate, and decreased sleep duration. As a standard procedure is not applied in diagnosing pain in infants, it is often evaluated with physiological and behavioral parameters (2). It was reported in a study that an average of sixteen procedures were performed per day in the Neonatal Intensive Care Unit (NICU), and ten of these were painful procedures, whereas another study reported that fourteen painful procedures were performed per day in NICUs (3,4). Pharmacological and nonpharmacological applications are used in pain management in newborns. The most commonly used pharmacologic agents in neonates include morphine, fentanyl, remifentanil, propofol, ketamine, and other sedatives. The most commonly used non-pharmacologic practices are swaddling, kangaroo care, reducing light and noise in the environment, breastfeeding, dextrose/sucrose. Pain should be considered in newborns, and appropriate procedures should be used according to the size of the procedure. The use of nonpharmacological methods is appropriate in small procedures. Each NICU should form its own pain procedure (2). Since the pain mechanism is more immature in preterm neonates compared to term neonates, they feel pain more severely. Physical, neurological, and behavioral disorders can be seen in preterm neonates exposed to long-term pain (5, 6). In a systematic review study performed abroad, it is stated that nonpharmacological methods in which the procedure of inserting OGT causes acute pain in newborns are effective in reducing this pain. Few studies include nonpharmacological methods used to reduce pain caused by orogastric probe insertion (7).

The primary aim of this study is to scrutinize the effect of nonpharmacological methods on pain and stress levels during the OGT insertion procedure in preterm neonates.

2. MATERIALS AND METHOD

This randomized controlled study was organized to understand the effect of breast milk or 25% dextrose on pain and stress during orogastric tube insertion in preterm neonates hospitalized in a four-level NICU with 60 beds between 29/04/2021-29/04/2022. Hospitalized in the NICU, preterm neonates whose "Informed Consent Form" was obtained from their parents", who were required to be inserted OGT for treatment and nutrition, and who were 320- 366 gestational weeks were included in the study. Based on the randomization table, sixty patients were included in the research group and 30 patients in the control group. The patients in the research group were divided into two groups: preterm neonates who were given breast milk consisted of the first group, while 25% dextrose consisted of the second group. In the data collection stage, an introductory information form including information about the diagnosis for hospitalization, sex, Apgar score, mode of delivery, body weight at birth, OGT number, OGT size, gestational age, and postnatal age was filled to collect introductory information about preterm neonates who were included in the study. The OGT measurement was carried out 30 minutes before the procedure and recorded in the introductory information form. No painful procedures were carried out for each group up to 30 minutes before the procedure. The steps taken before the procedure were applied similarly for each group.

2.1. Procedure:

Control Group: In all patients, video recording was started two minutes before the procedure, and the feeding tube suitable for the body weight of the infant was routinely inserted according to the measured and previously determined location. It was confirmed to be in place through the aspiration method. After the OGS insertion, a light touch was ensured, if necessary, to routinely comfort the baby. The video recording continued until two minutes after the procedure. The data were recorded in the data collection form.

Dextrose Group: Two minutes before the OGT insertion, video recording was started, and 2ml 25% dextrose was slowly administered to the preterm neonate orally by dropping into the lingual site. After waiting for two minutes, the feeding tube suitable for the weight of the preterm neonate was routinely inserted from the side of the mouth to the measured and determined location. It was confirmed to be in place through the aspiration method. The infant was monitored until two minutes after the procedure, and the video recording continued. The data were recorded in the data collection form.

Breast Milk Group: Video recording was started two minutes before the OGT insertion. Preterm neonates were given breast milk orally through the help of a sterile syringe slowly on the upper part of the tongue. After waiting for two minutes, the feeding tube suitable for the weight of the preterm neonate was routinely inserted from the side of the mouth to the measured and previously determined location. It was confirmed to be in place through the aspiration method. The infant was monitored until two minutes after the procedure, and the video recording continued. The data were recorded in the data collection form. The physiological and behavioral changes, peak heart rate, and oxygen saturation of the infants before, during, and after the procedure were evaluated by three different people from the video images, N-PASS pain scale and Newborn Stress Scale were scored three times for all groups two minutes before, during and two minutes after the procedure and the highest peak heart rate and the lowest spo2 were evaluated four times for all groups by watching the video recording.The study used GE Healthcare Carescape Monitor B650 to evaluate the preterm neonate's peak heart rate, respiratory rate, and oxygen saturation. The calibration validity date of the monitors was October 2022. A researcher and two observers (with at least five years of neonatal experience) scored the N-PASS pain scale and Newborn Stress Scale by individually watching a video recording at different times. N-PASS was developed by Pat Hummel et al. (2003) and revised on October 2, 2009. Açıkgöz and his colleagues in 2011 realized the adaptation of the scale to Turkish. The N-PASS, consisting of two separate sections measuring the level of sedation and pain level of the infant, has five sub-parameters, including crying and restlessness, behavior status, facial expression, hands and feet, body tension, and vital signs. A score between 0 and +2 is given for each behavioral and physiological criterion in the assessment of pain, and between 0 and -2 is given in the assessment of sedation. If the baby was born less than 30 gestational weeks, +1 point is added to the total score in the pain assessment. The total pain score is between 0 and +11, while the total sedation score is between 0 and -10. A high score points out that the pain intensity is excessive. The purpose of the pain treatment is to keep the score at three or below three. The normal score that the baby will receive from the sedation assessment depends on the status of the desired sedation level. If there are no signs of sedation in the infant, a score of 0 is given, and this score does not imply an inadequate reaction. Light sedation is targeted between -2 and -5 points, whereas deep sedation is targeted between -5 and -10 points. The mean time spent on the application of the scale during the procedure is a minute.

Newborn Stress Scale was developed by Ceylan and Bolisik (2017) to evaluate premature babies' stress. The scale consists of 24 items and eight subgroups. These subgroups include facial expression, body color, respiratory number, activity level, comfortability, muscle tone, extremities, and posture and are of the 3-point Likert type. Each subgroup is scored between 0-2 points. A minimum of 0 points and a maximum of 16 points are taken from the scale. Through the increase of the score, the stress level increases. The scale is evaluated through observation. In the evaluation,

when the baby shows both of the behaviors in the same cell, the behavior with a high score is accepted. If the baby's condition is stable, it corresponds to 0 points on the scale. The characteristics of stress, the baby's response to the stressor, and the gestational week involve the score obtained from the scale (8).

Introductory Information Form, Data Collection Form, Newborn Stress Scale, Neonatal Pain/Agitation and Sedation Scale (N-PASS), Monitor (GE carescape B650 model patient monitor) Video Camera (Xiomi Mi Note 10 Lite, 64 mp) were employed to collect research data.

2.2. Statistics:

Power analysis was applied to determine the number of people to be included in the research. The power of the test was calculated with the G*Power 3.1 program. As a similar research in the related literature, the effect size of the newborn stress score change was calculated as 0.635 in a study by Uslubaş (2019) before and during the procedure (9).

The data obtained in the research were evaluated using the SPSS 22.0 statistical program. Frequency and percentage analyses were used to determine the descriptive characteristics of the students participating in the research, and mean, and standard deviation statistics were used to investigate the scale. Chi-Square and Fisher's exact tests analyzed the differences between the ratios of categorical variables in the groups. Kurtosis and Skewness values were investigated to determine whether the research variables showed a normal distribution or not. Statistical significance was accepted as P.

2.3. Ethical Aspects of Research

Ethical approval of the research was evaluated by the Health Sciences University Ümraniye Training and Research Hospital Clinical Research Ethics Committee (dated 29/04/2021 number: B.10.1.TKH.4.34.H.GP.0.01/128) and was found ethically appropriate.

After the families of the babies who met the sample selection criteria were given verbal information about the research and their written consent was obtained by reading the "Informed Volunteer Consent Form", the baby was accepted into the study. Thus, the ethical principles of "Voluntarism Principle", "Principle of Protection of Confidentiality", "Principle of Informed Consent" and "Principle of Doing No Harm" were fulfilled.

2.4. Limitations

The low number of infants matching the sample selection criteria of the study, the single-hand collection given to strengthen the study, and the fact that there are cases where there is no breast milk have caused the case collection process to be prolonged.

3. FINDINGS

According to the study protocol, 90 preterm neonates were included in the study. Preterm neonates were grouped based on the randomization table. The mean type of delivery was 73 (81.1%) cesarean section, 17 (18.9%) normal delivery, and the mean sex was 35(38.9%) boys, 55(61.1%) girls. 45(50%) of 90 newborns were postnatal 32w. The mean Apgar was five minutes, 7,7, and the mean birth weight was 1545 g. (Table 1) When the Distribution of Descriptive Characteristics according to the groups was analyzed, no significant difference was found between the groups ($P<0.05$) (Table 1).

Table 1. Distribution of Descriptive Characteristics According to the Groups

		Control		Dextrose		Breastmilk		Total		p
		n	%	N	%	n	%	n	%	
Sex	**Male**	12	%40.0	12	%40.0	11	%36.7	35	%38.9	X^2=0.094
	Female	18	%60.0	18	%60.0	19	%63.3	55	%61.1	p=0.954
Mode of Birth	**Normal Birth**	7	%23.3	4	%13.3	6	%20.0	17	%18.9	X^2=1.015 p=0.602
	Cesarean	23	%76.7	26	%86.7	24	%80.0	73	%81.1	
Postnatal Age	**32.week**	14	%46.7	16	%53.3	15	%50.0	45	%50.0	X^2=6.633 p=0.577
	33.week	7	%23.3	3	%10.0	8	%26.7	18	%20.0	
	34.week	3	%10.0	7	%23.3	2	%6.7	12	%13.3	
	35.week	2	%6.7	2	%6.7	2	%6.7	6	%6.7	
	36.week	4	%13.3	2	%6.7	3	%10.0	9	%10.0	

	Control		Dextrose		Breastmilk		F	P
	Mean	Sd	Mean	Sd	Mean	Sd		
Apgar Five min.	8.233	1.165	7.967	1.299	8.133	1.106	0.383	0.683
Birth Weight	1610.033	502.370	1549.533	435.566	1477.567	437.698	0.625	0.538
OGS No	16.550	1.086	16.500	0.707	16.500	0.682	0.035	0.966
OGT Size	7.133	1.008	7.000	1.017	6.800	0.997	0.832	0.438
Gestational Age	31.300	2.628	30.930	2.532	30.700	2.493	0.422	0.657
Postnatal Age	33.170	1.440	33.030	1.299	33.000	1.339	0.126	0.882

X^2: Chi-Square Analysis; **F:** One Way Analysis of Variance

Peak Heart Rate Measurements: The measurements of peak heart rate of infants before, during, and after the procedure do not show a significant difference according to the groups (p>0.05). (Table 2)

In the control group, the increase in peak heart rate measurements during and after procedure was significant compared to the measurement before the procedure (p<0.05) (Table 2).

In the dextrose group, the increase in the measurements of peak heart rate during and after the procedure was significant compared to the measurement before procedure (p<0.05). The decrease in the peak heart rate after the procedure was significant (p<0.05) compared to the measurement during the procedure (Table 2).

In the breast milk group, the increase in peak heart rate measurements during and after the procedure is significant compared to the measurement before the procedure (p<0.05) (Table 2).

Table 2. The Differentiation Status of Peak Heart Rate Measurements According to the Groups

Groups	Control		Dextrose		Breastmilk		F^a	P
	Mean	Sd	Mean	Sd	Mean	Sd		
Peak Heart Rate Before the Procedure	144.567	13.132	149.667	13,368	150.600	9.943	2.109	0.127
Peak Heart Rate During the Procedure	157.733	15.097	157.200	10.476	162.667	15.588	1.408	0.250
Peak Heart Rate After the Procedure	154.533	17.216	153.733	10.596	159.333	11.541	1.524	0.224
F^b	12.286		10.745		17.843			
P	**0.000**		**0.000**		**0.000**			
Bonferroni	**2.3>1**		**2,3>1; 2>3**		**2.3>1**			

a: One-Way Analysis of Variance; **b:** Repeated Measures Anova

SPO2 Measurements: The spo2 measurements of the infants during the procedure showed significant differences according to the groups (F(2, 87)=6,254; p=0,003<0.05). The reason for the

difference is that the spo2 measurement of the dextrose group during the procedure (x=96,933) is higher than the spo2 measurement of the control group during the procedure (x=93,967). The spo2 measurement of the dextrose group during the procedure (x=96,933) is higher than the spo2 measurement of the breast milk group during the procedure (x=95,067) (Table 3).

The measurements of infants in terms of spo2 before and after the procedure do not show significant differences according to the groups (p>0.05) (Table 3).

Tablo 3. The Differentiation Status of SPO2 Measurements According to Groups

Groups	Control		Dextrose		Breastmilk		F[a]	p	Difference
	Mean	Sd	Mean	Sd	Mean	Sd			
SPO2 Before the Procedure	98.233	1.870	97.033	2.141	97.500	1.961	2.762	0.069	
SPO2 During the Procedure	93.967	3.855	96.933	2.377	95.067	3.444	6.254	**0.003**	**2.3>1**
SPO2 After the Procedure	99.133	13.328	98.067	1.760	96.633	2.356	0.760	0.471	
F[b]	3.680		4.254		8.392				
P	**0.031**		**0.025**		**0.001**				
Bonferroni	**1.3>2**		**3>2**		**1>2**				

a: One Way Analysis of Variance; **b:** Repeated Measures Anova

According to the groups of infants, spo2 min values differ significantly. (F(2, 87)=6,935; p=0,002<0.05). The reason for the difference is that the spo2 min value of the dextrose group (x=94,933) is higher than the spo2 min value of the control group (x=90,900). The spo2 min value of the dextrose group (x=94,933) is higher than the spo2 min value of the breast milk group (x=92,567). The peak heart rate max scores of the infants do not show significant differences according to the groups (p>0.05). (Table 4).

Table 4. The Differentiation Status of Max Peak Heart Rate and Spo2 Min Values According to the Groups

Groups	Control		Dextrose		Breastmilk		F	P	Difference
	Mean	Sd	Mean	Sd	Mean	Sd			
Max Peak Heart Rate	165.767	13.746	163.467	9.247	169.467	12.445	1.921	0.153	
SPO2 Min	90.900	5.492	94.933	2.050	92.567	4.352	6.935	**0.002**	**2>1.3**

The NPASS scores of the infants before the procedure do not show significant differences according to the groups (p>0.05) (Table 5).

According to the groups, the NPASS scores of the infants show significant differences during the procedure. (F(2, 87)=18,448; p=0,000<0.05). The reason for the difference is that the NPASS scores of the control group during the procedure (x=4,011) were higher than those of the dextrose group during the procedure (x=2,733). The NPASS scores of the breast milk group during the procedure (x=4,056) are higher than those of the dextrose group during the procedure (x=2,733) (Table 5).

According to the groups, the NPASS scores of the infants show significant differences after the procedure (F(2, 87)=23,505; p=0,000<0.05). The reason for the difference is that the NPASS scores of the control group after the procedure (x=2,400) are higher than those of the dextrose group after the procedure (x=1,133). The NPASS scores of the breast milk group after procedure (x=2,122) are higher than those of the dextrose group after the procedure (x=1,133) (Table 5).

Table 5. The Differentiation Status of NPASS Scores According to the Groups

Groups	Control		Dextrose		Breastmilk		F[a]	p	Difference
	Mean	Sd	Mean	Sd	Mean	Sd			
NPASS Before the Procedure	1.078	0.243	1.056	0.264	1.100	0.279	0.215	0.807	
NPASS During the Procedure	4.011	0.873	2.733	0.968	4.056	1.025	18.448	**0.000**	**1.3>2**
NPASS After the Procedure	2.400	0.961	1.133	0.378	2.122	0.795	23.505	**0.000**	**1.3>2**
F[b]	173.033		97.275		166.390				
P	**0.000**		**0.000**		**0.000**				
Bonferroni	**2>1.3; 3>1**		**2>1.3**		**2>1.3; 3>1**				

a: One-Way Analysis of Variance; b: Repeated Measures Anova

The newborn stress scale scores of the infants before the procedure do not show significant differences according to the groups (p>0.05) (Table 6).

According to the groups, the scores of the infants show significant differences in terms of the newborn stress scale during the procedure (F(2, 87)=22,030; p=0,000<0.05). The reason for the difference is that the control group's newborn stress scale scores during the procedure (x=4,678) were higher than the dextrose group's newborn stress scale scores during the procedure (x=3,000). The scores of the breast milk group in terms of the newborn stress scale during the procedure ($\bar{x}$=4.522) were higher than the scores of the dextrose group in terms of the newborn stress scale during the procedure ($\bar{x}$=3.000) (Table 6).

According to the groups, the scores of the infants show significant differences in terms of the newborn stress scale after the procedure. (F(2, 87)=43,203; p=0,000<0.05). The reason for the difference is that the newborn stress scale scores of the control group after the procedure (x=2,622) are higher than those of the dextrose group after the procedure (x=0,500). The breast milk group's newborn stress scale scores after the procedure (x=2,200) are higher than the dextrose group's newborn stress scale scores after the procedure (x=0,500) (Table 6).

Table 6. The Differentiation Status of Newborn Stress Scale Score According to the Groups

Groups	Control		Dextrose		Breastmilk		F[a]	P	Difference
	Mean	Sd	Mean	Sd	Mean	Sd			
Newborn Stress Scale Before the Procedure	0.522	0.604	0.500	0.611	0,467	0.610	0.063	0.939	
Newborn Stress Scale During the Procedure	4.678	1.023	3.000	1.028	4,522	1.186	22.030	**0.000**	**1.3>2**
Newborn Stress Scale After the Procedure	2.622	1.046	0.500	0.731	2.200	1.000	43.203	**0.000**	**1.3>2**
F[b]	203.248		147.180		176.539				
P	0.000		0.000		0.000				
Bonferroni	**2>1.3; 3>1**		**2>1.3**		**2>1.3; 3>1**				

a:One Way Analysis of Variance; **b:** Repeated Measures Anova

4. DISCUSSION

With the development of technology, there is an increase in the survival rate of premature babies who are followed up in NICUs compared to the past. Painful attempts for treatment and care can be made for premature babies in NICU beginning from their admission to the hospital. As the stress perception systems of infants hospitalized in the NICU are in the process of development, the control of pain that might occur during procedures is vital for premature infants not to experience neuro-developmental and behavioral problems in the future (10).

Within the literature, it is seen that studies on pain by care providers have been increasing, and pain control is gaining importance day by day (10).

Upon the scrutinization of the pain and stress scores between the groups in the study, the scores before the procedure do not show significant differences between the groups ($p>0.05$). Pain and stress scores show significant differences during and after the procedure. The N-PASS pain scale score was found to be the lowest in the dextrose group during and after the procedure and the highest in the control group. It was found out that the newborn stress scale score was the lowest in the dextrose group during and the after the procedure and the highest in the control group. These results confirm our hypothesis that “using oral 25% dextrose in preterm neonates reduces the pain that occurs during and after the insertion of the orogastric probe".

In light of the results of a study in India, lingually, 25% dextrose sugar solution was administered to reduce the pain caused during the OGS insertion. In the study in which the “Premature Infant Pain Profile (PIPP)" scale was used, it was specified that the pain level of the dextrose-administered research group was low and the pain level of the control group was moderate (11).

Chen and his colleagues (2016) investigated pain management during OGT and NGT procedures in infants between 0-12 months. It has been claimed that oral sugar solutions to be given in small amounts can reduce pain during OGT and NGT procedures (7). These results support our findings.

Reviewing the literature for our study, it is clear that OGT insertion causes acute pain, and nonpharmacological methods may be effective in reducing this pain. It has been stated that oral sucrose reduces procedural pain in newborns up to 0-12 months, and the effective dose may be 0.1-2 ml as a result of studies (12,13).

A study on the efficacy of oral sucrose reported that it reduced pain in the treatment of minor procedural pain and that this nonpharmacologic application has objective evidence for preventing neonatal painful procedures based on the results of the study (14). As a result of these studies, it is believed that the OGT insertion process causes acute pain and that sugar solutions may be effective in relieving this pain.

In our study planned on preterm neonates, oxygen saturation and peak heart rate to evaluate physiological pain responses, "N-PASS" scale score to investigate and evaluate behavioral pain responses, and "Newborn Stress Scale" score to examine and evaluate the stress level of preterm neonates were examined and discussed in the light of the literature.

In our study, the oxygen saturation parameter measured to evaluate the physiological pain response do not show significant differences between the groups before the procedure. It is thought that this is an essential finding for safer measurements in groups during and after the procedure. Spo2 measurements during the procedure show significant differences between the groups. The reason for this difference is the spo2 value of the dextrose group ($x=96,933$) is higher than the control group ($x=93,967$) and the breast milk group ($x=95,067$). In the literature, it is apparent that there is variability in the physiological pain responses of infants who feel pain, and spo2 value decreases during pain (16). In another study, it was claimed that the OGT procedure is painful, and a decrease in oxygen saturation might be observed during the procedure (11). Based on our findings, since the dextrose group has the highest value for oxygen saturation, it is believed that it is the group that feels the pain the least during the procedure.

The spo2 measurements of the infants after the procedure do not show significant differences according to the groups ($p>0.05$) (Table 3). The minimum spo2 values of the infants measured during the OGT insertion process show significant differences according to the groups. Since the minimum spo2 value of the dextrose group ($x=94,933$) is higher compared to breast milk ($x=92,567$) and the control group ($x=90,900$), a significant difference arises. Based on the findings, even if spo2 values

after the procedure in all groups do not show statistically significant differences with the spo2 values before the procedure, the highest spo2 value was observed in the dextrose group during and throughout the procedure, suggesting that the dextrose group had a positive effect on the oxygen saturation parameter compared to the breast milk and control group.

In our study, the heart rate measurements examined to evaluate the physiological pain response do not show significant differences between the groups before, during, and after the procedure ($p>0.05$c). The increase in the peak heart rate measured to evaluate the physiological pain response during and after the procedure was found to be significant in all three groups compared to pre-procedure. When the literature is scrutinized, it is found that there is an increase in peak heart rate when newborns experience pain (11,15). In light of these findings, it is believed that they felt pain during the OGT insertion procedure in all three groups. In the control group, the dextrose group, and the breast milk group, the peak heart rate measurement values are statistically significant compared to ones before, during, and after the procedure. In the dextrose group, the decrease after the procedure was found to be significant according to the peak heart rate measurement during the procedure ($p<0.05$). In our findings, the lowest change in peak heart rate score between pre (149.667) and post-procedure (153.733) was found in the dextrose group. It has been stated that repetitive and unresolved painful procedures cause sudden increases in heart rate and oxidative stress (16). Even if there are many studies within the literature on behavioral changes during painful procedures in newborns, the number of studies examining physiological parameters is relatively small. Cirik and Efe (2019) reported in their study that an increase in peak heart rate and a decrease in oxygen saturation value are physiological pain responses of preterm neonates during pain (17). In the study, similar results were found to the literature as a result of the fact that the dextrose group was the group that felt the least pain, and there was the least change in peak heart rate in this group. No significant difference was available in maximum peak heart rate scores between the groups during the procedure.

In our study, the N-PASS scale was used to evaluate the behavioral pain response of preterm neonates during the OGS insertion. Desai et al. (2018) stated in their comparative study that the N-PASS scale could be used to treat acute and chronic pain in newborns (18). Benbrook et al. (2022) reported that the N-PASS scale reflects nurses' views, is easy to use, safe, and suitable to measure pain and sedation in NICUs (19). It was also stated that using the N-PASS scale in treating pain in term and preterm neonates is appropriate (10). The N-PASS pain scores before the procedure do not show significant differences according to the groups. This finding is considered to be necessary for the evaluation of pain during and after the procedure. During the procedure, N-PASS scores show significant differences according to the groups. The reason for the difference is that the pain score of the dextrose group (x=2,733) during the procedure was lower than that of the control group (x=4,011) and the breast milk group (x=4,056). Reviweing the related literature, it has also been reported that oral sucrose reduces the intensity of procedural pain, is effective and safe, and is used in many pain guidelines. In this study, investigating the standard use of oral sucrose in NICUs for procedural pain relief worldwide and the necessity of two-minute waiting time, it was stated that non-nutritive sucrose suction showed a fast-acting analgesic effect (12,20). In a study designed to detect and reduce pain during an OGT procedure in a children's hospital by Nimbalkar, et al. (2013), 24% sucrose or distilled water (1ml) was administered 2 minutes before the OGT procedure to clinically stable preterm neonates who needed OGT. As a result of the study, the sucrose group's PIPP score was found to be low, and it was stated that a single dose of sucrose could reduce pain during OGT insertion (11). Since the dextrose group has the lowest N-PASS score during the procedure, dextrose is thought to positively affect pain during the procedure.

Since access to glucose is easier than sucrose and its use is widespread in Turkey, it has been stated that 1-2ml of 20-30% concentration can be given to newborns hospitalized in the NICU in minimal painful procedures (10).

After the procedure, N-PASS score shows a significant difference between the groups. The reason for this difference is that the N-PASS score of the dextrose group (x=1,133) is lower than those of the control group (x=2,400), and the breast milk group (x=2,122). Because the dextrose group causes a significant difference in scores after the procedure, it is believed that 25% dextrose has a positive effect on pain. It has also been stated that sucrose is effective in relieving pain caused by non-recurrent procedures such as blood sampling and intramuscular injection in term and preterm neonates and that there is no serious side effect caused by sucrose (12).

There was a significant increase in the N-PASS score of the control and breast milk groups after the procedure compared to the pre-procedure. In the dextrose group, according to the N-PASS score before the procedure, there was no significant increase in the N-PASS score after the procedure. According to the N-PASS scale score, the dextrose group is considered to be an essential factor in reducing pain during and after the procedure, it is effective in relieving acute pain caused by OGT insertion, and it provides clinical stability in painful procedures faster than other groups. In a study scrutinizing 3785 preterm neonates, it is reported that 20% to 30% glucose sugar solution reduces pain scores compared to the water and the control groups, shortens the crying time in painful procedures, and glucose can be an alternative to sucrose (21).

In the study, the newborn stress scale score was applied to evaluate the behavioral stress response of preterm neonates during the OGT insertion procedure. The newborn stress scale scores before the procedure do not show significant differences according to the groups. This statistical finding is thought to be important in objectively evaluating the newborn stress scale scores during and after the procedure. A significant difference was present between the newborn stress scale scores according to the groups during the procedure. The reason for this difference is that the newborn stress scale score of the dextrose group (x=3,000) is lower than the newborn stress scale scores of the control group (x=4,678) and the breast milk group (x=4,522). In light of the newborn stress scale score, it is believed that the dextrose group experienced less stress during the procedure compared to the control group and the breast milk group.

There is a significant difference between the newborn stress scale scores after the procedure. The reason for the difference is that the newborn stress scale score of the dextrose group (x=0.500) was lower than the newborn stress scale scores of the control group (x=2.622) and the breast milk group (x=2.200). It is assumed that the dextrose group is the group experiencing the least stress according to the newborn stress scale score during and after the procedure.

In the control group, there was a significant decrease in the newborn stress scale score after the procedure compared to the score during the procedure. However, since the newborn stress score after the procedure is five times higher than the newborn stress scale score before the procedure, it points out that it is quite stressful to perform the OGT insertion procedure without applying any nonpharmacological method.

The study findings were discussed in light of the literature. It is believed that dextrose given in a safe dose before the OGT insertion to preterm neonates helps to reduce pain and stress and positively affects physiological parameters.

5. CONCLUSION AND RECOMMENDATIONS

Based on the results of this study, it was found that since there was a significant increase in NPASS scores during and after the OGT insertion in all groups included in the study, the pain was felt in all groups, and the levels of feeling pain were different between the groups.

When the newborn stress scale scores of the infants included in the study were analyzed since the newborn stress scale score of the control group and the breast milk group after the procedure was higher than the score before the procedure, the OGT insertion procedure caused stress for the control

and breast milk groups during the procdure, and the stress continued for at least two minutes after the procedure.

The increase in the newborn stress scale score during the procedure for the dextrose group is significant compared to the pre-procedure and creates stress for preterm neonates. As the newborn stress scale score after the procedure for the dextrose group is the same as the newborn stress scale score before the procedure and has the lowest newborn stress scale score during the procedure, it is thought that dextrose reduces stress during the OGT insertion and prevents the prolongation of stress and protects from the long-term negative effects of stress.

One of the primary goals of all healthcare professionals working in neonatal intensive care units is to prevent and relieve pain in terms of newborns and to ensure that they survive the intensive care period well. Our research, planned in light of our clinical observations and studies, targeted to eliminate or reduce pain during the insertion of an orogastric probe in preterm neonates. Upon the investigation of the results of the study, it was found out that dextrose solution has an analgesic effect during the OGT insertion and provides a positive effect on pain and stress. More randomized studies are also necessary to determine the safe dose and repetition for sucrose/dextrose solutions. It is recommended that appropriate nonpharmacologic methods are determined, each clinic has a pain protocol, and it is transferred to clinical practice.

"THE EFFECT of NONPHARMACOLOGICAL METHODS on PAİN and STRESS LEVEL DURİNG OROGASTRIC TUBE INSERTION in PRETERM NEONATES: A RANDOMIZED CONTROLLED EXPERIMENTAL STUDY" Research and Ethics Statement Information for the Article with Title

This study has been prepared in accordance with the values of 'Research and Publication Ethics' and has been checked by a plagiarism control programme. All responsibility for the study lies with the author(s).

Information	This article is based on a master's thesis titled 'A Study to Determine the Digital Competence Levels and Effects of Healthcare Professionals.'
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REFERENCES

1. Official Gazette (2011). (19.04.2011, Issue: 27910) Regulation on the Amendment of the Nursing Regulation numbered, 1.
2. Aliefendioglu, D., Guzoglu, N., (2015). Pain in newborn. Journal of Child Health and Diseases, 58, 35-40.
3. Carbajal, R, Rousset A, Danan C., Claude, D., Coquery, P., Nolent, P., Ducrocq, P., Saizou, C., Lapillonne, A., Granier, M., Duran, P., Lenclen, R., Coursol, A., Hubert, P., Blanquet, L. S., Boëlle, P.-Y., Annequin, D., Cimerman, P., Anand, K. J. S., Bréart, G., (2008). Epidemiology and treatment of painful procedures in neonates in intensive care units. JAMA, 300: 60-70.
4. Johnston, C., Barrington, K.J., Taddio, A., Carbajal, R., Filion, F., (2011). Pain in Canadian NICUs: have we improved over the past 12 years?, The Clinical Journal of Pain. 27(3), 225-232.

5. Asadi-Noghabi, F., Tavassoli-Farahi, M ., Yousefi, H., Sadeghi, T., (2014). Neonatal pain management: what do nurses really know?. Global Journal of Health Science, 6(5), 284-293. https://doi.org/10.5539/gjhs.v6n5p284.
6. Anand, K. J. S., (2008). Analgesia for skin-breaking procedures in newborns and children: What works best?. CMAJ, 179(1), 11-12.
7. Chen, P., Zhang, Q., Xie, R.H., Wen, P.W., Harrison, D. (2016). What is the best pain management during gastric tube insertion for infants aged 0-12 months: a systematic review. Journal of Pediatric Nursing. 34, 78-83.
8. Ceylan, S.S., Bolışık, B. (2017). Yenidoğan stres ölçeği'nin psikometrik özelliklerinin incelenmesi. ACU Sağlık Bilimleri Dergisi, (2), 97-103.
9. Uslubaş, R., (2019). El Antiseptiği Kokusunun Preterm Yenidoğanlarda Kardiyorespiratuar Stabilizasyon ve Stres Düzeyine Etkisi, Yüksek Lisans Tezi. İstanbul Üniversitesi-Cerrahpaşa Lisansüstü Eğitim Enstitüsü, İstanbul, Türkiye.
10. Yiğit, Ş., Ecevit, A., Altun-Köroğlu, Ö., (2021). Yenidoğan döneminde ağrı ve tedavisirehberi 2021 güncellemesi. Ankara: Güneş Tıp Kitabevi.
11. Nimbalkar, P., Sinojia, A., Dongara, A., (2013). Reduction of neonatal pain following administration of 25% lingual dextrose: a randomized control trial. Journal of Tropical Pediatrics, 59(3), 223-225. https://doi.org/10.1093/tropej/fms072.
12. Stevens, B., Yamada, J., Ohlsson, A., Haliburton, P., Shorkey, A., (2016). Sucrose for analgesia in newborn infants undergoing painful procedures. The Cochrane Database of Systematic Reviews, 7(7), CD001069. https://doi.org/10.1002/14651858.CD001069.pub5
13. McCullough, P., Halton, T., Mowbray, D., Macfarlane, P.I ., (2008). Lingual sucrose reduces the pain response to nasogastric tube insertion: a randomized clinical trial. Archives of Disease in Childhood - Fetal and Neonatal Edition, 93, 100–103.
14. Passariello, A., Montaldo, P., Palma, M ., Cirillo, M., Di Guida, C., Esposito, P., Caruso, M., Pugliese, M., Giliberti, P., (2020). Neonatal painful stimulus: skin conductance algesimeter index to measure efficacy 24% of sucrose oral solution. The Journal of Maternal-Fetal & Neonatal Medicine, 33(21), 3596-3601.
15. Dantas, L.V., Dantas, T.S., Santana-Filho, V.J., Azevedo-Santos, I.F., DeSantana, J.M., (2016). Pain assessment during blood collection from sedated and mechanically ventilated children. The Revista Brasileira de Terapia Intensiva, 28(1), 49-54.
16. Field, T. (2017). Preterm newborn pain research review. Infant Behavior & Development, 49, 141-150. https://doi.org/10.1016/j.infbeh.2017.09.002
17. Cırık, V. A., Efe, E. (2020). Orogastrik tüp takma işlemindeki ağrıyı azaltmada önerilen nonfarmakolojik yöntemlere karşın sınırlı sayıda çalışma: literatür değerlendirmesi. Türkiye Klinikleri Hemşirelik Bilimleri Dergisi.
18. Desai, A., Aucott, P., Frank, K., Silbert-Flagg, J., (2018). Comparing N-PASS and NIPS: Improving Pain Measurement in the Neonate. Advances in Neonatal Care, 18(4), 260-266. https://doi.org/10.1097/ANC.0000000000000521
19. Benbrook, K., Manworren, R., Zuravel, R., Ents, A., Riendeau, K., Myler, C., Ricca, P., (2022). Agreement of the neonatal pain, agitation, and sedation scale (N-PASS) with NICU nurses' assessments. Advances in Neonatal Care. 10.1097/ANC.0000000000000968.
20. Meesters, N., Simons, P., van Rosmalen, J., Reiss, I., van den Anker, J., van Dijk, M. (2017). Waiting 2 minutes after sucrose administration-unnecessary?. Archives of disease in childhood. Fetal and Neonatal Edition, 102(2), F167–F169. https://doi.org/10.1136/archdischild-2016-310841
21. Bueno, M., Yamada, J., Harrison, D., Khan, P., Ohlsson, A., Adams-Webber, T., Beyene, J., Stevens, B., (2013). A systematic review and meta-analyses of nonsucrose sweet solutions for pain relief in neonates. Pain Research and Management, 18(3), 153-161.