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Comparison of the Effectiveness of Warm Compress and Music on the Pain Caused by Heel Blood Sampling in Neonates: A Single-Blind, Prospective, Randomized Controlled Trial

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Dear Editor,

Pain treatment has remained an unresolved issue in medicine and the best treatment option is still unknown based on the complexity of pain treatment (1). In addition, pain experienced during medical procedures such as blood sampling from neonates is a common phenomenon. The prevention of pain in neonates is considered as a professional and legal task (2). Heel-blood sampling is a type of screening from neonates for the early diagnosis of very dangerous congenital diseases. Previous evidence shows that this type of sampling is associated with physical and psychological consequences in neonates. In this regard, non-medical interventions such as breastfeeding, oral glucose, massage, sensorial saturation, music therapy, and warm compress are successfully used for relieving the pain in neonates.

Previous research suggests that music has a role in relieving the pain which is due to painful procedures in term and preterm neonates (2). Further, the result of a clinical trial confirmed the effects of using a warm compress for pain relief (3). The present study was conducted to compare the effect of warm compress and music on the pain caused by heel-blood sampling in neonates.

It was a single-blind, prospective, randomized controlled trial (the Code of Ethics: MUBABOL.HRI.REC.1395.49; Clinical Trial Registration Code: TCTR20181109001). Using a respondent-driven sampling method (4), 90 neonates were selected from among the neonates who were admitted to the neonatal intensive care unit in Taleghani Hospital during April-September 2017. Then, they were randomly divided into warm compress, music, and control groups (each containing 30 patients) by block randomization method. Three minutes before the heel-blood sampling, the music band played a happy song repeatedly (with flute) with an intensity of 55 dB from a distance of one meter from the bed of the neonates. The intensity of the sound of music was measured by a standard sound meter (Lorton SL-4001 model, Italy). Similarly, the compressed group received warm compress 15 minutes before the heel-blood sampling with a temperature of 37°C below the posterior muscle of the leg. On the other hand, the control group merely received the routine works of the hospital. Blood sampling was carried out through lancet and the pain level of the neonates was measured based on the Neonatal Infant Acute Pain Assessment Scale. The heart rate and arterial blood oxygen were also measured by a pulse oximeter. The pulse oximeter is an appropriate, reliable, and non-invasive device for evaluating arterial blood oxygen and heart rate. The obtained data were analyzed by ANOVA and chi-square tests using IBM SPSS statistics, version 22 (SPSS, Inc., Chicago, IL, USA). All stages of the research were performed based on the Declaration of Helsinki (5).

The primary outcomes showed that the presentation of warm compress and music reduced the pain which was caused by heel-blood sampling. The highest pain relief was allocated to the warm compress group ($P<0.001$). Moreover, the secondary outcomes demonstrated that heart rate changes in warm compress ($P<0.003$) and arterial blood oxygen ($P<0.001$) were significantly lower in neonates under music compared to the control group (Table 1).

The findings of the study by Shu et al (6) indicated that the intensity of pain in neonates under warm compress was significantly lower than that of the swaddled neonates, which is in line with the results of our study. The role of warm compress in reducing the pain was also confirmed in

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Table 1. Mean and Standard Deviation of Arterial Blood Oxygen in Neonates Before and After Intervention

Arterial Blood Oxygen (%)		Number	Mean	SD	*P*
Before intervention	Warm compress	30	95.07	1.72	0.516
	Music	30	95.17	1.11	
	Control	30	95.48	1.52	
	Total	90	95.24	1.47	
After intervention	Warm compress	30	92.57	3.19	<0.001
	Music	30	93.13	3.39	
	Control	30	88.10	1.7	
	Total	90	91.23	3.62	
Variations	Warm compress	30	-2.5	2.88	<0.001
	Music	30	-2.03	3.38	
	Control	30	-7.38	1.45	
	Total	90	-4.01	3.61	

the other studies. For example, Akbarzadeh et al (3) found that the use of warm compress is effective in alleviating the length of giving birth. The results of the study by Maroufi et al (2) also demonstrated that the average pain intensity of the neonates during the intervention was lower in the music group than the breast milk group, and in the breast milk group, it was less than the control group. Based on these results, using warm compress and music could be recommended as a practical and cost-effective intervention for pain management in the neonatal unit.

Conflict of Interests

None to be declared.

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