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The Effect of Lavender Scent on Pain of Blood Sampling in Term Neonates

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Abstract

Introduction

After birth, many infants are in hospital undergo repeated invasive procedures and because there is increasing evidence of short term and long term adverse neurodevelopment consequences, pain management in neonates is very important.

Materials and Methods

This was a clinical trial study that carried out on 80 term neonates that were allocated to 2 intervention (40 neonates) and control (40 neonates) groups. In experimental group, infants at night were exposed to the scent of lavender for 8 hours before blood sampling, and the next day, at the time of blood sampling was used of the scent of lavender. Simultaneously with the needle, Douleur Aigue Nouveau-ne (DAN) scale by a trained person was calculated and recorded. Duration of infants crying in seconds of starting cry to silence that lasted at least 5 seconds interval was measured. The control group did not receive additional action for pain relief. Data were analyzed by using SPSS version 16 software.

Results

Average rating of DAN scores in control group was 5.97 ± 1.94 and in experimental group was 4.47 ± 1.81. Mann Whitney test results showed a significant difference in pain scores in the two groups (P=0.001). There were no statistically significant differences between two groups in the time of crying (P = 0.25).

Conclusion

The results of this study indicate that the scent of lavender is effective in reducing the pain of blood sampling in term neonates; but had no effect on duration of crying infants. Since neonatal pain management is an important task for nurse, using of the scent of lavender as a non pharmacological method of pain management in neonates can be useful.

Key Word: Lavender scent, Neonates, Pain.

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Introduction

Pain, as defined by the International Association for the Study of Pain (2001), is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage"(1).

Newborn infants routinely undergo painful invasive procedures, even after uncomplicated birth. Evidence shows that neonates do feel pain and may even have increased sensitivity to pain and to its long term effects compared with older infants (2). Neonates cannot speak and advocate for themselves when they experience pain, which makes nurses face enormous challenges, because self report is the gold standard for pain measurement. It is critical that nurses are able to recognize a neonate's pain using appropriate pain tools; that is the first step toward effective pain relief (3).

Studies showed that infants had a mean of 10 to 16 painful procedures per day during their early lives and neonates can detect, process, and respond to painful stimuli, and they may actually have a 30% to 50% lower pain threshold than adults. Excessive and prolonged unrelieved pain in the infant causes adverse physiologic effects in all major organ systems including brain structure, can be life-threatening, and can have long term cumulative outcomes (3) that interfere with normal growth and development during the infant's hospitalization and have implications for permanent changes in long-term neurodevelopment (1).

Effective pain prevention and treatment have been recommended as the standard of care at neonates; however both pharmacologic and non pharmacologic pain interventions are still underused. Pharmacological treatments are rarely used during procedures because of concerns about their effectiveness and potential adverse effects (central analgesics). Therefore, non pharmacological interventions are valuable alternatives. Non pharmacological interventions that have been tested in neonates that have shown varying degrees of efficacy can be categorized into sensory stimulation (positioning or swaddling, vestibular action or rocking, aromatherapy, non nutritive sucking, music), nutritive (oral sweet solutions) and maternal interventions (maternal odor and voice, breastfeeding, and skin-to-skin contact or Kangaroo care) (2-4).

The use of aromatherapy in nursing care continues to be popular in many settings. Most of the nursing literature relates to the use of essential oils in low doses for massage or use of the oils as environmental fragrances (5).

Lavender has sedative, antispasmodic and anti colic properties. As a result of these properties, it is thought that that might be able to relieve the symptoms of pain. Two means of administering lavender oil are recommended—topically and by inhalation. In pediatrics, to be able to use essential oils safely, it is important to know about their toxic effects, as well as to know which are the most appropriate ways of applying them including frequency of application for infants and children (6).

Most commonly lavender is recommended for oral administration; however, it is also being employed in aromatherapy

(inhalation of lavender), aromatherapy massage, dripping oil and bathing. Lavender also prescribed by some medieval physicians such as Ebn-e-sina and Razi for treatment of epilepsy and migraine attacks. Furthermore, lavender is considered beneficial in treatment of pain and tremor (7).

The aim of this study was to investigate the effect of lavender scent on pain from blood sampling in term neonates.

Materials and Methods

This was a clinical trial study that carried out on 80 term neonates that hospitalized in the neonatology ward in Hashemi Nezhad Hospital, affiliated with Mashhad University of Medical Sciences, Iran; between August 2011 to January 2012. The entire study process was approved by the Research Ethics Committee of Mashhad University of Medical Sciences, and clinical trials - registration ID is:

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The details of the study were explained to the mothers of neonates and their informed consent was obtained. Neonates were randomly assigned to two intervention (40 neonates) and control (40 neonates) groups and available sampling was conducted. Inclusion criteria included: gestational age over 37 weeks, Appearance, Pulse, Grimace, Activity, Respiration (APGAR) scores at five minutes greater than seven, non use of tranquilizer or sedative and anticonvulsant drug in the last 24 hours by mother and neonate, need for venous blood sampling, stability in general and clinical status and lack of diabetes in the mother. Also, if the baby was restless and unsettled before the blood sampling or if the first attempt for blood sampling was not successful; if the infants in the intervention group, after the orientation phase of the scent or during the familiar within scent up to blood sampling, was discharged, were excluded from the study. Because it was probable for the control group to be exposed to the lavender scent spread from aromatherapy group (diffusion effect), sampling was done only for one group during each week, with groups being randomly selected; in other words, on the first day, the name of each group was written on a separate piece of paper, then was lottery.

During each week, eligible cases were recognized and selected by convenience sampling only for one group, and groups were replaced respectively.

Demographic information based on questionnaires and profile of the infants filled. To assess pain in infants was used from pain behavioral tool in neonate DAN.

The DAN scale is a behavioral scale developed to rate acute pain in term and preterm neonates. Scores range are from 0 (no pain) to 10 (maximum pain). The scale is used to evaluate 3 items: [facial expressions (calm to very pronounced, continuous from 0 to 4 score), limb movements (calm or gentle movements to very pronounced, continuous from 0 to 3 score), and vocal expression (no complaints to long-lasting crying, continuous howl from 0 to 3 score)].

Credit of collection tools data were evaluated using content validity, the reliability and validity of this instrument has been confirmed by researcher in Iran (8).

The neonates in the aromatherapy group inhaled ten drops of 0.5% lavender essential oil [three drops lavender essential oil 100% was dissolved in 30 cc glycerin solution that lavender essential oil, produced by Barij Esans Co. Iran (Kashan)]. By the company doctor mentioned and neonatologist innocuous use of scent for newborn babies were confirmed.

For the scent group, familiarization was performed the night before blood sampling and neonates were exposed to the lavender scent during the painful procedure. In this group, a sterile gauze pad (10 * 10 cm) moistened with ten drops of lavender solution was placed in the incubator ~10 cm from the neonate's head. The next morning, the scented gauze was removed for average familiarization duration of 8 hours. Blood sampling was done in the presence of the lavender scent. The average time of blood sampling in neonates was half to one hour after removal of the gas.

Venous blood sampling in both intervention and control groups were performed by a skilled person and for collecting blood from veins in the back of hand and the 21 gauge needle was used. Along with needling, scores of DAN scale by the one fixed and trained person observed, calculated and recorded. Duration of crying, in the first three minutes of blood sampling were also measured. Start and completion criteria cry was based on the first cry, which was the duration of audible crying from the beginning (after needle insertion) until the cessation of crying for five seconds.

But in control group, data collection and blood sampling were performed in the same manner as described for the experimental groups but no scent was given to them. All statistical analyses were performed at a confidence level of 0.05 using the statistical software SPSS_ 16. Kruskal-wallis, Chi-square, and one way analysis of variance (ANOVA) were used to compare background characteristics among the two groups. Mann Whitney U, independent t-test were applied to assess groups differences.

Results

In this study, 80 infants 3- 13 days were enrolled, the mean age in the intervention group was 5.47 ± 1.97 and in the control group was 5.55 ± 2.44 (Table.1). Results showed 57.5% of infants were females and 42.5% of neonates were first child and 67.5% of them were natural childbirth. There was no significant difference between two groups regarding the individual characteristics that might have an effect on the intervention.

Average rating of DAN scores in control group was 5.97 ± 1.94 and in experimental group was 4.47 ± 1.81. Mann Whitney test results showed a significant difference in pain scores in the two groups (P=0.001).

Time of crying in the intervention group was 61.4 ± 21.13 seconds and in control group was 76.15 ± 35.65 seconds. The crying time between groups were not significant difference (P = 0.25); although the average crying time in intervention group was less than the control group (Table.2).

Table 1: The demographic characteristics of newborns in the intervention and control groups

Demographic information		Intervention group	Control group	P- value
		Mean ±SD	Mean ±SD	
Age (day)		5.47 ± 1.97	5.55 ± 2.44	P= 0.98
Gestational age		38.27 ± 0.96	38.19 ± 0.89	P= 0.96
Weight		3.23 ± 0.5	3.05 ± 0.5	P=0.18
Time of sampling		82.25 ± 21.93	97.15 ± 38.94	P = 0.08
		Number (percent)	Number (percent)	
Gender	boy	15 (37.5%)	19 (47.5%)	P = 0.23
	girl	25 (62.5%)	21 (52.5%)	
Type of labor	natural childbirth	25(62.5%)	29 (72.5%)	P = 0.6
	cesarean	15 (37.5%)	11 (27.5%)	
Rank of birth	first	15 (37.5%)	19 (47.5%)	P = 0.18
	second and third	17 (42.5%)	16 (40%)	
	more than a third	8 (20%)	5 (12.5%)	

Table 2: Comparison of mean and SD of scores of DAN scale and time of crying in two groups

Groups Criteria	Intervention Mean ±SD	Control Mean ±SD	Type and test results
Time of crying	61.4 ± 21.13	76.15 ± 35.65	t- test F= 9.98 P= 0.25
Score of pain	4.47 ± 1.81	5.97 ± 1.94	Man Whitney Z= -3.31 P= 0.001

Discussion

The results of this study showed, lavender scent can reduce pain in term neonates, and this decrease in comparison with control group was statistically significant**,** but had no effect on the duration of crying in infants.

A similar study that measured lavender scent on pain in term neonate didn't find. The study of Sadat Hosseini, Negarandeh, and Movahedi showed that stimulating the neonates with a familiar vanillin scent during the arterial puncture reduced the duration of crying compared with the other groups. Comparison of the physiologic parameters showed less variation in Oxygen saturation level during arterial puncture in the familiar scent group. In this study, a familiar scent could reduce crying and oxygen consumption during arterial puncture (9).

Goubet, Strasbaugh and Chesney have shown a familiar odor (vanilla) is effective in significantly reducing crying and grimacing during the heel stick (10).

The study results of Rattaz, Goubet and Bullinger have shown that infants who smelled a familiar odor (neonate mother's milk or vanilla) cried and grimaced significantly less during the recovery phase compared with the heel stick phase.

Infants who were presented with an unfamiliar odor or no odor showed no significant changes during recovery. Smelling a familiar odor reduces agitation during the heel stick and diminishes distress after the procedure (11).

Goubet, Rattaz, Pierrat, Bullinger and Lequien showed that infants who were presented with a familiar odor during venipuncture showed no significant increase in crying and grimacing during the procedure compared to baseline levels. By comparison, infants presented with an unfamiliar odor or with no odor either during the heel stick or the venipuncture had a significant increase in crying and grimacing (12). Cetinkaya and Basbakkal concluded that the use of aromatherapy massage using lavender oil was found to be effective in reducing the symptoms of colic in term neonates (6).

Studies of Burns, Zobbi, Panzeri, Oskrochi and Regalia showed there was a neonatal wellbeing (Apgar scores) and transfer to Neonatal Intensive Care Unit (NICU) for the control six (2%) versus none in the aromatherapy group; this study revealed that the use of aromatherapy during labour as a care option that could improve maternal and neonatal outcomes (13).

Conclusion

Since the management and control of pain in infants is one of the most important the goals and tasks of nurses, search and use of all possible methods for this purpose should be in mind. The results of this study indicate that the scent of lavender can be considered as an effective strategy in reducing the pain from blood sampling in term neonates, but more research is needed in this area.

Conflict of interest: None.

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