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A Randomized-Control Trial to Test Breast Milk Odor/Taste on Preterm Infant Pain During Venipuncture

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Purpose: Every year, an estimated 15 million babies are born preterm. To survive, these immature infants need to stay at the neonatal intensive care units (NICUs), where they may experience numerous painful procedures during the first few days of their life. Repeated and prolonged pain exposure alters preterm infants' subsequent pain processing, physiological and behavioral stability, long-term developmental outcomes. Peripheral venipuncture commonly occurred in neonatal clinical practice and are important sources of pain in preterm infants. However, the use of analgesics does not preferred in neonatal populations due to the side effects. It is important to integrate of two or more nonpharmacological interventions to help preterm infants relieve pain receiving short invasive procedures. Neurodevelopmental studies have shown that olfactory, gustatory pathways and their neurophysiologic responses are present even at 28 weeks gestation. Studies suggest that the effects of single use of breast milk odor/taste on pain relief are still inconsistent. The evidence drives us to use the infants' sensory developmental competences (especially odor/taste integration) in relieving pain during venipuncture. Therefore, the study purpose was to compare the effects of using breast milk odor/taste integration on pain in preterm infants across the peripheral venipuncture procedures.

Methods: This is a prospective randomized controlled trial. Level III neonatal intensive care unit and a neonatal unit at a medical center in Taipei. Preterm infants ($N=70$, gestational age 28–37 weeks, stable disease condition) needing procedural venous punctures were recruited by convenience sampling and randomly assigned to two treatment conditions: routine care, breast milk odor (BMO) + oral expressed breast milk (OEBM). Pain was measured by watching video recordings of infants undergoing venipuncture procedures and scoring pain at 1-minute intervals with the Premature Infant Pain Profile-Revised; physiological parameters (heart rate [HR], oxygen saturation [SpO_2]) by electrocardiogram monitors, and was be digitally sampled at 10-s intervals by computer. Data were collected over nine phases: baseline (phase 0, 5 min without stimuli before venipuncture), disinfecting (phase 1), during venipuncture (phase 2), and a 10-minute recovery (phases 3-8).

Results: For the group of the infants receiving BMO+ OEEM, pain score changes from baseline were 1.90, 2.15, and 2.00 units significantly lower than corresponding pain-score changes in infants receiving routine care across phases 2, 5, 6 (p -values < 0.05 , and p -values=0.05). However, there were no significant differences in pain score changes between the two groups at phase 3, 4, 7, and 8. For the group of the infants receiving BMO+ OEEM, HR changes from baseline across phase 2,5, 8 were 8.00, 8.88, 5.25 units significantly lower than corresponding HR changes of infants receiving routine care (all p -values < 0.05). However, there were no significant differences in HR changes between the two groups at phase 1, 3, 4, 6, and 7. For the group of the infants receiving BMO+ OEEM, the SpO₂ changes from baseline across phases 4 were 2.49 units higher than corresponding SpO₂ changes of infants receiving routine care (p -values < 0.05). However, there were no significant differences in SpO₂ changes between the two groups at phase 1, 2, 3, 5, 6, 7 and 8.

Conclusion: The study suggests that preterm infants receiving BMO+ OEEM could significantly lower the infant's pain-score, and lower the changes of the HR during the venipuncture phase. The results can guide caregivers to alleviate preterm infants' pain during painful procedure by using breast milk odor/taste integration. By using the infant's sensory competences; clinicians could calm their pain, and HR across the venipuncture phase.

Title:

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Abstract Describes:

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Applicable category:

Students

Keywords:

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References:

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Abstract Summary:

The study suggests that preterm infants receiving odor/taste integration could significantly lower the pain score of infants, and lower the changes of the HR during the venipuncture phase. The results can guide caregivers to alleviate preterm infants' pain during painful procedure by using breast milk odor/taste integration.

Content Outline:

Introduction: Every year, an estimated 15 million babies are born preterm. To survive, these immature infants need to stay at the neonatal intensive care units (NICUs), where they may experience numerous painful procedures during the first few days of their life. Repeated and prolonged pain exposure alters preterm infants' subsequent pain processing, physiological and behavioral stability, long-term developmental outcomes. Peripheral venipuncture commonly occurred in neonatal clinical practice and are important sources of pain in preterm infants. However, the use of analgesics does not preferred in neonatal populations due to the side effects. It is important to integrate of

two or more nonpharmacological interventions to help preterm infants relieve pain receiving short invasive procedures.

Neurodevelopmental studies have shown that olfactory, gustatory pathways and their neurophysiologic responses are present even at 28 weeks gestation. Studies suggest that the effects of single use of breast milk odor/taste on pain relief are still inconsistent. The evidence drives us to use the infants' sensory developmental competences (especially odor/taste integration) in relieving pain during venipuncture.

Aims: We compared the effects of using breast milk odor/taste integration on pain in preterm infants across the peripheral venipuncture procedures.

Design: This is a prospective randomized controlled trial

Settings: Level III neonatal intensive care unit and a neonatal unit at a medical center in Taipei.

Participants/Subjects: Preterm infants ($N=70$, gestational age 28–37 weeks, stable disease condition) needing procedural venous punctures were recruited by convenience sampling and randomly assigned to two treatment conditions: routine care, breast milk odor (BMO) + oral expressed breast milk (OEBM).

Methods: Pain was measured by watching video recordings of infants undergoing venipuncture procedures and scoring pain at 1-minute intervals with the Premature Infant Pain Profile-Revised; physiological parameters (heart rate [HR], oxygen saturation [SpO_2]) by electrocardiogram monitors, and was be digitally sampled at 10-s intervals by computer. Data were collected over nine phases: baseline (phase 0, 5 min without stimuli before venipuncture), disinfecting (phase 1), during venipuncture (phase 2), and a 10-minute recovery (phases 3-8).

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For the group of the infants receiving BMO+ OEBM, HR changes from baseline across phase 2,5, 8 were 8.00, 8.88, 5.25 units significantly lower than corresponding HR changes of infants receiving routine care (all p -values < 0.05). However, there were no significant differences in HR changes between the two groups at phase 1, 3, 4, 6, and 7.

For the group of the infants receiving BMO+ OEBM, the SpO_2 changes from baseline across phases 4 were 2.49 units higher than corresponding SpO_2 changes of infants receiving routine care (p -values < 0.05). However, there were no significant differences in SpO_2 changes between the two groups at phase 1, 2, 3, 5, 6, 7 and 8.

Conclusion: The study suggests that preterm infants receiving BMO+ OEBM could significantly lower the infant's pain-score, and lower the changes of the HR during the venipuncture phase. The results can guide caregivers to alleviate preterm infants' pain

during painful procedure by using breast milk odor/taste integration. By using the infant's sensory competences; clinicians could calm their pain, and HR across the venipuncture phase.