

Reducing Pain in Preterm Neonates during Heel Lance Sampling: A Systematic Review and Meta-Analysis of Non-Nutritive Sucking Interventions

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Abstract : Background: Persistent and early pain experiences before the full development of the nervous system can lead to enduring behavioural changes in preterm infants. Purpose: This study was conducted to evaluate the effect of non-nutritive sucking on pain during heel sticks in preterm neonates. Data Sources: Databases include PubMed/MEDLINE, Scopus, Web of Science, Cochrane, and Google Scholar search engines were searched from January 2000 to May 2024. Study Selection: Inclusion criteria were clinical trials about the effect of non-nutritive sucking on pain management during heel stick focused on neonates. Articles must have been written in English. Data Extraction: Selected articles were assessed, and data was extracted by two independent reviewers based on inclusion criteria, and any disagreements were resolved through discussion and consensus. Results: Until May 25, 2024, a total of 6216 articles were retrieved. Following the screening, eight articles underwent a detailed assessment, focusing on 225 neonates—116 in the NNS group and 109 in the control group. Among the subjects, male neonates constituted 58.5% (n=131). The gestational age averaged 31.6 ± 2.02 weeks, with a mean birth weight of 1632.2 ± 322.8 grams. The findings revealed a statistically significant reduction in pain scores among neonates in the intervention group compared to the control group. While non-nutritive sucking exhibited a significant effect on pain and heart rate reduction, its impact on oxygen saturation in neonates was non-significant when compared to the control group. Implications for Practice and Research: Using the non-nutritive sucking method as a low-cost and accessible measure can reduce pain during painful procedures.

Keywords : non-nutritive sucking, heel stick, pain management, preterm neonates, non-pharmacologic interventions, systematic review, meta-analysis

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