Effects of Sensory Intervention on Neurological Development in the Neonatal Intensive Care Unit: A Critically Appraised Topic
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Rationale
• In 10 infants in the U.S. were born prematurely in 2020 (Centers for Disease Control and Prevention, 2021).
• Premature infants are often faced with an environment for which they are not developmentally prepared.
• This is a vulnerable population in an overwhelming environment.

Neurological Development
An umbrella term we are using to refer to the brain’s development and the observed and measured functioning as a result. This may encompass neuromaturation as well as neurobehavioral, neuromuscular, and neuromotor development.

Review Process

PICO Question
For premature babies in the Neonatal Intensive Care Unit (NICU), are sensory interventions effective for improving neurological development?

Search Methods

Main Findings

Inclusion Criteria

Exclusion Criteria

Study, Design, & Quality Interventions Outcomes Limitation

Level I

Alta et al. (2021)
• Systematic Review & Meta-Analysis
• Quality Score: 88%
• Newborn Individualized Developmental Care & Assessment Program
• Positioning & incubators covers
• Alternative positioning
• Tactile stimulation
• Multisensory stimulation
• Music

Statistically significant:
• Multisensory intervention on neuromotor & neuromuscular development
• Music on neuromotor development
Statistically non-significant:
• Tactile intervention on neurobehavioral development

Operationalization of standard care varied

Pineda et al. (2016)
• Integrative Review
• Quality Score: 90%
• Manulized Multisensory Program (SENSE)

Little evidence for improved long-term outcomes
• Some evidence support use of kangaroo care, music & language exposure, & multimodal interventions

Excludes non-English studies
• Sample sizes < 30 Participants between ages of 33-36 wks.
• gestation
• Studies > 20 yrs. old
• One reviewer
• Lack of cohesion in interventions

Level II

Lecuona et al. (2017)
• Small scale RCT
• Quality Score: 58%
• Ayres Sensory Intervention

No statistically significant difference reported
• Authors report positive effects

Participants from only low SES areas

Pineda et al. (2021)
• RCT
• Quality Score: 76%
• SENSE Program

> lethargy at term age

Small sample size
• Participant selection bias
• Sensory logs may suggest need for sensory experiences
• Type I errors due to multiple measures of constructs over time

Recommendations
• More research needed
• Long-term follow up
• Caregiver and interdisciplinary education on sensory intervention & documentation

CONCLUSIONS

Clinical Bottom Line
• Use with caution and monitoring with this vulnerable population
• Some statistically significant evidence
• Positive trends, but lack of long-term follow up

References

Aita et al. (2021)
Pineda et al. (2016)
Lecuona et al. (2017)

Databases Searched
CINAHL, Embase, Google Scholar, PubMed

Search Terms
NICU, Neonatal Intensive Care Unit, premature infants, sensory experiences, sensory input, sensory program, sensory stimulation, neurobehavior, developmental, brain development

Example for Monitoring Clinical Application

Caregiver Sensory Log

Date & Time
Before Session
After Session

References

Bigsby, 2020