Procedural pain assessments for neonates at risk of neonatal opioid withdrawal syndrome: A JBI scoping review[1]

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What evidence is available on pain assessments for procedural pain in hospitalized neonates at risk of neonatal opioids withdrawal syndrome (NOWS)?

Methods

This scoping review was conducted using JBI methodology[2,3,4]

- Databases were searched on October 24, 2022, and included MEDLINE, CINAHL, Embase, PsycInfo, and Scopus.
- Two independent reviewers completed title/abstract and full-text screening through Covidence
  - Main reason for exclusion was wrong patient population
- The relevant data from included studies were extracted by two reviewers using a modified JBI extraction tool.

Inclusion criteria

Participants: Full-term and preterm neonates at risk of NOWS. Any neonate born to a birthparent who identified as opioid using for the whole duration of the pregnancy were considered eligible.

Concept: Measurement of pain response during an invasive/pain-inducing acute procedure and/or recovery from such procedures. Measurements may use any of the following: behavioral pain indicators, physiological pain indicators, and/or validated composite pain scores.

Context: In-patient hospitalized neonates cared for in any perinatal, neonatal, or postpartum units.

A total of 22,731 unique studies were screened, with 5 studies included. Two of these studies included neonates at risk of NOWS but did not report pain responses separately. The 3 remaining studies observed procedural pain in opioid-exposed neonates compared to neonates without opioid exposure during heel lance.

Results: Included studies

Various pain assessment methods were reported on including physiologic responses and validated composite pain tools. There was considerable variability in pain responses. When using composite tools, one study showed higher pain response in opioid-exposed neonates, while the other two studies showed the same or lower pain response. For skin conductance, the findings from two studies were discrepant: one study reported higher pain response, the other showed no difference.

Title and authors	**Oji-Mmuo et al (2020)** ***Prenatal opioid exposure heightens sympathetic arousal and facial expressions of pain/ distress in term neonates at 24-48 hours post birth***[5]	**Schubach et al (2016)** ***Skin conductance in neonates suffering from abstinence syndrome and unexposed newborns***[6]	**Marceau et al (2010)** ***Efficacy of oral sucrose in infants of methadone-maintained mothers***[7]	Jones et al (2018) *EEG, behavioural and physiological recordings following a painful procedure in human neonates*[8]	Gonsalves & Mercer (1993) *Physiological correlates of painful stimulation in preterm infants*[9]
Setting	NICU and well-baby nursery in USA	Neonatal centers and maternity wards in Germany	Special care nursery and postnatal ward in Australia	Postnatal, special care, or intensive care wards in the UK	2 ICUs in the USA
Age of observation	24 to 48 hours	Median age 72 hours	48 to 72 hours	0.5 - 96 days	Mean age 10.4 days
Opioid exposure	Methadone (n = 16/22), buprenorphine (n = 2/22), morphine or oxycodone (n = 4/22)	Methadone (n = 11/12), buprenorphine (n = 1/12), other opioid exposure (n = 7/12)	Methadone (n = 26/26)	Some neonates included had neonatal abstinence diagnoses	Heroin (n = 1/35)
Pain measurement	Skin conductance and Neonatal Facial Coding System (NFCS)	Skin conductance and Bernese Pain Scale for Neonates (BPSN)	Premature Infant Pain Profile (PIPP)	Electroencephalogram (EEG) and PIPP	Heart rate, respiration rate, oxygen saturation
Pain management	Swaddling and non-nutrtitve sucking	No treatment	Sucrose	No treatment	Not reported
Key findings	Higher NFCS scores and increased number of skin conductance fluctuations in the opioid-exposed neonates	Lower BPSN scores and no statistically significant skin conductance changes in opioid-exposed neonates	Same PIPP scores in opioid-exposed neonates as non-opioid-exposed neonates	No dataset available	Opioid-exposed neonate is not differentiated

Possible causes for variability in findings

- Postnatal age of observation[10]
- Type of opioid exposure[10]
- Exposure to substances (i.e. cigarettes, alcohol)[11,12]
- Pain management strategies used
- Differences in composite pain tools

Discussion: What now?

Implications for research additional prospective observational studies examining:

- Acute pain responding in neonates with NOWS
- Pain assessment methods for neonates with NOWS
- Effects of type of opioid exposure and exposure to other substances
- Influence of pain management interventions

Implications for nursing practice continued utilization of available clinical composite pain tools and pain management strategies

- Sucrose
- Breastfeeding
- Skin-to-Skin contact
- Eat, Sleep, Console (ESC) approach[13]

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