

Associations Between Infant Sleep & Postpartum Maternal-Infant Bonding Among Mothers with Opioid Use Disorder

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Background

- Infant sleep difficulties negatively impact maternal mental health, maternal sleep quality, and the bonding experience
- Bonding is especially important among postpartum individuals with opioid use disorder as this population is associated with impaired caregiving & reduced maternal behaviors
- Opioid-exposed neonates are reported to have greater sleep deprivation, disorganization, and fragmentation

Hypothesis: Poor infant sleep is associated with lower levels of maternal-infant bonding among people with OUD

Methods

Study Design

- Retrospective cohort study
- Recruited from multiple clinics throughout Ohio
- Inclusion criteria:
 - >18 years old
 - Between 6-24 months postpartum
 - Received medications for OUD (methadone, buprenorphine) at any point during pregnancy

Survey Design

- Survey co-designed by individuals with lived experience of OUD during pregnancy
- Maternal-infant characteristics
- Postpartum experiences
- Postpartum Bonding Questionnaire (PBQ)
 - Higher score indicate bonding impairment
 - Subscales:
 1. Impaired bonding
 2. Rejection of infant and pathological anger
 3. Infant-focused anxiety
 4. Incipient abuse

Statistical Analysis

- Chi-square analysis to detect characteristics and experiences that had strong associations with a total PBQ score in the top quartile (poor bonding)
- Literature search and concept mapped (DAG) to determine covariates and mediators (Figure 1)
- Unadjusted and stepwise linear adjusted regression models used to calculate mean effect (β) and 95% confidence intervals

Results

- Out of 100 study participants, 91 completed the PBQ survey
 - 57% reported that their baby's sleep was a problem during the first 6 months postpartum
 - Those who reported infant sleep problems scored 10.40 points higher on the PBQ than those who did not report infant sleep problems (Figure 2)
 - Effect remained after stepwise linear regressions of adjusting for relevant covariates of interest (Figure 1, Table 1)
 - Effect remained when breaking down PBQ score into its 4 subscales: impaired bonding, rejection, and anxiety were all increased with infant sleep problems (Table 2)
- Those who did report sleep problems, the increase in PBQ score was only significant if sleep problems persisted after 1 month after birth (Table 3)

Figure 1. Directed Acyclic Graph of Exposure, Outcome, and Covariates of Interest

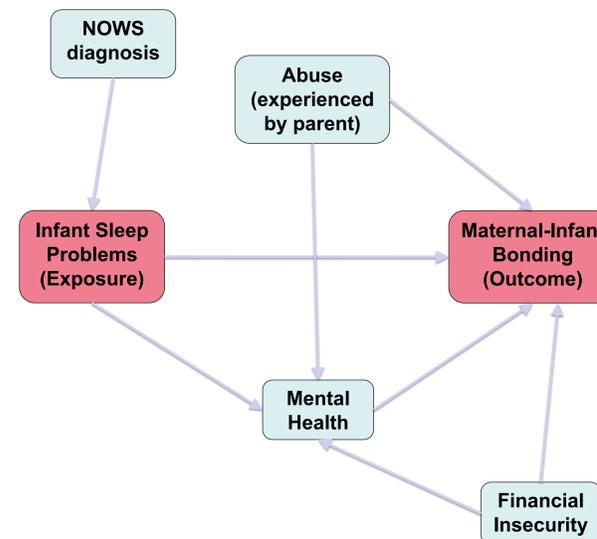


Table 1. Unadjusted and Adjusted Models between Infant Sleep Problems and Total PBQ Score

Variable	Model 1 β (95% CI)	Model 2 β (95% CI)	Model 3 β (95% CI)	Model 4 β (95% CI)	Model 5 β (95% CI)
Infant Sleep Problems ¹	10.40 (5.83, 14.96) *	9.90 (5.04, 14.76) *	9.15 (4.24, 14.05) *	9.03 (4.10, 13.96) *	8.95 (3.93, 13.97) *
NOWS diagnosis ²		4.34 (-0.49, 9.17)	3.36 (-1.55, 8.27)	3.55 (-1.44, 8.54)	3.53 (-1.50, 8.56)
Financially Insecure ³			5.03 (-0.09, 10.16)	4.06 (-1.32, 9.44)	3.87 (-1.87, 9.60)
Abuse ⁴				4.33 (-1.78, 10.44)	4.24 (-1.98, 10.45)
Mental Health ⁵					0.73 (-6.28, 7.74)

¹Model 1 is an unadjusted linear regression between self-reported infant sleep problems and total PBQ score. Subsequent models added covariates of interest that are all adjusted for one another in each model. β is the average difference in total PBQ score between those who reported the stated variable and those who did not

²Neonatal opioid withdrawal syndrome (NOWS) diagnosis was based on self-report. Of 46 infants diagnosed with NOWS, 28 (60.9%) were sent to the NICU. Of 45 infants not diagnosed with NOWS, 10 (22.2%) were sent to the NICU.

³Financially insecure was a composite score that included self-reported worrying about paying for food/shelter, housing insecurity, engaging in sex work, inability to find help with childcare, and needing to buy medications for OUD elsewhere.

⁴Abuse was a composite score of self-reported physical and emotional abuse. All who reported physical abuse had also reported emotional abuse.

⁵Mental health was a composite score of self-reported depression, anxiety, and "other mental health" symptoms.

*p-value < 0.001

Figure 2. Comparison of Total PBQ Score Between Infant Sleep Problems

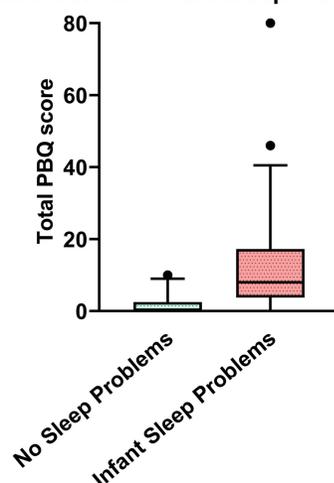


Table 2. Mean Increase in PBQ Subscale Scores based on Infant Sleep Problems at 6 Months Postpartum

	β , SD	CI	p-value
PBQ Total	10.40 \pm 2.30	(5.83, 14.96)	>0.001*
PBQ Bonding	4.68 \pm 1.06	(2.57, 6.78)	>0.001*
PBQ Rejection	2.65 \pm 0.73	(1.19, 4.10)	>0.001*
PBQ Anxiety	2.94 \pm 0.52	(1.92, 3.97)	>0.001*
PBQ Abuse	0.08 \pm 0.24	(-0.39, 0.55)	0.742

Table 3. Mean Increase in Total PBQ Score based on Infant Sleep Problems at 1 Month vs. 1+ Month

Infant Sleep Problem	β , SD	CI	p-value
\leq 1 month (n = 10)	6.20 \pm 4.21	(-2.16, 14.55)	0.144
\geq 1 month (n = 47)	11.20 \pm 2.40	(6.45, 15.94)	>0.001*

*Referent group was "infant sleep was never a problem"

Conclusions

- In this pilot study among postpartum individuals with OUD, those who reported difficult sleep problems had higher scores of impaired bonding, even after adjusting for several factors of interest
- Improving infant sleep may yield increased maternal-infant bonding in families with OUD
- Future studies should increase the sample size and include observational and interview-based mixed methods

Clinical Relevance

Given the importance of infant sleep on maternal mental health and maternal-infant bonding, and the increased prevalence of infant sleep problems among infants with opioid exposure, sleep education should be more strongly considered when counseling new parents with OUD.

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