

# Sleep and Depression Rates Among High-Risk Postpartum Women: Possible Benefits of the SNOO®

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## Introduction

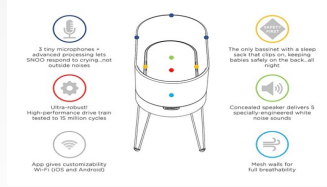
- Identifying risk factors for postpartum depression and anxiety is critical in order to intervene in a timely manner.
- Poor maternal sleep is a recognized risk factor for PPD.
- Infant sleep, on the other hand, is less appreciated as a potent risk factor.
- The SNOO is a robotic, responsive bassinet that helps an infant self-soothe and return to sleep without the intervention of the parents.
- In theory, fewer awakenings to attend to their infant would result in more consolidated sleep and better sleep quality for the mother.
- The SNOO may be a viable option that provides “additional support” and mitigates depression, especially for those at high risk

## Objectives

To collect longitudinal self-reported maternal sleep and mood data, as well as maternally reported infant sleep among those who used a SNOO bassinet through 6-months postpartum

## Methods

- The SNOO is a robotic, responsive bassinet that calms a fussing or crying infant with motion and womb-like sound. It automatically responds to encourage self-soothing and sleep training, allowing for fewer parental interventions, particularly at night. A potential benefit of the SNOO may be *tangible* or *instrumental* support, as it can act like “another caretaker” that “attends” to the fussing or crying infant allowing the mother to remain asleep, perform self-care, or even eat.



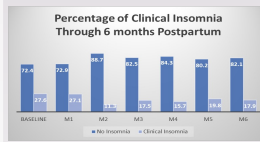
- Women with a history of depression, but not currently depressed, were recruited in late gestation from across the U.S. via Facebook and word of mouth, and shipped a SNOO to use through 6 months postpartum
- IMPORTANTLY:** all women were assessed during the **COVID-19 pandemic**
- Participants completed online questionnaires via Qualtrics monthly
  - Pittsburgh Sleep Quality Index (PSQI)
  - Insomnia Symptom Questionnaire (ISQ)
  - Edinburgh Postnatal Depression Scale (EPDS)
  - Generalized Anxiety Disorder Scale (GAD)
  - Epworth Sleepiness Scale (ESS)
  - Flinders Fatigue Scale (FFS)
  - Brief Infant Sleep Questionnaire (BISQ)
  - Infant Behavior Questionnaire (IBQ)
- Analyses were done to 1) describe maternal and infant sleep; 2) whether it changed over time; and 3) whether sleep was associated with depression and anxiety scores

## Results

Data from 93 women who completed all 6-months are reported here

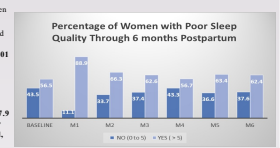
- Mean Age = 31.1 ± 4.3 years of age weeks \*Gestational age at enrollment = 34.4 ± 2.0 weeks
- 76.9% Caucasian, 1.1% Black, 3.3% Asian, 11.0% Latina, and 7.7% multi-racial
- 96.7% Married/Living with Partner, 1.1% Single, 2.2% Separated/Divorced
- 92.5% College degree or higher

### Maternal Sleep



Percentage of women meeting clinical insomnia criteria. Change over time was not significant  $\chi^2(6) = 6.23, p = .39$  NS. Average 18.2% having insomnia compared to an Argentinian sample in COVID where 46% had insomnia (ISI) (Miranda et al., 2021)

Percentage of women having poor sleep. Percentages changed over time  $\chi^2(6) = 28.97, p < .01$ . Average PSQI at 2 mos. = 6.5 (2.9) as compared to a pandemic sample 7.9 (3.1) at 6 weeks PP in COVID (Li et al., 2021)

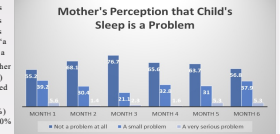


### Infant Sleep

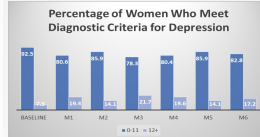


Maternally reported infant sleep. Significantly increased over time  $F(4,89, 327.96) = 15.44, p < .001$ . Mean 24-hour sleep duration = 14.14 hrs in line with recommendations for infants.

In months 2-6, mothers who rated their infant's sleep as “a very serious problem” compared to “a small problem” or “not a problem at all” had higher EPDS scores ( $p < .05$ ). Average % who reported sleep was a serious or small problem = 35.6%. Another study found 30% perceived it as a moderate/severe problem.

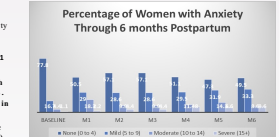


### Maternal Mood

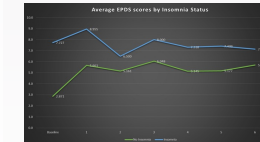


Percentage of women meeting clinical depression over 6 months = 18.9%. No significant change over time  $\chi^2(6) = 8.88, p = .18$ . Rates of depression ranged from 25% - 41% worldwide during the pandemic. (Liang et al., 2020 = 38%.

Percentage of women meeting clinical anxiety criteria. Percentages changed over time  $\chi^2(18) = 38.63, p < .01$ . Average rates of high anxiety (7+) = 31.8%. Compared to 42.8% in an Italian sample during the pandemic (Pengo et al., 2021)



### Insomnia and Mood



Women who met clinical criteria for insomnia had significantly higher EPDS scores at all time points.

Women who met clinical criteria for insomnia had significantly higher GAD scores in early postpartum



	df(1)	df(2)	F	p
Main Effect ISQ	1	82	103.832	0.000
Main Effect Time	6	492	3.189	0.000
Interaction	6	492	2.628	0.002

	df(1)	df(2)	F	p
Main Effect ISQ	1	74	122.25	0.000
Main Effect Time	6	444	3.692	0.001
Interaction	6	444	3.37	0.003

## Conclusions

- A substantial number of women have disturbed sleep in the postpartum. More women had insomnia and/or poor sleep quality during the pandemic than compared to women from pre-pandemic datasets. However, rates of insomnia and poor sleep quality in the current study appear to be substantially lower than other comparable datasets.
- Mothers who report that their infant's sleep is a problem have more depressive symptomatology than those that report the sleep is not a problem. This suggests that improving infant sleep may positively affect PPD by modifying maternal perceptions. The SNOO may be a viable option to improve infant sleep and mitigate PPD risk.
- The rate of PPD (12+ on the EPDS) ranged from 13.5%-17.4% through 6 months postpartum. This contrasts with global reports of postpartum women during the COVID-19 pandemic (30%-41%). Although there is no control group, these data suggest that the use of the SNOO may reduce depressive symptom reporting and/or mitigate risk for PPD in the first 6 months postpartum.
- Having insomnia in late pregnancy was significantly associated with depressive and anxiety symptoms throughout the postpartum. We suggest that maternal sleep is both a mediating and moderating pathway between infant sleep and risk for recurrent PPD.

## ACKNOWLEDGEMENTS AND CONTACT

We would like to thank Happiest Baby, Inc for supplying the SNOO bassinets to all the participants. We would like to thank all the participants. For further information contact: Dr. Michele Okun [mokun@uccs.edu](mailto:mokun@uccs.edu)