Association between Sleep Duration and Vagal Activity during the Postpartum Period: Insights from Wearable Digital Health

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Background

Postpartum Physiology

- Marked by sleep disruption following delivery
- Period of autonomic and cardiovascular vulnerability

Established Evidence

- Poor sleep in non-pregnant populations --> reduced HRV (vagal tone)

Clinical relevance

- HRV = Marker of autonomic recovery

Do sleep quantity and quality differentially influence heart rate variability during the postpartum period?

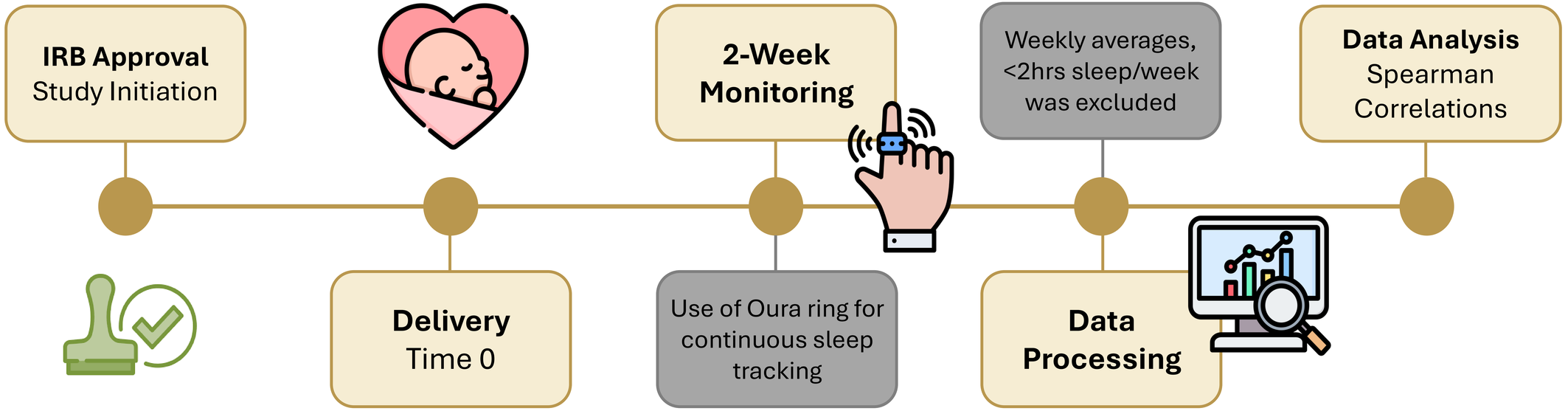
Hypothesis

Poorer sleep quality and greater sleep fragmentation will be associated with lower HRV.

Study Design and Methods

Timeline

Prospective Cohort (n=40) | Feb 2025 – Jan 2026



Sleep Metrics			
Total Sleep Time (TST)	**Sleep Efficiency (SE%)**	**Wake After Sleep Onset (WASO)**	**Sleep Onset Latency (SOL)**
Sleep occurring between 6pm and next day noon	Percentage of time asleep while in bed. 85% is good sleep	Total time awake after initiating sleep and before final awakening	Time it takes to fall asleep

Results

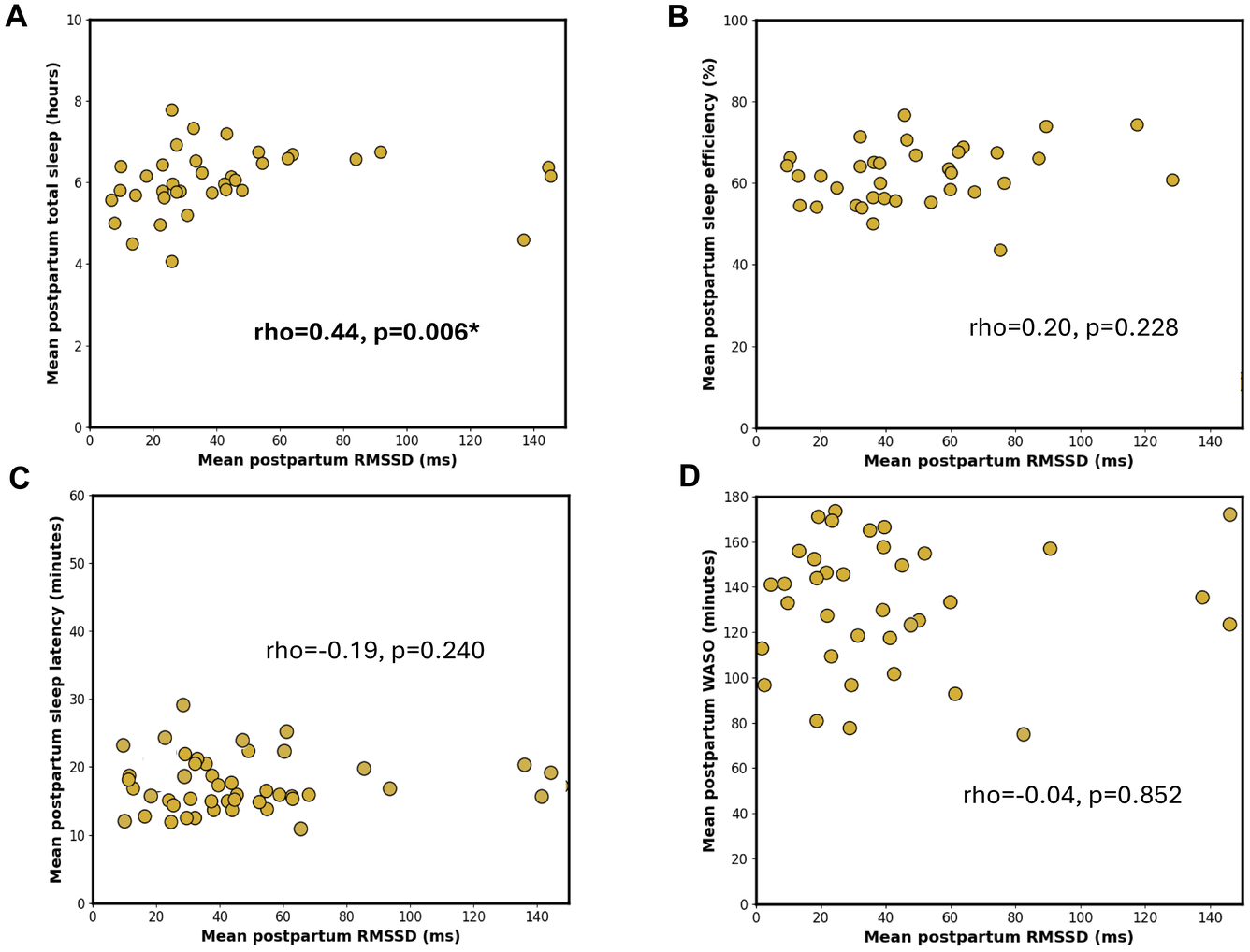


Table 1. Spearman Correlations between Postpartum Sleep Metrics & HRV

	rho-value	p-value
TST x HRV	**0.44**	***0.006**
SE% x HRV	0.20	0.228
SOL x HRV	-0.19	0.240
WASO x HRV	-0.04	0.852

Figure 1A. Objective measure of sleep quantity, TST, was moderately and positively associated with HRV, indicating higher vagal activity with longer sleep duration.

Figure 1B, 1C, 1D. Objective measures of sleep quality, SE%, SOL, and WASO, were not significantly associated with HRV during this period.

Conclusion/Discussion

Sleep duration was associated with greater vagal activity postpartum. In contrast, sleep fragmentation and efficiency showed no association with HRV

Clinical Implication	Future Directions
1.Distinct pattern of autonomic regulation in the postpartum period 2.How long you sleep matters more than how well you sleep for autonomic recovery 3.Sleep duration may represent a modifiable target for improving postpartum cardiovascular health	1.Stratification by cardiovascular risk 2.Longitudinal assessment (pregnancy → postpartum) 3.Mechanistic pathways (inflammation, recovery physiology)