

# Implementation of the SLEEP-MAD Mnemonic for Improving Sleep Quality in the Intensive Care Unit: A Pilot Study



Jinglin Tang, Pharm.D.; Gloria Su, Pharm.D.; Vincent Mabasa, Pharm.D.; Christine Thomas, R.N.; Katherine Suchorowski, R.N.

## Background

- Patients report inadequate sleep as one of the most stressful factors of their intensive care unit (ICU) admission
- Multiple factors may contribute to poor patient sleep quality in the ICU
- Improving sleep quality in patients is important as studies have linked sleep disturbance to various negative sequelae
- SLEEP-MAD is a mnemonic that has been developed as a standardized nursing tool to help improve patient sleep quality in the ICU setting

Sedatives & stimulants	Medications
Lights	Activity
Earplugs	Delirium
Environmental disturbances	
Pain assessment	

- We conducted a pilot study to assess the feasibility and outcomes of SLEEP-MAD mnemonic implementation

## Objectives

- Primary: to assess the impact of SLEEP-MAD mnemonic implementation on patient sleep quality in the ICU
- Secondary: to evaluate compliance rates of SLEEP-MAD mnemonic implementation; to evaluate impact of SLEEP-MAD mnemonic implementation on incidence of delirium, ICU length of stay, ICU mortality, and usage of sedatives

## Methods

- Observational, prospective, single-site quality improvement pilot study conducted in the Burnaby Hospital ICU
- Three phases: pre-mnemonic implementation, training and education, post-mnemonic implementation
- Convenience sampling with target of N=30 patients per group
- Richards-Campbell Sleep Questionnaire (RCSQ) was employed as the sleep measurement tool; scores range from 0 to 100, with higher scores indicating better sleep

Inclusion:	Exclusion:
<ul style="list-style-type: none"> <li>Patients ≥18 years staying ≥1 night in the ICU</li> </ul>	<ul style="list-style-type: none"> <li>Cognitive dysfunction (severe dementia; acute traumatic brain injury, stroke, hepatic encephalopathy)</li> <li>Target RASS goal ≤-3</li> <li>Acute seizures</li> <li>Anoxic brain injury</li> <li>Acute alcohol/illicit drug abuse</li> </ul>
	<ul style="list-style-type: none"> <li>Receiving neuromuscular blockade agents</li> <li>Comfort care</li> <li>Off-service/post-op sleep apnea monitoring</li> <li>Ready to transfer out</li> </ul>

Table 1: Patient Characteristics

Characteristic	Pre-SLEEPMAD N=34	Post-SLEEPMAD N=48
Age, mean ± SD	60.6 ± 18.7	66.7 ± 18.1
Male, N (%)	18 (52.9)	21 (43.8)
On sedatives prior to ICU admission, N (%)	17 (50.0)	10 (20.8)*
ICU admission diagnosis, N (%)		
CNS	4 (11.8)	4 (8.3)
Respiratory	13 (38.2)	16 (33.3)
Cardiovascular	7 (20.6)	10 (20.8)
GI/GU	1 (2.9)	7 (14.6)
Sepsis	4 (11.8)	5 (10.4)
Other	5 (14.7)	6 (12.5)
Patient nights on mechanical ventilation or BIPAP, n (%)	41 (39.4)	84 (57.9)*

\* p-value <0.05

Figure 1: Comparison of RCSQ Sleep Scores on a per Patient Basis

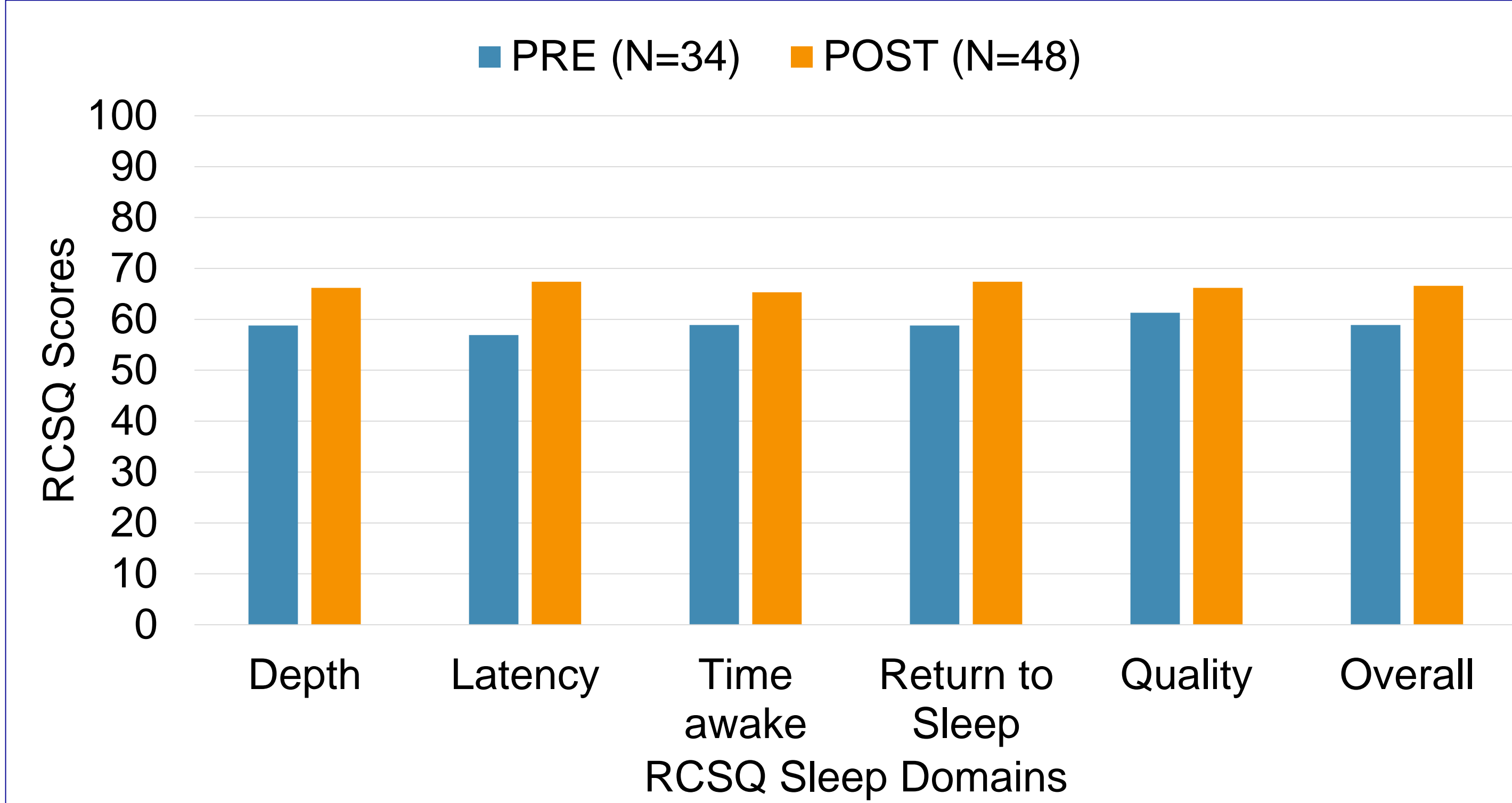


Figure 2: Comparison of RCSQ Sleep Scores on a per Night Basis

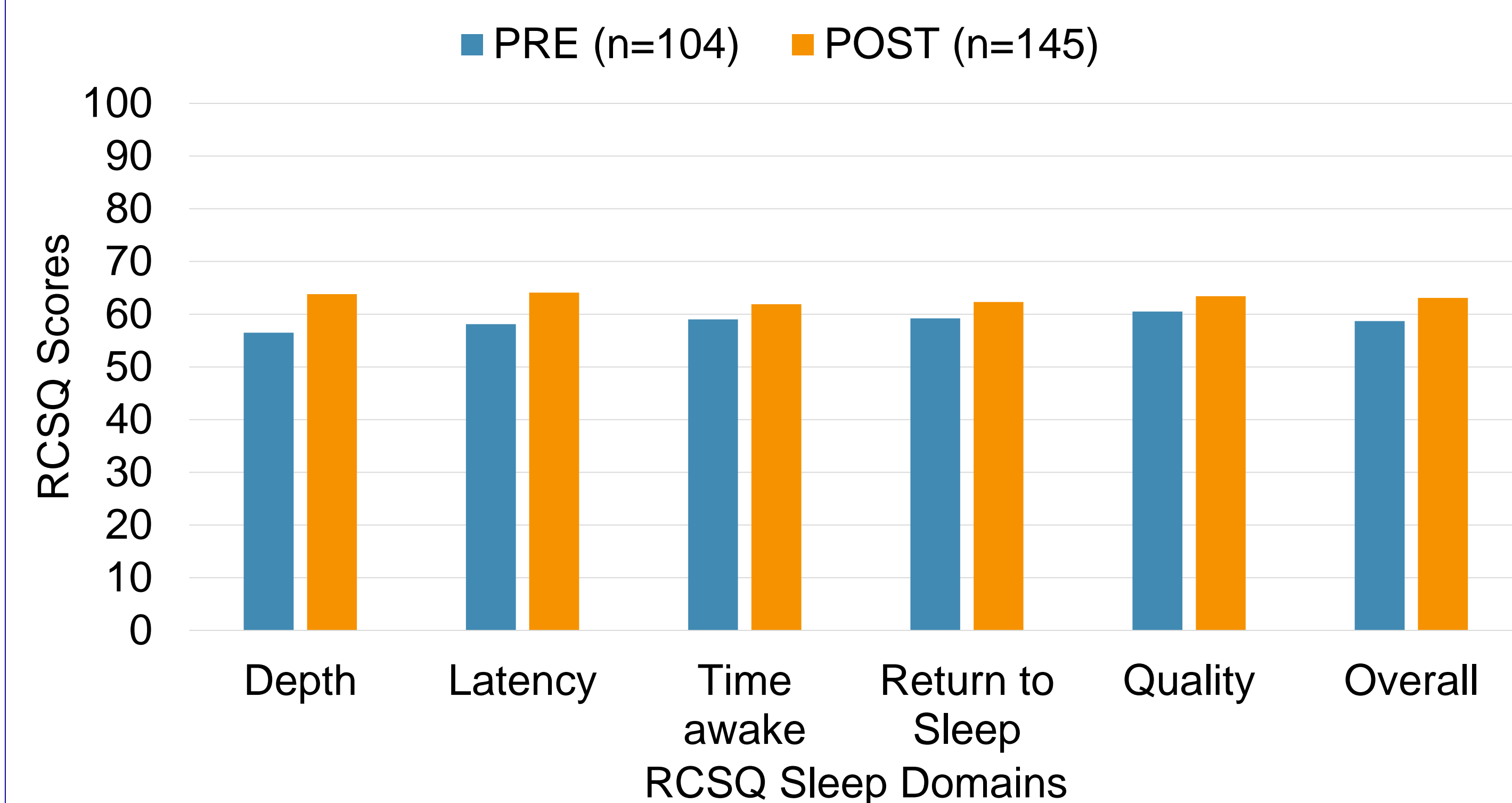


Table 2: Secondary Outcomes

Outcome	Pre-SLEEPMAD N=34	Post-SLEEPMAD N=48
Mnemonic compliance, n (%)	--	104 (72)
Patient nights with delirium, n (%)	6 (5.8)	14 (9.7)
ICU length of stay (in days), median (interquartile range)	2 (3)	5 (9.8)*
Expired on discharge from ICU, N (%)	0 (0)	4 (8.3)

\* p-value <0.05

Table 3: Usage of Sedatives

Drug	Pre-SLEEPMAD n=104		Post-SLEEPMAD n=145	
	Frequency, n (%)	Amount (mg) <sup>a</sup>	Frequency, n (%)	Amount (mg) <sup>a</sup>
Opioids <sup>b</sup>	60 (57.7)	57.5	86 (59.3)	96.0
Melatonin	33 (31.7)	1.9	44 (30.3)	1.8
Propofol	13 (12.5)	103.2	30 (20.7)	264.2
Benzodiazepines <sup>c</sup>	2 (1.9)	0.02	18 (12.4)	0.23
Zopiclone	2 (1.9)	0.11	15 (10.3)	0.81
Quetiapine	2 (1.9)	0.48	11 (7.6)	2.8

<sup>a</sup> Average per night, <sup>b</sup> Amount in oral morphine dose equivalents, <sup>c</sup> Amount in oral lorazepam dose equivalents

## Discussion & Limitations

- RCSQ scores improved post SLEEP-MAD implementation, but differences were not statistically significant
  - Sicker patients in post phase
  - Increased use of mechanical ventilation/BIPAP in post phase
  - Increased use of sedatives in post phase
  - 28% non-compliance rate for SLEEP-MAD mnemonic uptake
- This was a smaller, single-site study with inadequate sample size to statistically detect the observed RCSQ score difference of 10
- The one week education period may not have captured all nursing staff resulting in suboptimal compliance rates
- The pre and post groups were not randomized and thus were imbalanced; this increases the risk of confounding factors

## Conclusions

- This pilot study demonstrated improved patient sleep quality with SLEEP-MAD mnemonic implementation
- It is feasible to conduct larger validation studies to confirm this observation
- Future studies should employ randomization or matched cohorts and a prolonged training period to optimize results

*Acknowledgements: Special thanks to Jenny Tom, Marsha Fajardo, Tracy Liu, and Dr. Samar Hejazi for helping with data collection and statistical analysis*