A Strategy for Noise Reduction to Improve Patient Experiences with Sleep (SNORES)

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Background

Hospitalized patients rate sleep quality as worse in the hospital as compared to at home.[1] Sleep deprivation counteracts adequate healing and has been associated with impaired immunity, mood disorders, and delirium.

- The inpatient population is vulnerable to sleep disruption from multiple causes including phlebotomy, vital signs, medication administration, and noise from telemetry and intravenous pumps.
- Patients located on 5-West Telemetry Unit sleep an average of 4.35 hours per night, with an average of 4.33 awakenings per night.

Aim

- Our aim was to improve patient-reported sleep satisfaction on the 5 W telemetry unit at Thomas Jefferson University Hospital over a 4 month time period (11/2018 to 2/2019) using a Marpac white noise machine.

Methods & Intervention

- **Metrics:** Patient self-reported sleep quality (used 5 items from the Dutch-Flemish Patient Reported Outcomes Measurement Information System (PROMIS) Sleep Disturbance item bank), and likelihood of recommending the Marpac machine to another patient[1]
- **Population**: Patients on 5-West Telemetry

Intervention: A Marpac machine (Figure 1) was placed into a patient's room. Nursing staff turned the machine on when the patient was ready to sleep

Measurement: Pre/post survey of intervention patients

Figure 1. Marpac White Noise Machine

Results

Dutch-Flemish Patient Reported Outcomes Measurement Information System (PROMIS) Sleep Questionnaire Items. Average scores for each item:

n = 49	Pre-MARPAC	Post-MARPAC	Mean Difference (95% CI)
My sleep quality last night was:	2.34	3.82	1.49 (.91 - 2.07)
I was satisfied with my sleep:	1.98	3.82	1.80 (1.27 - 2.32)
My sleep was refreshing:	2.02	3.76	1.69 (1.16 - 2.23)
My sleep was lousy:	1.31	1.31	-1.65 (-2.32 - -0.98)
I felt lousy when I woke up:	2.68	1.27	-1.40 (-2.08 - 0.71)

Every question was answered using a 5-point likert scale, scored as follows: 0, very poor/not at all; 1, poor/a little bit; 2, fair/somewhat; 3, good/quite a bit; and 4, very good/very much. Items 4 and 5 were negative items.

Table 1: Pre- and Post- Survey Responses

Impact of MARPAC on Patient's Sleep as Measured by the Sleep Score

n = 49	*mean*	*St. Dev*	*95% CI*		
Pre-MARPAC	0.8	7.11	-1.25	2.83	
Post-MARPAC	8.84	6.23	7.05	10.63	
Difference	8.04	8.77	5.52	10.56	p = <.001

Table 2: Mean Sleep Satisfaction Score Pre- and Post-Intervention

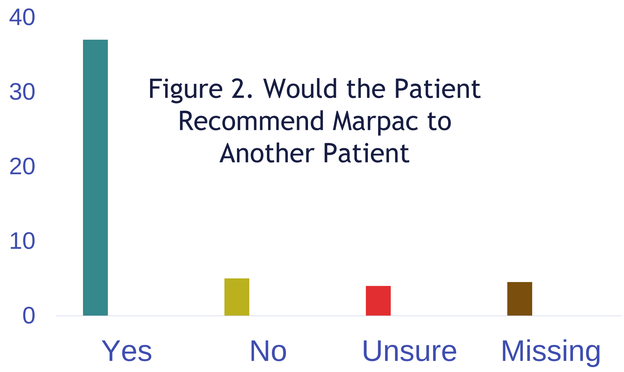

Figure 2. Would the Patient Recommend Marpac to Another Patient

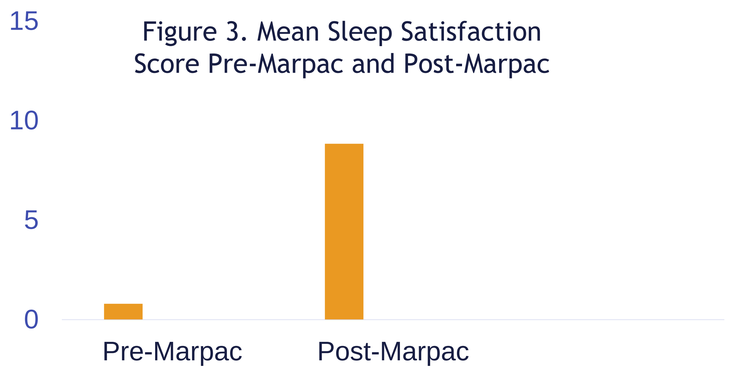

Figure 3. Mean Sleep Satisfaction Score Pre-Marpac and Post-Marpac

Results

Between November 2018 and February 2019, 49 patients were enrolled and completed a pre and post-Marpac survey.

- The mean sleep satisfaction score prior to intervention was 0.80 (SD 7.12, CI -1.25-2.84) and post-intervention was 8.84 (SD 6.23, CI 7.05-10.63).
- The mean improvement in sleep satisfaction score was 8.04 and significantly greater than zero (SD 8.77, t-score 6.41, two-tail p = <.001, 95% CI 5.52-10.56) suggesting that the Marpac machine was associated with improvement in sleep satisfaction.
- 46 patients (92%) answered the secondary outcome of whether they would recommend the Marpac machine to another patient. Of the 46 who answered, 37 (80%) answered yes, 5 (11%) answered no, and 4 (9%) answered unsure (Figure 3).

Conclusions

- The Marpac white noise machine improved patient sleep satisfaction on a telemetry unit at our institution
- This intervention, combined with other sleep hygiene techniques, has the potential to help hospitalized patients

Limitations: single institution and unit with predominantly cardiac patients on telemetry monitoring.

Future studies:

- Expansion beyond pilot unit to general medical floors and intensive care units to determine if sleep satisfaction can be improved with the Marpac machine.
- Assess Marpac's impact on length of hospital stay, rates of delirium, and in-hospital falls as these may be reduced with better sleep quality.

References

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3. Pisani MA,Friese RS,Gehlbach BK,Schwab RJ, Weinhouse GL, Jones SF. Sleep in the intensive care unit. *Am J Respir Crit Care Med.* 2015;191(7):731-738.