

Sleep Quality Assessment in Trauma Patients Requiring Intensive Care – A Prospective Observational Study

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Background

- Sleep in critically ill patients is highly fragmented, with marked loss of deep, restorative REM sleep.
- Among ventilated survivors (≥48 h): 38.5% reported poor sleep, 40% frequent awakenings & 35% difficulty falling asleep.
- Eliminating ICU sleep disruptors sharply improves care and recovery.
- No studies have assessed sleep quality in trauma ICU patients.
- Trauma-related pain may be strongly disrupting sleep, prompting this dedicated sleep quality study in critically injured ICU patients.

Aims & Objectives

Primary Objective

- To assess the sleep quality in trauma patients requiring intensive care on day 1.

Secondary Objectives

- To assess the change in sleep quality of trauma patients over the next 3 days of ICU stay.
- To assess noise level in trauma ICU.
- To assess the incidence of delirium in trauma patients admitted in ICU.

Methods

Study Design

- A prospective observational study was conducted in Trauma ICU of a level I trauma centre.
- Single blind study

Study Population: Trauma patients requiring ICU caring within 24 hour of trauma

Study Duration:

- Patients were assessed from ICU admission until the earlier of study day 3 or ICU discharge.

Inclusion Criteria

- Age > 18 years
- Expected length of stay in ICU >= 24 hours

Exclusion Criteria

- Chronic neurological illness
- H/o sleep disorder
- H/o drug abuse
- Intubated head injury patients
- H/o dementia
- GCS < 15 or with <12 tracheostomised
- Chronic kidney disease patients

Methodology

- Patients were assessed using the Richmond Agitation and Sedation Scale (RASS) to evaluate levels of sedation and agitation.
- Those with RASS –1 to +1 were screened for delirium using CAM-ICU.
- CAM-ICU-negative patients were enrolled and completed the Modified Richards-Campbell Sleep Questionnaire (RCSQ) daily for three consecutive days.
- CAM-ICU-positive patients were excluded.
- Sleep quality was assessed each morning between 07:00 and 10:00 h, along with concurrent noise measurements.
- Poor sleep was defined as RCSQ score <50.

Sleep Assessment

- Polysomnography, gold standard for sleep assessment, is impractical & cumbersome.
- Richards-Campbell Sleep Questionnaire (RCSQ) is the most widely used & validated tool for evaluating sleep.
- This is 6-item self-report questionnaire measures sleep depth, latency, awakenings, efficiency, overall quality, & noise using a 0–100 mm visual analogue scale, where higher scores indicate better sleep.

Sample Size and Statistical Analysis

- In a study by Naik et al.,[2] the mean RCSQ score was 51.6 ± 13.5 mm.
- Using a 95% confidence interval and absolute precision of 3 mm, the required sample size is 78 patients.
- A total of 80 patients was recruited.
- Categorical data: n (%), analyzed by Chi-square/Fisher's exact test.
- Continuous data: mean ± SD or median (IQR), analyzed by t-test/Mann-Whitney U test.

Results

- Total of 256 patients assessed, 176 were excluded and 80 were enrolled.

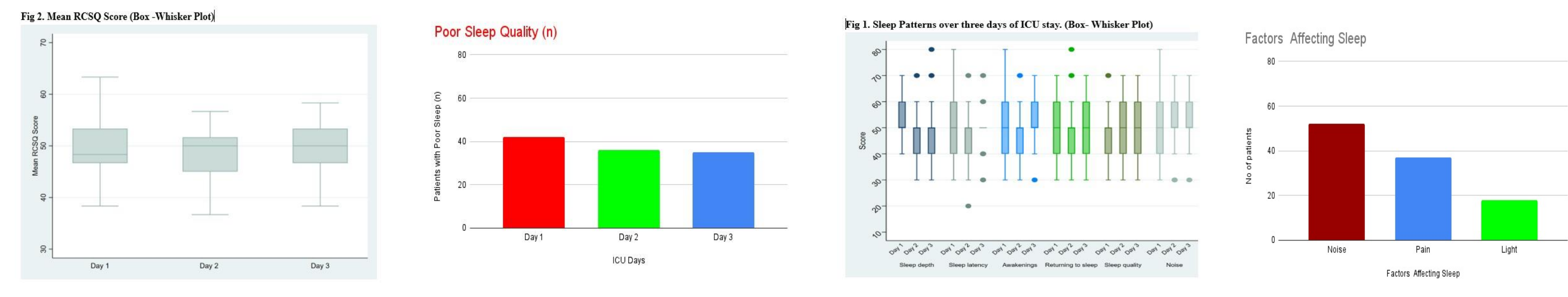
- Demographic & clinical characteristics are shown in Table 1.

- Mean RCSQ score was 49.87± 5.35 on day 1, indicating poor sleep.
- Poor sleep (RCSQ<50) was found in 52.5% of patients on 1st day, 45% on 2nd day, & 43.75% on day 3rd.

Table 1. Demographic and Clinical characteristics

S No	Total Patients (80)	Poor Sleep (n=42)	Good Sleep (n=38)	P-value
Age (Years)	41.42 ± 17.04	41.23 ± 17.66	41.63 ± 16.55	0.54
Gender	Male	66 (82.5%)	35	0.83
	Female	14 (17.5%)	7	
APACHE II	3.32 ± 2.79	3.5 ± 2.76	3.13 ± 2.84	0.41
SOFA	1.09 ± 1.29	1.04 ± 1.32	1.13 ± 1.27	0.67
ISS	23.32 ± 13.59	23.64 ± 13.88	22.97 ± 13.42	0.71
Length of ICU stay (Days)	11.24 ± 7.14	11.69 ± 8.14	10.73 ± 5.90	0.81
Length of Hospital Stay (Days)	21.67 ± 8.59	21.61 ± 8.48	21.73 ± 8.82	0.96
Noise level(db)	48.70 ± 2.04 db	49.52 ± 2.87	49.06 ± 4.20	0.68
Pain Score		5.30 ± 0.74	5.13 ± 0.74	0.85
Mean RCSQ Scores	49.57 ± 3.52	45.87 ± 2.60	54.29 ± 3.90	0.00
Delerium incidence	40(20%)			
Mortality	9 (11.25%)	7 (16.67 %)	2(5.26%)	0.103

- Noise was most common factor (n=52), followed by pain (n=37) & light (n=18), which kept the patients awake.
- Mean noise level in the ICU over three days was 48.7±2.04 dB, slightly above WHO recommendations.
- Delirium incidence was 20%, and mortality was 11.25%, with better sleep reported in survivors.



Discussion

- Sleep quality in our study of trauma patients at 1st day of ICU stay was poor as the mean RCSQ value was <50 (49.87± 5.35).
- Naik et al.[2] reported a mean RCSQ score of 51.6 ± 13.5 mm (indicating good sleep) in surgical ICU patients, supported by actigraphy.
- In contrast, KIZILCIK ÖZKAN et al. found a lower mean RCSQ of 39.3 ± 14.4 mm (range 13–81), reflecting poor sleep quality.
- Age, surgical type, pain severity, stress, and environmental factors (lights, noise & temperature) significantly affect RCSQ scores and sleep quality, which was evident in our study.
- Sleep quality pattern improve over three days but it wasn't significant.
- Mean noise levels in our Trauma ICU were 48.7 ± 2.0 dB (range 44.8–57.0 dB), exceeding WHO recommendations. Other ICU studies report higher means of 53–59 dB and peaks of 67–86 dB.

Limitations

- Small sample size limits generalizability.
- Reliance on the subjective RCSQ (not gold-standard PSG) may reduce result validity.
- 3-day follow-up period precludes assessment of long-term effects on recovery & mortality.

Conclusions

- Trauma ICU patients experience poor sleep comparable to other critically ill patients.
- Sleep quality improves progressively during the ICU stay, likely due to decreasing pain.

References

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