A prospective repeated assessment of sleep quality and sleep disruptive factors in the intensive care unit: strategies to improve patients' sleep in the ICU in Saudi Arabia

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Background

- Poor sleep quality is a consistently reported by patients in the ICU**(1)**
- ICU patients' sleep is extremely fragmented **(2).**
- Assessment of sleep quality does not form part of the standard clinical care given to ICU patients **(3).**

(1) (Altman et al. 2017); (2) (Beltrami et al.2015); (3) (Jeffs and Darbyshire., 2019)

Aim

To assess patients' self-reported sleep quality along with self-reported sleep disruptive factors on a daily basis during their stay in the ICU.

Purpose

- To provide a comprehensive view of the quality of ICU patients' sleep and sleep disruptive factors.

- To understand patients’ acceptability to complete daily self-reports on their sleep quality.

This is to develop strategies for improving sleep of ICU patients if necessary.

Methods (study design/setting)

A prospective repeated assessment study design was conducted at King Abdul-Aziz University hospital in Jeddah city/Saudi Arabia.

The study involved mixed-ICU (medical and surgical) over a 3 month period (May-August 2018)

Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Adult patients (≥18 years) treated in the ICU for ≥24 hours	Patients who had sleep pathologies
Alert and interactive, with Glasgow Coma Scale (GCS) scores of 15	Patients with high cognitive dysfunction (defined as the presence of dementia, traumatic brain injury, stroke or active delirium (positive CAM-ICU)
Mechanically ventilated patients or spontaneously breathing patients	A Richmond Agitation and Sedation Score (RASS) of <-1 or >+1 (agitated).
	Patients who did not speak Arabic

Methods(Data collection/outcome measures)

1. Demographic and clinical data (Age, gender, ICU admission diagnosis, (APACHE II) score, (ICU-LOS), nightly mechanical-ventilation statues, medications, previously administered sedation)

2. Each morning/on a daily basis

   Self-reported sleep quality (RCSQ-A) and Self-reported sleep disruptive factors (SICQ)

3. When patients were due to be discharged from the ICU

   How did you find completing the self-report assessment on your sleep quality on a daily basis?

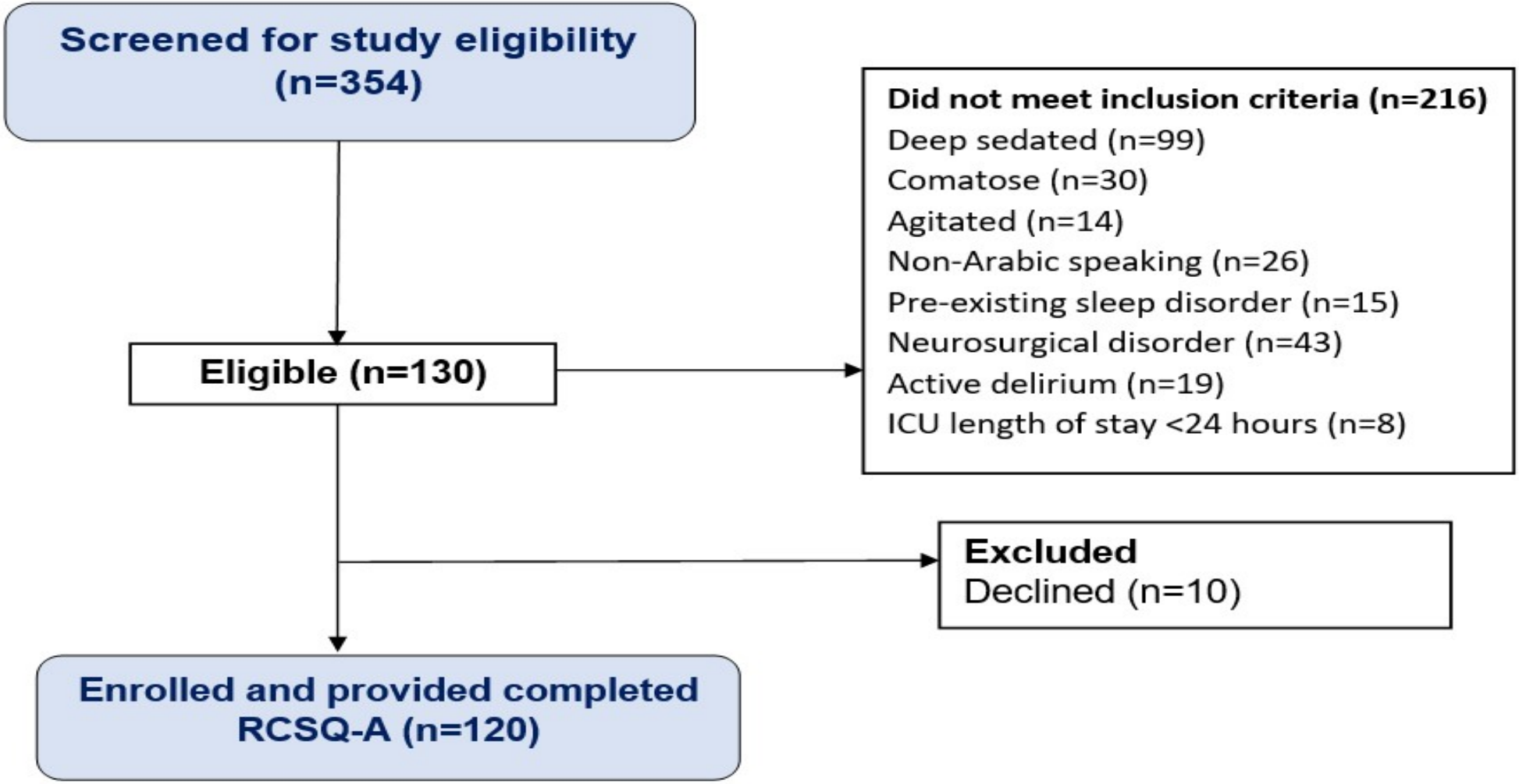


Figure 1. Flow diagram of patients screening, enrollment and participants RCSQ-A completions.

Table 1 Demographic and clinical characteristics of patients (n=120)

Characteristics	Category	n (%)	Range
Age (Mean ±SD)	59.7±9.44		19.00- 75.00
Gender	Male	72 (60)	
	Female	48 (40)	
Admission diagnosis	Medical cardiac	21(17.5)	
	Medical respiratory	21 (17.5)	
	Gastrointestinal	11 (9.1)	
	Other	8 (6.7)	
	Surgical post-operative	59 (49.2)	
	Cardiothoracic	37 (30.9)	
	Thoracic traumatic	12 (10)	
	Abdominal	10 (8.3)	
APACHE II score (Mean ±SD)	15.78 ±2.606		10.00-24.00
	Low	71 (59.2)	10.00-16.00
	Medium	49 (40.8)	17.00-24.00
Length of ICU stay (Mean ±SD)	9.35±3.15		4.00-21.00
Medications [a]	Beta blockers	75 (62.5)	
	Diuretics	76 (63.5)	
	Calcium channel blockers	99 (82.5)	
	Corticosteroids	45 (37.5)	
	Adrenergic	39 (32.5)	
	Non-Opioid and Opioid	105 (87.5)	
	Non-Opioid-Paracetamol	15 (12.5)	
Sedation	Propofol	54 (45)	
	Benzodiazepines (Midazolam)	40 (33.3)	
	Dexmedetomidine (Precedx)	26 (21.7)	
RASS score on enrolment [b]	Alert and calm (zero-score)	120 (100)	
GCS [c]	Fully conscious (15-score)	120 (100)	
Developed delirium	Positive CAM-ICU [d]	11 (9.2)	
Intubation statues	Intubated	43 (35.8)	
Method of ventilation	Invasive ventilation [e]	30 (69.8)	
	Non-invasive[f]	13 (30.2)	
Duration of MV (Mean ±SD)	6.26 ±3.381		2.00-17.00

Table 2 Cohort patients' self-report of sleep quality, (n=120)

Richards-Campbell items	Mean ±SD	Range
(RCSQ-A.1) Sleep depth	31.82±7.03	19-56
(RCSQ-A.2) Falling asleep	33.07±6.73	21-54
(RCSQ-A.3) Awakenings	35.06±5.76	18-47
(RCSQ-A.4) Returning to sleep	36.29±5.36	25-50
(RCSQ-A.5) Overall sleep quality	35.36±5.34	22-51
Total RCSQ-A score [a]	34.41±5.60	23-48

Total RCSQ-A = average of 5 items (Q1-Q5). The total RCSQ-A score was categorized, with a cut off-point of <26 indicating very poor sleep quality, a score of [26-50] indicating poor sleep quality, a score of [51-75] indicating good sleep quality, and a score of >75 indicating very good sleep quality

Table 3 Self-reported sleep disruptive factors on modified SICQ, (n = 120)

Self-reported sleep disruptive factors	Mean ±SD	Range
Noise	**7.48±1.57**	3.00-9.00
Clinical interventions (i.e. blood samples, vital signs, etc.)	**5.95±1.86**	2.30-9.00
Light	2.36±0.94	1.00-5.00
Talking	**6.80± 1.25**	1.00-9.00
Machines' alarm (i.e. heart monitor, ventilator, etc.)	**4.31±2.35**	1.00-9.00
Telephone	1.12±0.36	1.00-7.30
Fear	3.64±2.01	1.00-8.25
Pain	2.30±1.10	1.00-7.30
Discomfort of being attached to the devices	2.26±1.18	1.00-5.75

Table 4 Model summary of the stepwise multiple regressions predicting total sleep quality from sleep disruptive factors with (adjusted $R^2 = 0.393$)

Variable	B [a]	R^2	ΔR^2	F [b]	(95.0% CI) [c]	P
Midazolam	-6.424	0.222	0.222	33.719**	(-8.99– -3.86)	<.0005**
Propofol	-3.600	0.287	0.065	23.541**	(-5.71– -1.49)	0.001*
Gender	1.836	0.340	0.053	19.914**	(0.157– 3.52)	0.032*
Noise	-1.033	0.373	0.033	17.097**	(-1.70– -0.364)	0.003*
Daytime sleepiness	0.856	0.401	0.028	15.236**	(0.175– 1.54)	0.014*
Nightly mechanical ventilation status	-1.218	0.423	0.023	13.828**	(-2.36– -0.077)	0.037*

The time taken to complete each RCSQ-A was between 2-3 min

In total, 381 reports were collected from 120 participants

Majority of patients (83.9%) were happy about completing the RCSQ-A daily during their stays in the ICU

'It is really opened my eyes on how is important to my health to get enough sleep"

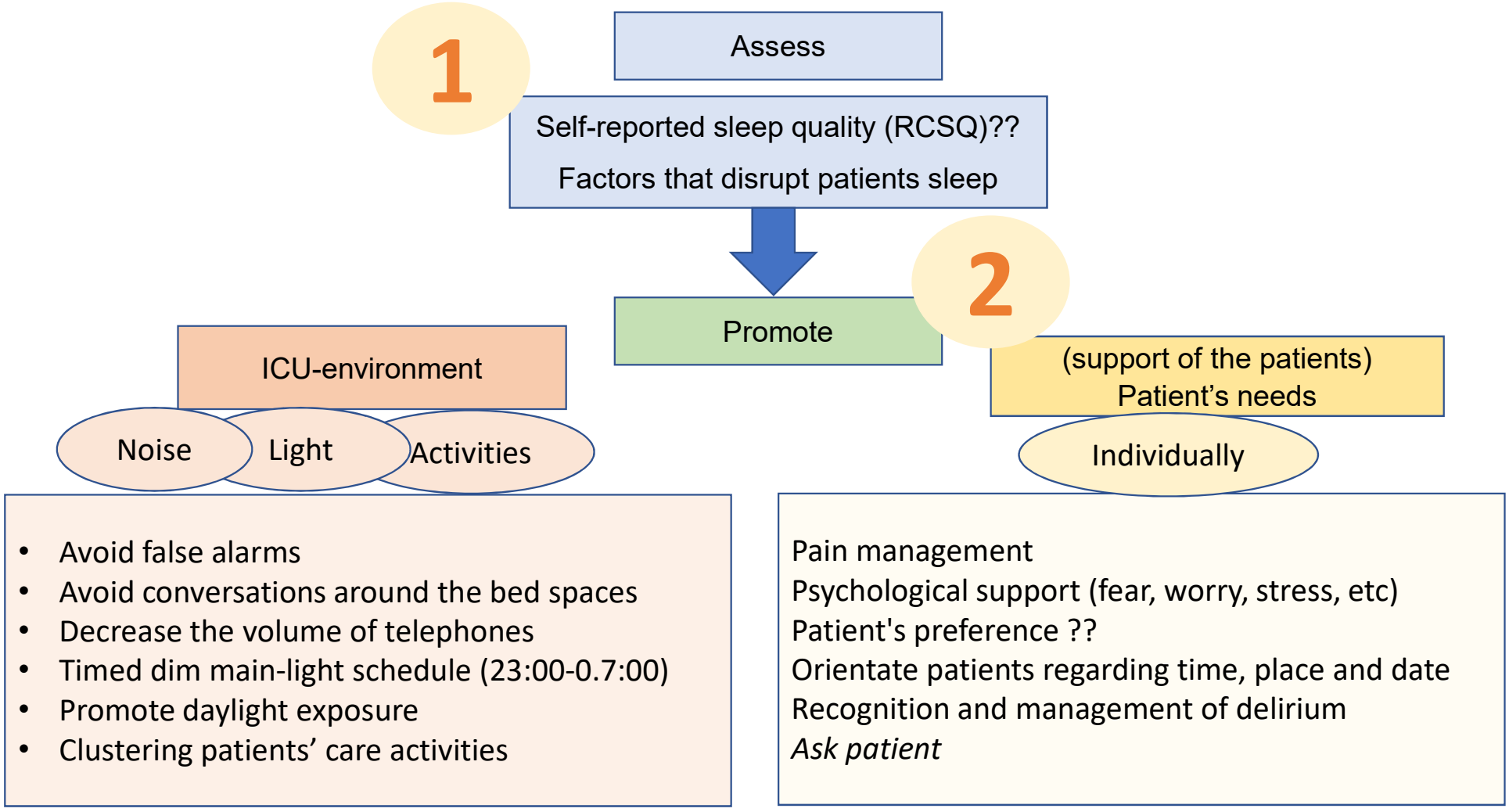
"I felt happy to find someone asking about my sleep, especially at that time no one was caring about this problem I have"

"I was feeling lonely most of the time, everybody was busy, so I was pleased that I had opportunity to interact with someone"

''It was easy to answer the questionnaire, I was just pointing"

"I felt safe having someone asking about my sleep''

Suggested strategies for sleep promotion in ICU



“Next step”

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