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A CROSS-SECTIONAL PROSPECTIVE OBSERVATIONAL STUDY ON SLEEP DEPRIVATION, IT'S DISTURBING FACTORS AND DEPRESSION IN ICU (INTENSIVE CARE UNIT) PATIENTS

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ABSTRACT: Patients in the intensive care unit (ICU) frequently experience disturbed sleep, which could have negative effects. How exactly environmental factors contribute to sleep disruption in the intensive care unit is unknown. The Richard-Campbell Sleep Questionnaire was used to assess their sleep, and the Hamilton Depression Rating Scale was used to assess their depression. 500 patients in total took part in this study. Factors like pain, discomfort, light, medication administration, panic, current sickness, noise, and the ventilator can awake patients in an intensive care unit. Sleep impairment is directly related to co-morbidity. We evaluated the ICU patients' sleep quality and divided them into groups based on how long they had been there. We specifically selected those who stayed longer than 6 days to compare their sleep quality before and after removing elements that interfere with restful sleep. In order to treat sleeplessness, it is necessary to lessen the factors that cause disruption. Using eye masks, ear plugs, music therapy (playing soft music), reducing light disturbance, noise reduction, and extra blankets has generally produced beneficial results with high-quality evidence, and no negative side effects have been reported. Depression is directly associated with sleep disturbances. Increasing the frequency of visits may give some relaxation and decrease depression in ICU patients.

INTRODUCTION: The second troublesome predicament which may appear during an ICU stay is sleep deprivation among intensive care unit (ICU) patients¹. Our health is based on sleep since it allows our body and mind to recover. The body is purged of metabolic waste, growth hormone secretion peaks to aid in the body's ability to repair from potential physical harm and secretion of cortisol rises².

Patients brought to the intensive care unit often struggle with a lack of restorative sleep and a disrupted sleep-wake cycle (ICU)³. Patients in intensive care units (ICUs) have trouble sleeping for various reasons, with particular surroundings and intrusive treatment approaches leading to such sleep disorders.

The patient sickness, and the different degrees of illness influence the inability to get physiological sleep. The following elements, including pain and discomfort, nursing care and medical procedures, mechanical ventilation, the ICU environment (including noise), pharmaceutical medications, and disease severity, have been identified as factors that interfere with sleep⁴.

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Since, environmental factors are thought to be a major contributor to sleep disruption in the ICU, it is puzzling why environmental interventions have only slightly improved objectively measured sleep⁵. It is safe and affordable to employ earplugs and eye masks as an adjuvant to pharmacological treatments to enhance ICU patients' sleep quality⁶.

Since, sleep assessment is inherently subjective, it might be challenging to carry out in an intensive care unit. Due to speech difficulties, patients cannot accurately describe their perceived level of rest and the things that bother them the most. In a healthy adult, nocturnal sleep lasts, on average, 7-8 hours. But estimating the biological need for sleep is challenging. Individual differences exist and are influenced by genetics, age, and gender⁷.

One of the most significant contributors to sickness and impairment in both teens and adults is a depressive mood. Depression symptoms make it difficult for sufferers to perform physical labour and prevent them from participating in social activities⁸. The likelihood of developing mental disorders is higher in people with ongoing sleep issues⁹. Health workers often ignore sleep pattern disruption in critically ill patients, even though it is key in accelerating patient recovery. The emergency care nurse is a crucial member of the diverse healthcare team and is in charge of determining the patient's problems and resolving them in order to provide the best care.

The nurse's top priorities should include maintaining the patient's regular sleeping schedule. Based on individual factors, critical care unit nurses can identify patients who are at risk for sleep disturbances and start the necessary interventions¹⁰.

MATERIALS AND METHODS:

Study Type: The study was a cross-sectional prospective observational study.

Study site: The study was conducted in a multi-specialty hospital in the South India Intensive Care Unit. The study was performed after receiving the necessary ethical clearance from the Institutional Ethics Committee. R/ref > no: EC/PHARM.D/2022-07

Study Duration: The study was conducted for 6 months, from March 2022 to August 2022.

Study Population: 500 ICU patients

Inclusion Criteria: Patients who were admitted to ICU, over 18 years of age and completed at an entry were included in the study.

Exclusion Criteria: Non-consenters and less than 24 hours ICU stay were excluded from the study.

Data Collection: Data were collected and entered in designed patient data entry forms. Sleep scores were collected by using Richard Campbell sleep questionnaire. Depression scoring was collected by using the Hamilton Depression rating scale.

Informed Consent: Patients fulfilling the inclusion and exclusion criteria were included in the study. Patients / Legally authorized representatives (LAR) were informed about the nature of the study. Written informed consent from the patients or care taker was taken.

Questionnaires used: RCSQ – Richard Campbell Sleep Questionnaire: The Richards-Campbell Sleep Questionnaire (RCSQ) is designed for patient use in the ICU and is a composite measure of sleep derived from five visual analogue scales (VAS).

HDRS- Hamilton Depression Rating Scale: is a multiple-item questionnaire used to indicate depression.

Statistical Analysis: The data collected were tabulated, analyzed, and interpreted using standard statistical tools the statistical procedure was undertaken with the help of the statistical package” and ‘ Prism’ version 6.0. The P-value less than or equal to 0.05 was fixed as the significance level. The statistical method used here is Wilcoxon signed rank test and chi-square test.

RESULTS:

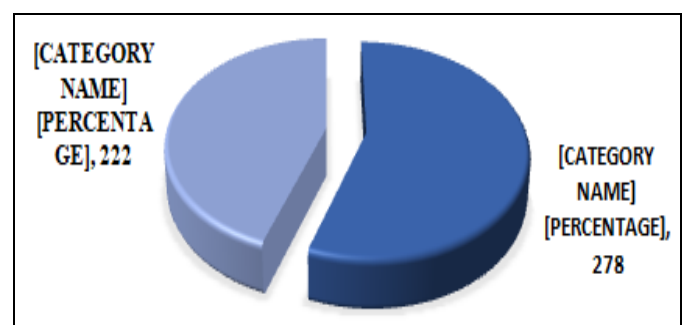


FIG. 1: GENDER-WISE DISTRIBUTION

TABLE 1: AGE-WISE DISTRIBUTION (N=500)

S. no.	Age in years	No of patients (N=500)	Percentage (%)	Mean±SD
1	Below 20	0	0	
2	20-29	30	6%	
3	30-39	26	5.2%	
4	40-49	62	12.4%	61.7 ± 16.4
5	50-59	76	15.2%	
6	60-69	116	23.2%	
7	Above 70	190	38%	

TABLE 2: DISEASE BASED DISTRIBUTION AND SLEEP QUALITY

Disease based distribution	No of patients (N=500)	Good sleep	Bad sleep
Brain and nervous	186 (37.2%)	138 (74.2%)	48 (25.8%)
Digestive	14 (2.8%)	12 (86%)	2 (14%)
Reproductive	4(0.8%)	2 (50%)	2 (50%)
Musculoskeletal	14 (2.8%)	2 (14%)	12 (86%)
Endocrine	44 (8.8%)	30 (68%)	14 (32%)
Respiratory	70 (14%)	28 (40%)	42 (60%)
Cardio	62 (12.4%)	34 (55%)	28 (45%)
Infectious disease	34 (6.8%)	24 (70.5%)	10 (29.5%)
Others (Accident, Carcinoma)	72 (14.4%)	60 (83.3%)	12 (16.7%)

TABLE 3: ASSOCIATION BETWEEN CO-MORBIDITY AND SLEEP

Co-morbidity	No. of patients (N=500)	Good Sleep	Bad sleep	Chi square	P value
Present	193	78	115	86.546	0.0001***
Absent	307	250	57		

***extremely significant.

TABLE 4: RCSQ (RICHARD CAMPBELL SLEEP QUESTIONNAIRE) PARAMETERS

RCSQ parameters	Mean ± SD (mm)
Sleep depth	65.91±24.81
Sleep latency	63.30±26.05
Number of awakenings	65.83±25.35
Returning to sleep	60.63±29.49
Sleep quality	58.87±31.68
Total RCSQ score(average of above 5 parameters)	62.05 ±26.01

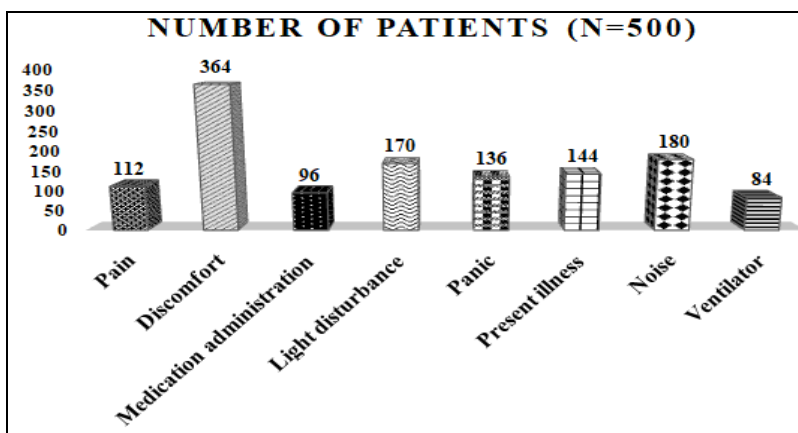


FIG. 2: FACTORS AFFECTING SLEEP IN ICU PATIENTS

TABLE 5: SLEEP QUALITY-BASED ON FACTORS

Factors		Sleep quality		Chi square	P value
		Good sleep	Bad sleep		
Pain	Yes (136)	76	60	7.237	0.0071**
	No (364)	262	126		
Discomfort	Yes (144)	222	142	11.868	0.0006**
	No (356)	262	30		
Medication	Yes (96)	58	38	1.145	0.2847

administration	No (404)	270	134		
Light disturbance	Yes (170)	96	74	8.910	0.0028
	No (330)	232	98		
Panic	Yes (136)	76	60	7.237	0.0071**
	No (346)	252	112		
Present Illness	Yes (144)	66	78	33.798	0.0001**
	No (356)	262	94		
Noise	Yes (180)	80	100	54.325	0.0001**
	No (320)	248	72		
Ventilator	Yes (84)	33	51	29.594	0.0001**
	No (416)	295	121		

P < 0.01 ** is the extremely significant, P < 0.001 is the not significance.

TABLE 6: LENGTH OF THE ICU STAY

Length of ICU stay in days	No. of patients (N=500)	Percentage %
1-3 days	250	50
4-6 days	166	33.2
More than 6 days	84	16.8

TABLE 7: RCSQ PARAMETERS DAY WISE

Richard Campbell sleep questionnaire (RCSQ)	Mean and Standard Deviation			P value < 0.0001*
	1-3 days	< 0.0001*	More than 6 days	
Sleep depth	57.38±32.83	58.96±29.93	62.07±30.97	
Sleep latency	65.45±25.95	65.48±23.70	68.28±23.52	
Number of awakenings	61.58±27.07	63.82±24.17	67.34±25.66	
Returning to sleep	65.42±26.02	64.20±24.29	69.80±25.09	
Sleep quality	58.80±30.19	60.83±28.39	64.83±28.75	
Total score	61.46±26.26	61.21±25.08	66.64±24.83	

TABLE 8: COMPARISON OF SLEEP QUALITY BETWEEN BEFORE AND AFTER REDUCING SLEEP DISTURBANCE

Richard Campbell sleep questionnaire (RCSQ)	Mean and Standard Deviation		P value < 0.001*
	Before	After	
Sleep depth	58.15±28.47	62.07±30.97	
Sleep latency	65.19±22.44	68.28±23.52	
Number of awakenings	63.07±24.26	67.34±25.66	
Returning to sleep	65.33±23.94	69.80±25.09	
Sleep quality	62.03±27.36	64.83±28.75	
Total score	62.54±23.3	66.64±24.83	

TABLE 9: DEPRESSION

Score	No. of patients (N=500)	Good sleep	Bad sleep	Chi square	P value
0-7	248 (49.6%)	192	56	38.042	<0.0001
8-20	212 (42.4%)	122	90		
> 20	40 (8%)	14	26		

DISCUSSION: A total of 500 ICU Patients, **Fig. 1** shows, 56% of patients are male and 44% are female. A similar study was done by Abbas al-Mutair in which 56.7% are male and 43.3% are female. **Table 1** shows, out of 500 patients enrolled in this study, the most commonly ICU-admitted patients were above the age of 70, (n=190, 38%) followed by (n=116, 23.2%) patients were in the age of 60-69, then (n=76, 15.2%) patients were in the age of 50-59, then (n=62, 12.4%) patients were in the age of 40-49, then (n=30, 6%) were in the

age of 20-29, and 5.2% (26) patients were in the age of 30-39. The patient population's mean age ± Standard deviation (SD) was 61.7± 16.4. A similar study was done by Marita Ritmala-Castren *et al.*, in which age mean and standard deviation was 59± 14. **Table 2** shows, Brain and nervous-related diseased patient were 186 (37.2%) among them 138 (74.2%) have good sleep and 48 (25.8%) have bad sleep. Then patients with digestive related disease 2.8% (14) among them 12 (86%) have good sleep, 2 (14%) have bad sleep.

Then patients with reproductive-related disease was 4(0.8%), among them 2 (50%) have good sleep and 2 (50%) have bad sleep. Then patients with musculoskeletal-related disease 14 (2.8%), among them 2 (14%) have good sleep, 12 (86%) have bad sleep. Then patients with endocrine-related disease 44 (8.8%), among them 30 (68%) have good sleep, 14 (32%) have bad sleep. Then patients with respiratory related disease 70 (14%), among them 28(40%) have good sleep, 42(60%). Then patients with cardio related disease 62 (12.4%) among them 34 (55%) have good sleep, 28 (45%) have bad sleep. Then patients with the infectious disease 34 (6.8%), among them 24 (70.5) have good sleep, 10 (29.5%) have bad sleep. Other cases include patients with carcinoma, accidents 72(14.4%), among them 60 (83.3%) have good sleep, 12 (16.7 %) have bad sleep.

Table 3 shows, co-morbidity is directly associated with sleep deprivation in ICU patients. Co-morbidities such as Hypertension, Diabetes mellitus, Hypothyroidism, CVA, Anaemia, CKD, AKI, CAD, Seizure. **Table 4** shows, among the 5 parameters, sleep quality is very poor in ICU patients. A similar study was done by Ramavath Devendra Naik *et al.*, 2018, Sleep depth 50 ± 15.2 , Sleep latency 54.1 ± 17.6 , Number of awakenings 46.1 ± 16.2 , Returning to sleep 53.4 ± 15.2 , Sleep quality 54.2 ± 15.0 , Total RCSQ score (average of above 5 parameters) 51.6 ± 13.5 .

Fig. 2 shows, among, 500 patients, 364 patients have discomfort, 180 patients have noise disturbance, 170 patients have light disturbance, 144 patients have present illness, 136 patients have panic, 112 patients have pain, 96 patients have medication administration disturbance and the 84 patients have ventilator disturbance. **Table 5** shows that among the 8 factors panic, present illness, ventilator, noise, and discomfort are directly associated with sleep impairment. **Table 6** shows, among the total Patients (500), 50% (250) patients were stayed 1-3 days, 33.2% (166) Patients stayed 4-6 days and then 16.8% (84) Patients were stayed more than 6 days. **Table 7** shows the P value-significant variation. Sleep score differed among the three categories of ICU-stayed patients. **Table 8** shows, a significant difference in sleep quality of ICU patients after reducing sleep disturbing factors in ICU setting. It shows the sleep quality of the

patients who were stayed more than 6 days before and after reducing the sleep-disturbing factors. Poor sleep was observed in ICU patients due to various disturbing factors such as pain, discomfort, medication administration, light disturbances, present illness, ventilator, panic and noise. Poor sleep is managed by reducing the disturbing factors by eye mask, ear plugs, Music therapy (playing mild music), light disturbance, noise reduction, and extra blanket generally showed positive results with quality evidence and no harmful effects were reported. Increasing the frequency of visiting time may give some relaxation and decrease depression for the Patients

Table 9 Shows According to HDRS, 0-7(no depression) is about 248 (49.6%), 8-20 (mild depression) is about 212(42.4%) and then greater than 20 (risk of clinical depression) is about 40(8%). Depression is directly associated with sleep impairment. P value <0.0001 is considered as significant.

CONCLUSION: Critically ill patients frequently experience sleep disturbance, it is multifactorial and caused by both environmental and non-environmental causes and varies from Patient to Patient. Co-morbidity is directly associated with sleep impairment. In RCSQ, overall sleep quality is poor when compared with other parameters. ICU patients have depression that affects sleep quality. Most patients were depressed due to the loneliness, un-adapted and scarring environment. Poor sleep may trigger the present illness and increase the length of stay burden. As a clinical pharmacist, poor sleep is managed by reducing the disturbing factors by eye mask, earplugs, Music therapy (playing mild music), reducing disturbance, noise reduction, and providing extra blankets generally showed positive results with quality of evidence, and no harmful effects were reported. Increasing the frequency of visiting time may give some relaxation and decrease depression for the Patients. The quality of patient care provided during the ICU stay by increasing learning about the causes of sleep disturbance among ICU patients as we seek to design interventions and strategies to prevent the disruptions. Patient counseling were given to the patient, nurses, and caregivers that affect the quality of sleep among ICU patients, especially those who stayed more than 6 days in ICU.

Improving sleep quality can lead to less ICU stays and faster recovery. Individual sleep care plan for each patient improves the quality of sleep. The study suggests that better education should be provided regarding the negative effects of poor sleep for ICU patients. Training should also be established to allow healthcare providers to mitigate the effects. Regularly assess the sleep quality of patients in Intensive Care Patient.

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