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Research Article

Assessing Environmental Stressors Among Patients Admitted In A Medical Intensive Care Unit

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Abstract
Background: Intensive Care Units (ICUs) are fundamentally stressful environments. Factors like noise, lighting, and a lack of control, particularly in Medical Intensive Care Units (MICUs), can significantly affect patient well-being and recovery. This study aimed to assess the environmental stressors perceived by patients admitted to a MICU.
Methods: A descriptive cross-sectional study was conducted in the MICU of a tertiary care hospital in Lucknow, U.P. A purposive sample of 101 critically ill patients was selected. Data were collected using a demographic proforma, a clinical variables checklist, and the standardized Intensive Care Unit Environmental Stressor Scale (ICUESS), which was translated into Hindi and validated.
Results: The majority of participants were male (71.28%) and aged 40-50 years (48.51%). A significant proportion of patients rated the MICU environment as "Very Stressful" (75.24%) or "Extremely Stressful" (9.90%). The highest-rated stressors included the inability to sleep (mean score: 3.55), immobility due to IV lines (3.50), being stuck with needles (3.41), and being in pain (3.38). Stress levels were significantly associated ($p<0.05$) with age, educational status, occupation, monthly income, and family type.
Conclusion: Patients in the MICU experience substantial environmental stress, primarily related to physical discomfort, loss of control, and invasive procedures. Sociodemographic factors significantly influence the perception of these stressors. The findings underscore the critical need for healthcare professionals to implement targeted interventions to mitigate these stressors, thereby enhancing patient comfort and well-being.

Keywords: Intensive Care Unit, Environmental Stressors, Patient Experience, Stress Levels

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Introduction

Intensive Care Units (ICUs) are a cornerstone of modern healthcare, providing specialized, life-saving care for critically ill patients. Originating in the 1950s, ICUs have evolved into technologically advanced environments staffed by multidisciplinary teams. However, the very nature of this environment—with its constant noise from alarms and equipment, bright lighting, and frequent interruptions—is inherently stressful for patients. These environmental stressors can lead to sleep deprivation, anxiety, physiological stress, and even delirium, which can hinder recovery.

In Medical Intensive Care Units (MICUs), these stressors are often amplified due to the critical nature of the patients' conditions and the constant need for medical interventions. High noise levels, continuous artificial lighting that disrupts circadian rhythms, and a loss of personal control can compound the physical and emotional challenges patients already face. Previous studies have consistently shown that factors like pain, thirst, sleep deprivation, and the presence of invasive tubes are major sources of stress for ICU patients. This study aims to assess the specific environmental stressors perceived by patients in a MICU in Lucknow, India, and to explore the association between these stressors and patient demographic characteristics.

Methods

Study Design Setting

A descriptive, cross-sectional study was conducted in the Medical Intensive Care Unit (MICU) of King George's Medical University, a tertiary care hospital in Lucknow, U.P., India. The data was collected between December 2024 and January 2025.

Participants

A total of 101 critically ill patients were included in the study using a purposive sampling technique. Inclusion criteria were: admission to the medical ICU, age 18-60 years or older, conscious state, and ability to respond to questions in Hindi or English. Patients with severe cognitive impairment or those who were comatose were excluded.

Data Collection

Data were collected using three tools:

1. **Demographic and Clinical Profile:** A structured tool to collect data on age, gender, education, occupation, income, and clinical details like diagnosis and length of ICU stay.
2. **Intensive Care Unit Environmental Stressor Scale (ICUESS):** This standardized 42-item tool was used to measure patients' perception of environmental stressors. It uses a four-point Likert scale (1=Not stressful to 4=Extremely stressful). The tool was translated into Hindi and validated for this study, showing good reliability (Cronbach's alpha = 0.75).

Ethical Considerations

Ethical clearance was obtained from the Institutional Ethical Committee of King George's Medical University (No. 839/X.51/2024). Written informed consent was obtained from all participants before their enrollment in the study. Confidentiality and anonymity were maintained throughout.

Data Analysis

Data were analyzed using descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics. The Chi-square test was used to determine the association between demographic variables and stress levels.

Results Participant Characteristics

The study included 101 participants. The demographic profile of the participants is detailed in Table 1. The majority were male (71.28%), with the largest age group being 40-50 years (48.51%). Education levels and occupations were varied. All patients were subject to multiple potential stressors, with the most common ICU stay being 3 days (44.55%).

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Table 1: Frequency and Percentage Distribution of Demographic Variables (n=101)

Variable	Category	Frequency (f)	Percentage (%)
Age (in years)	18-28	4	3.96
	29-39	29	28.71
	40-50	49	48.51
	60 & above	19	18.81
Gender	Male	72	71.28
	Female	29	28.71
Educational Status	Graduate	32	31.68
	Professional	20	19.80
	Intermediate/Diploma	20	19.80
	Other	29	28.72
Occupation	Professional	29	28.71
	Unskilled Worker	17	16.83
	Other	55	54.46
Family Type	Joint	54	53.46
	Nuclear	46	45.54
	Extended	1	0.99

Overall Stress Levels

As shown in Table 2, the majority of patients experienced significant stress, with a combined 85.14% rating the ICU environment as "Very Stressful" or "Extremely Stressful."

Table 2: Comparative Evaluation of Perceived Stress Level

Stress Level	Score Range	Frequency (f)	Percentage (%)
Not Stressful	42	9	8.91
Mildly Stressful	43-84	6	5.94
Very Stressful	85-126	76	75.24
Extremely Stressful	127-168	10	9.90

Specific Environmental Stressors

The highest-rated stressors were primarily related to physical discomfort and loss of control. Table 3 lists the top five stressors based on their mean scores.

Table 3: Highest-Rated Stressors Based on Mean Scores

Sr. No	Stressor	Mean	SD
1.	**Not being able to sleep**	3.55	0.96
2.	**Not being able to move your hands or arm because of the (IV) line**	3.50	1.07
3.	**Being stuck with a needle**	3.41	1.11
4.	**Being in pain**	3.38	1.08
5.	**Being tied down by a tube**	2.97	1.22

Other significant stressors included being thirsty, hearing alarms from machinery, and feeling a lack of control. Conversely, factors like "Having no Privacy" and "Not having a nurse introduce themselves" were rated as less stressful.

Association between Demographics and Stress

Significant associations were found between the overall stress level and several demographic variables. As detailed in Table 4, age, educational status, occupation, monthly income, and family type were all statistically significant ($p < 0.05$).

Table 4: Association between Demographic Variables and Stress Level

Demographic Variable	χ^2 value	p-value	Significance
Age	7.4326	0.006	Significant
Gender	1.5651	0.210	Not Significant
Educational Status	14.99	<0.001	Significant
Occupation	18.48	<0.001	Significant
Monthly Income	27.58	<0.001	Significant
Marital Status	1.57	0.209	Not Significant
Family Type	4.23	0.039	Significant

Discussion

This study confirms that the MICU is a highly stressful environment for patients, with over 85% reporting their experience as "Very" or "Extremely Stressful." The findings highlight that the most potent stressors are directly related to physical discomfort and the invasive nature of critical care, such as sleep deprivation, pain, and physical restraints. This underscores the critical importance of fundamental nursing care in managing pain effectively, minimizing restraints, and creating conditions conducive to rest, despite the inherently disruptive ICU setting.

The study revealed a significant link between socioeconomic factors and perceived stress. Differences in age, education, occupation, and income likely influence a patient's expectations, coping mechanisms, and understanding of the complex ICU environment, leading to varied stress responses. For instance, a lower educational level might correlate with higher stress due to a lack of understanding about procedures and the environment.

Interestingly, factors often assumed to be highly stressful, such as a lack of privacy, were rated as low stressors in this cohort. This could be due to cultural factors or the possibility that the severity of the physical illness overshadows such concerns. The study successfully demonstrates that while medical interventions are necessary, they are a substantial source of patient distress.

Limitations

The study has some limitations. The use of a purposive sample from a single center may limit the generalizability of the findings. The study period was also limited, and a longitudinal design could provide more insights into the persistence of stress post-discharge.

Conclusion

Patients admitted to the Medical Intensive Care Unit experience significant environmental stress, predominantly from physical sources such as pain, sleep deprivation, and immobility from medical devices. The perception of this stress is significantly influenced by the patient's age, education, occupation, income, and family structure. These findings emphasize the crucial need for healthcare professionals, particularly nurses, to actively identify, assess, and implement targeted interventions to mitigate environmental stressors. By focusing on pain management, promoting sleep, and improving communication, healthcare providers can enhance patient comfort and well-being, potentially contributing to better clinical outcomes in the MICU setting.

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