



# Evaluation of stressors in intensive care units

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## ABSTRACT

**Objective:** Physical and psychological stressors adversely affect the treatment and length of stay of patients in intensive care units. In this study, we aimed to describe environmental and psychological stressors affecting intensive care unit patients and to determine their priorities.

**Material and Methods:** In this study, the 40-item Intensive Care Unit Environmental Stressor Scale was administered to patients in the General Surgery Intensive Care Unit and the Anesthesiology and Reanimation Intensive Care Unit. The patients' age, gender, marital status, educational status, cause of hospitalization, and intensive care unit length of stay were questioned and recorded. Acute Physiology And Chronic Health Evaluation II scores were determined for intensive care unit patients.

**Results:** A total of 98 patients, 80 in the General Surgery Intensive Care Unit and 18 in the Anesthesiology and Reanimation Intensive Care Unit, were included in the study between May 1, 2015 and October 31, 2015. Fifty-six of the patients were male (57.1%) and 42 were female (42.9%). The mean age of the patients was 55.1±15.1 years. The mean intensive care unit length of stay was 3.4±1.6 days. The median Acute Physiology And Chronic Health Evaluation II score of the patients was 6 (0 to 17). The patients were most affected by thirst (mean 2.44). The second most stressful stress factor was the presence of tubes in the mouth and nose (mean 2.25). The least stressful factor for the patients was the presence of nurses constantly performing activities around the bed. Although 51% of the patients were postoperative, pain was ranked 5th among stress factors.

**Conclusion:** The environmental and psychological factors affecting intensive care unit patients varied according to age, sex, and educational and surgical status. These factors had adverse effects on the patients. The elimination or modification of these factors would contribute positively to the treatment of intensive care unit patients and shorten their length of stay in the intensive care unit.

**Keywords:** Environmental, intensive care, psychological, stress

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## INTRODUCTION

The intensive care unit (ICU) is a new and different environment for patients. Patients are exposed to unusual sounds and smells in the ICU. An unfamiliar medical team provides care for these patients (1, 2). The treatment process of the intensive care patient is extended to these external factors by adding psychological factors such as not being able to fully understand the disease, having no information about the treatment process and being away from the family (3, 4). Factors such as pain, unfamiliar and unusual noises, and constant ambient light disturb the sleeping patterns of critically ill ICU patients. Sleep disturbances can elevate blood pressure, impair immune system function, and lead to a negative nitrogen balance. Delirium is a common disorder in ICUs. Although the impact of the environment on delirium is not clear, it has been stated that the ICU environment may be a contributing factor to the development of delirium (5-7). The addition of conditions such as sleep disturbance and delirium triggered by environmental factors to existing medical conditions has negative effects on the treatment process of disease. Environmental stressors vary according to factors such as age, sex, and educational and surgical status (4). Therefore, describing the physical and psychological factors affecting ICU patients and determining their degrees of influence are important for effective follow-up and treatment.

In this study, we aimed to describe environmental and psychological factors affecting ICU patients using the Intensive Care Unit Environmental Stressor Scale (ICUESS) and to determine the priorities of these factors, especially in patients who did and did not undergo surgery.

## MATERIAL AND METHODS

This study was approved by the Non-interventional Clinical Research Ethics Board of Hacettepe University Faculty of Medicine. The ICUESS was administered to patients in the General Surgery Intensive Care Unit (GSICU) and the Anesthesiology and Reanimation Intensive Care Unit (ARICU) in Hacettepe University School of Medicine. The patients' age, gender, marital status, educational status, cause of hospitalization, and ICU length of stay were questioned and recorded. APACHE II scores were determined for the ICU patients.

### Patient Group

Patients who were hospitalized from 24 hours to 7 days between May 1, 2015 and October 31, 2015 in the GSICU with nine beds and the ARICU with four beds in Hacettepe University Faculty of Medicine were enrolled in the study. Patients who were under 18 years of age, had persistent neurological damage, had psychological problems, whose general condition prevented them from answering questions, and who had previously stayed in the ICU were excluded from the study. Written consent was obtained from the patients who participated in the study.

### The Intensive Care Unit Environmental Stressor Scale

The validity and reliability of the scale administered in the study were determined by Ballard (8) and Nastasy (9). Permission was obtained to use the scale at the beginning of the study. The ICUCESS was translated into Turkish and culturally adapted before its application. The scale was translated from English to Turkish by two independent persons. 10 persons from different socio-cultural levels compared the two translations. A group of hospital staff, patient and patients relatives made choices in terms of independence of the individual, more easily understood from the word differences between the translators. A Turkish version of the scale was created by the two independent translators; also, the Turkish version of the scale was re-translated into English by a different person. An independent person with good English skills compared the translation to the original scale and supervised the translation. The Turkish version of the scale was administered to ICU patients, and its clarity was confirmed. The patients were informed about the scale before it was applied. The patients were asked 40 questions. Each question in the scale was assessed as (1) not stressful; (2) moderately stressful; (3) very stressful; or (4) extremely stressful.

### Statistical Analysis

The data were evaluated using Statistical Package for the Social Sciences version 15.0 software (SPSS Inc.; Chicago, IL, USA). The variables were investigated using visual (histogram and probability plots) and analytical (Kolmogorov-Smirnov/Shapiro-Wilk tests) methods to determine whether they were normally distributed. The descriptive analyses were presented using mean and standard deviation for normally distributed variables. Cross-tabulations were performed for age, gender, marital status, educational and surgical status, and ICU length of stay with the stress factors on the scale. The difference between the groups was compared using the chi-square test or Fisher's exact test. p-values less than 0.05 were considered statistically significant.

### RESULTS

A total of 98 patients, 80 in the GSICU and 18 in the ARICU, were included in the study between May 1, 2015 and October 31, 2015. Fifty-six patients were male (57.1%) and 42 were female (42.9%). The mean age of the patients was 55.1±15.1 years. The mean ICU length of stay was 3.4±1.6 days. The median APACHE II score of the patients was 6 (0 to 17). Fifty-one per cent of the patients were postoperative (50 patients); 49% of the patients were medical (48 patients). The rates of illiteracy, literacy, and elementary, middle school, high school, and university education were 10.2%, 4.1%, 28.6%, 8.2%, 14.3%, and 34.7%, respectively.

Table 1. Ranking of stressors

	Mean
1- Thirst	2.44
2- Presence of tubes in the nose or mouth	2.25
3- Not being in control of yourself	2.22
4- Inability to sleep	2.11
5- Pain	2.05
6- Inability to move hands due to i.v. line	1.98
7- Seeing family and friends for only a few minutes each day	1.91
8- Being in a room that is too hot or too cold	1.85
9- Having lights on constantly	1.70
10- Having to look at the pattern of holes in the ceiling	1.66
11- Unfamiliar and unusual noises	1.64
12- Being aware of unusual smells around you	1.63
13- Hearing buzzers and alarms from machinery	1.62
14- Hearing other patients cry out	1.59
15- Missing husband or wife	1.58
16- Not knowing when to expect things will be done to you	1.56
17- Being stuck with needles	1.54
18- Not having treatments explained to you	1.53
19- Uncomfortable bed and/or pillow	1.49
20- Being bothered	1.46
21- Having to wear oxygen	1.46
22- Not knowing what time it is	1.46
23- Not knowing what day it is	1.39
24- Having blood pressure taken often each day	1.38
25- Having the team use words you cannot understand	1.34
26- Nurses and doctors talking too loudly	1.34
27- Being cared for by unfamiliar doctors	1.27
28- Hearing the heart monitor alarm go off	1.26
29- Being awakened by nurses	1.25
30- Having strange machines around you	1.21
31- Not having the nurses introduce themselves	1.19
32- Constantly being examined by doctors and nurses	1.19
33- Feeling the nurses are watching the machines more closely than they are watching you	1.15
34- Lack of privacy	1.14
35- Having nurses be in too much of a hurry	1.13
36- Seeing i.v. bags hanging over your head	1.13
37- Not knowing where you are	1.11
38- Hearing the telephone ring	1.10
39- Being tied down by tubes	1.10
40- Presence of nurses constantly performing activities around your bed	1.09

The patients were most affected by thirst (mean 2.44). The second most stressful factor was the presence of tubes in the mouth and nose (mean 2.25). The least stressful factor was the presence of nurses constantly performing activities around the bed (Table 1). Postoperative patients were most affected

Table 2. Ranking of stressors among postoperative patients and medical patients

Postoperative patients	Mean	Medical patients	Mean
1- Thirst	2.61	1- Thirst	2.27
2- Presence of tubes in the nose or mouth	2.44	2- Not being in control of yourself	2.27
3- Not being in control of yourself	2.17	3- Being in a room that is too hot or too cold	2.18
4- Inability to sleep	2.10	4- Inability to sleep	2.12
5- Pain	2.06	5- Inability to move your hands due to i.v. line	2.10

Table 3. Ranking of stressors among age  $\leq 40$  and age  $> 40$  ICU patients

Age $\leq 40$ ICU patients	Mean	Age $> 40$ ICU patients	Mean
1- Seeing family and friends for only a few minutes each day	2.67	1- Thirst	2.48
2- Thirst	2.28	2- Presence of tubes in the nose or mouth	2.25
3- Presence of tubes in the nose or mouth	2.24	3- Not being in control of yourself	2.23
4- Not being in control of yourself	2.18	4- Inability to sleep	2.14
5- Pain	2.06	5- Pain	2.05

ICU: intensive care unit

by thirst (mean 2.61). Medical patients were most affected by thirst and not being in control of themselves (mean 2.27) (Table 2). Pain was the fifth greatest stressor in postoperative patients (mean 2.04). There was no statistically significant difference between patients who did and did not undergo surgery in terms of pain ( $p=0.65$ ) and inability to sleep ( $p=0.94$ ).

There was no statistically significant difference between college graduates and non-college graduates in terms of lack of privacy ( $p=0.27$ ). There was no statistically significant difference between male and female patients in terms of lack of privacy ( $p=0.07$ ). Patients over the age of 40 were most affected by thirst (mean 2.48). Patients under the age of 40 were most affected by seeing family and friends for only a few minutes each day (mean 2.67) (Table 3). Male patients were most affected by thirst, followed by the presence of tubes in the mouth and nose. Female patients were most affected by not being in control of themselves and the presence of tubes in the mouth and nose, respectively.

## DISCUSSION

Patients are exposed to psychological factors such as separation from family, dependence on bed and health personnel, and environmental factors such as unfamiliar devices, sounds, and smells in the ICU. Studies on determining the priorities of these physical and psychological factors and eliminating them in ICU patients would contribute positively to the treatment process of ICU patients.

Cornock (10) stated that thirst was the most common stressor and the presence of tubes in the mouth and nose was the second most common stressor. In our study, thirst was the most common stressor. Cochran and Ganong (11) found that the presence of tubes in the mouth and nose was the most disturbing stress factor for patients. Similarly, Hweidi et al. (1) found that the presence of tubes in the mouth and nose was the most disturbing stress factor for patients. In our study, we found that the presence of tubes in the mouth and nose was the second most common stress factor, in accordance with the study by Cornock (10).

Failure to detect or treat pain can lead to complications involving the cardiovascular, pulmonary, and neurological systems. Good pain control decreases these complications (12). In Malaysia, Soh et al. (13) found that pain was the most frequent complaint of patients. In our study, although 51% of the patients were postoperative, pain was ranked 5th among stress factors. There was no statistically significant difference between postoperative and medical ICU patients in terms of pain. The low pain ranking suggested that sufficient pain control was provided because pain was frequently assessed with various scoring systems in our ICU.

We found that ICU patients were less affected by the presence of unfamiliar devices, smells and noise. This situation suggested that awareness of critical illness and intensive care have increased. In our study, approximately 50% of the patients were high school and college graduates. We believe that the high level of education contributed to the fact that the patients were less affected by these stressors. We found that most of the patients had already been followed up by doctors and nurses; therefore, they were less anxious about their situations and futures. The least stressful factor for the patients was the presence of nurses constantly performing activities around the bed. We believe that the patients had confidence in the doctors and nurses.

Intensive care unit patients are often bedridden; also, their basic needs are met by medical personnel. Lack of privacy can be a stressor for patients (14). In our study, lack of privacy was ranked 34th among the stress factors in the ICU. There was no statistically significant difference between male and female patients regarding lack of privacy. There was no statistically significant difference between college graduates and non-college graduates regarding lack of privacy. This situation suggested that curtains/screens are frequently used in the ICUs, nurses and health personnel consider the discomfort patients may experience due to their physical condition when planning patient care, and a relaxing environment is provided for patients. Intensive care units are noisy environments due

to the nature of the working environment and the technical equipment and alarms used. Noise and light in the ICU cause sleep disorders in patients (15). Inability to sleep in the ICU was ranked 4th among the stress factors in our study. In China, So and Chan (16) stated that inability to sleep was ranked 3rd among stress factors.

The ICU is a stressful environment with many environmental and psychological factors that affect patients. It should be known that some of these factors can be changed or reduced. Puntillo et al. (17) reported that some stress factors in the ICU are subjective and can be modified. They stated that thirst, which was ranked 1st among stress factors in the ICU, can be reduced with simple and inexpensive methods such as placing wet gauze on the lips and using cold water sprays. Environmental factors such as noise, light, and temperature, which lead to sleep disorders, are controllable stressors in the ICU. Moreover, when considering the working conditions of the ICU and the psychological needs of patients, the physical and psychological stressors of ICU patients can be removed or reduced with interchangeable factors such as frequent evaluation of the necessity for tubes in the nose and mouth and vascular accesses as well as their timely withdrawal, effective control of pain monitored by scoring systems, and well-organized visiting hours.

We believe the limitations of this study are low APACHE II scores, short ICU lengths of stay, and inclusion of patients from the GSICU and ARICU.

## CONCLUSION

It is important to determine the environmental and psychological factors that affect patients in ICUs. These factors can vary according to age, sex, and educational and surgical status; also, their priorities may change. Elimination or modification of these factors would contribute positively to the treatment of ICU patients and their length of stay in the ICU.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Hacettepe University School of Medicine Non-interventional Clinical Research Ethics Board.

**Informed Consent** Written informed consent was obtained from patient who participated in this study.

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