

## Original Article

# The Effect of Environmental Stressors in Intensive Care Unit on the Comfort Level of the Patients

**Aysegul Akdag Karaagac, MSc, RN**  
Sinop Ataturk State Hospital, Sinop, Turkey

**Bilge Bal Ozkaptan, PhD, RN**  
Assistant Professor, Sinop University, Faculty of Health Sciences, Nursing Department, Sinop, Turkey

**Correspondence:** Bilge Bal Ozkaptan, PhD, RN, Assistant Professor, Sinop University, Faculty of Health Sciences, Nursing Department, Sinop, Turkey e-mail: bilgebal57@hotmail.com

### Abstract

**Background and Aim:** The intensive care environment has an effect that causes stress in patients and therefore reduces the comfort of patients. The aim of this study is to determine the effect of environmental stressors in Intensive Care Unit (ICU) on the comfort level of the patients.

**Method:** The study was carried out with 111 patients hospitalized in the ICU of a state hospital in the northernmost part of Turkey between January 1 and April 30, 2021. Patient Identification Form, Intensive Care Unit Environmental Stressors Scale (ICUESS), General Comfort Scale (GCS), Numeric Pain Scale and Numeric Nausea Scale were used to collect data.

**Results:** The mean age of the patients participating in the study was  $66.11 \pm 12.61$  years and it was determined that 64.9% were male. The mean ICUESS score and GCS total score of the patients were found to be respectively  $100.81 \pm 19.31$  and  $135.24 \pm 18.04$ . A moderate negative correlation was found between the patients' ICUESS score and the total GCS score ( $r = -0.57$ ;  $p < 0.001$ ).

**Conclusion:** In our study, it was determined that the environmental stressor perception of the patients was above the medium level and their general comfort level was above the average.

**Keywords:** intensive care units; environment; stress, patient comfort

### Introduction

Intensive Care Units (ICUs) are specialized units that require a multidisciplinary follow-up and care by supporting the vital functions of individuals with critical physical conditions with biomedical devices, and where special treatment methods are applied with a professional team to survive. ICUs are environments that create stress for patients in many ways (McKinley et al, 2002; Ozer & Akyil, 2008). Disturbance in day-night discrimination, changes in body perception, sensory deprivation, sleep interruptions, pain, inactivity, side effects of drugs, social isolation, telephone and unusual sounds, noise, tubes/drains used in diagnosis and treatment, hunger, very cold unit are among some environmental stressors that affect patients in intensive care (Ozer & Akyil, 2008; Arslan & Ozer, 2016; Tuncay & Ucar, 2010). These environmental stressors cause problems such as agitation, stress, anxiety, impairment in

physiological and psychological parameters, decrease of comfort level, delay in the recovery process, and post-traumatic stress disorder after discharge (Tuncay & Ucar, 2010).

The higher the level of stressor perceived by the patients in the intensive care unit, the more the level of comfort deteriorates, and this causes the healing process to be negatively affected and the quality of life of the patients to deteriorate (Henrich et al., 2017). Since environmental stressors cause many syndromes in intensive care and affect comfort, it is important to determine and control these stressors. In addition, determining the relationship between environmental stress level and comfort will reveal the importance of combating environmental stressors in increasing the comfort level of intensive care patients. With this study, it was aimed to determine what level of stressor the intensive care environment has for patients and

how it affects the comfort level of patients, as well as the relationship between stress and comfort level. The data obtained as a result of the research will contribute to the studies to be planned and the arrangements to be made in order to reduce the perception of environmental stressors and increase their comfort in intensive care patients.

## Method

**Sample and Participants:** The research was conducted with a total of 111 patients hospitalized in intensive care units between January 1 and April 30, 2021 in a state hospital in the northernmost part of Turkey. During the pandemic period of the hospital, one of the intensive care units where patients with the diagnosis of Covid-19 were not hospitalized; The second level Coronary ICU, the second level Internal Medicine ICU, the second level Emergency ICU and the tertiary Cardiovascular Surgery ICU are the units where the research is applied. In order to determine the number of samples, power analysis was performed with the G\*Power (3.1.9.7) program. As a result of the analysis, the number of samples was calculated as 111 people.

## Measures

**Patient Information Form:** This form included questions to collect descriptive information such as age, marital status, gender, education status, chronic diseases, current illness, length of stay in the intensive care unit, and previous experience of staying in the intensive care unit (Ozer & Akyil, 2008; So & Chan, 2004; Gezgin, Goktas & Orhan, 2020).

**Intensive Care Unit Environmental Stressors Scale (ICUESS):** It was developed by Ballard (1981) and revised by Cochran and Ganong (1989). Çınar et al. (2011) adapted into Turkish and the scale's Cronbach's alpha value was calculated as 0.94 and consists of 42 items in total (Ballard, 1981; Cochran & Ganong, 1989; Çınar, Aslan & Kurtoglu, 2011). In this study, the Cronbach's alpha value was found to be 0.92. The rating on the scale is a 4-point Likert scale, which includes the items: Does not affect at all (1 point), affects a little (2 points), affects often (3 points), and affects a lot (4 points). The lowest 42 and the highest 168 points are obtained from this one-dimensional scale scoring. The high scores of the patients indicate that the stress experienced is high.

**General Comfort Scale (GCS):** It was developed by Kolcaba (1992) and adapted into Turkish by Kuğuoğlu and Karabacak (2008) and a reliability analysis was performed (Kolcaba, 1992;

Kuğuoğlu & Karabacak, 2008). In Kolcaba's study, the scale Cronbach alpha was found to be 0.88, Kuğuoğlu and Karabacak was found it to be 0.85. In this study, the Cronbach Alpha coefficient was found to be 0.90. There are a total of 24 negative questions in a complex form among the items in the 4-point Likert-type scale, which consists of a total of 48 items and four sub-dimensions (physical comfort, psychospiritual comfort, environmental comfort, socio-cultural comfort), and these items are reverse coded. The lowest score that can be obtained from the scale is 48, and the highest score is 192. As the score obtained from the scale increases, the level of comfort perceived by the patient increases.

**Visual Analogue Scale (VAS):** The VAS developed by Cline et al., was used by Eti Aslan to evaluate postoperative pain, and its validity and reliability study was performed in Turkish (Cline, Herman, Show & Marton, 1992; Eti Aslan, 2004). The scale objectiveizes subjective feelings such as pain and nausea on a 10 cm ruler. (0=mildest, 10=most severe)

**Data Collection:** The research was applied to the patients after obtaining the permissions of the ethics committee and the institution. The data collection forms were applied to the patients in the ICU at the bedside, by the researcher in an average of 20 minutes, using the face-to-face interview technique when appropriate. After the information was given and consent was obtained, the data collection forms were given to the patients who could read and fill them themselves, and were expected to fill them. The verbal answers given by reading the questions to the patients who did not want to do the marking themselves were marked in the appropriate box by the researcher. The data collection form of the illiterate patients was read by the researcher and the patient's response was recorded.

**Data Analysis:** In the evaluation of the data; Statistical Package for Social Science (SPSS) 21.0 was used. Data were expressed using descriptive statistics such as number, percentage, mean, standard deviation. In order to determine which method to use in the analysis of the data, it was decided whether the groups were normally distributed or not by checking the Shapiro-Wilk, Kolmogorov-Smirnov conformity, kurtosis and skewness values. The t-test was used when comparing the relationship of data between two independent groups, and the Anova test was used when comparing the relationship between more than two groups. Pearson correlation analysis and linear regression analysis were performed to

evaluate the relationship between the environmental stress perception and comfort level of the patients.

**Ethical Approval:** Before the study, local ethics committee approval (Decision Number: 2020/131) was obtained. In addition, Written permission was obtained from the hospital where the study was conducted (Decision Number: E.679). Permission was obtained from the researchers, who adapted the scales used in the study into Turkish, via e-mail. During the data collection phase, the patients who participated in the study were informed about the purpose of the study. Written informed consent was obtained that they agreed to participate in the study voluntarily.

## Results

The distribution of the patients according to their descriptive characteristics is given in Table 1. The mean age of the patients was  $66.11 \pm 12.61$ . 47.7% (n=53) of the patients were between the ages of 61-75, 64.9% (n=72) were male, 75.7% (n=84) were married, 51.4% (n=57) had primary school education. graduated and 50.5% (n=56) were retired (Table 1).

Seventy three percent (n=81) of the patients were hospitalized in the ICU for two to five days, 83.8% (n=93) had at least one chronic disease, 87.4% (n=97) had previous hospitalization experience. was determined to be. When asked about the perceptions of the general health level of the patients, 65.8% (n=73) answered as good, 20.7% (n=23) as bad, and 13.5% (n=15) as very good. It was found that 79.3% (n=88) of the patients experienced four or less than four negative feelings, these feelings were fear (55.9%), loneliness (55%), anxiety (46.8%), addiction (41.4%), grief (25.2%), fear of death (23.4%), helplessness (14.4%) and hopelessness (9%).

It was determined that 58.5% of the patients had no pain and 15.3% had moderate pain, according to the pain severity that the patients felt in the last 24 hours and evaluated by VAS. According to the severity of nausea felt by the patients in the last 24 hours and evaluated by VAS, it was determined that 81% of the patients did not have nausea and 10.8% had mild nausea.

The scores of the patients in ICUESS vary between 60 and 152, with a mean of  $100.81 \pm 19.31$ . According to the scale, the first five environmental stressors most affected by ICU patients are lack of privacy (no confidentiality) ( $\bar{x}=3.6577 \pm 0.74$ ), seeing family and friends for a

few minutes a day ( $\bar{x}=3.4414 \pm 0.62$ ), not having your own control ( $\bar{x}=3.2793 \pm 0.72$ ), pain ( $\bar{x}=3.2703 \pm 0.65$ ) and not aware of time.

The total scores of the patients in the GCS ranged between 90 and 168, and the mean score was  $135.24 \pm 18.04$ . In the study, it was determined that the general comfort levels of the patients were above the middle with a rate of 70.4%.

According to Table 2, there was no statistically significant difference when the socio-demographic and clinical characteristics of the patients and the ICUESS score averages were compared ( $p > 0.05$ ).

The socio-demographic characteristics and clinical characteristics of the patients and the statistical comparison results between them with the GCS score are given in Table 3. A statistically significant relationship was found between the mean GCS score and the patients' chronic disease status, perceived general health status, previous hospitalization experience and length of stay in the intensive care unit ( $p < 0.05$ ). It was determined that those with chronic disease had lower comfort scores than those without chronic disease ( $p < 0.05$ ). When the current number of chronic diseases of the patients hospitalized in the ICU was evaluated, a statistically significant relationship was determined between the patients with three or more chronic diseases and those without chronic diseases ( $p < 0.05$ ). With this relationship, it was observed that the mean GCS score of the patients decreased with the increase in the number of chronic diseases (Table 3). In addition, it was determined that patients with previous hospitalization experience had lower comfort scores than patients who were hospitalized for the first time ( $p < 0.05$ ), (Table 3).

A statistically significant relationship was found between the perceived general health status of the GCS score and the number of days spent in the intensive care unit ( $p < 0.05$ ). A statistically significant correlation was found between patients who responded as "poor" in the assessment of perceived general health status and those who responded as "very good" and "good" ( $p < 0.05$ ). In this relationship, it was observed that when patients hospitalized in the intensive care unit evaluated themselves as "very good", their mean GCS score increased, and when they evaluated themselves as "poor", their mean GCS score decreased. A statistically significant relationship was found between the patients with 10 days or more hospitalization period in the intensive care

unit and the patients who were hospitalized for one day and between two and five days ( $p < 0.05$ ). With this relationship, it was observed that the mean GCS score of the patient, whose length of stay in the intensive care unit increased, decreased. It was determined that there was no statistically significant difference between the other variables and the mean GCS scores ( $p > 0.05$ ). (Table 3).

The relationship between the patients' total ICUESS scores and their total GCS scores and sub-dimensions is given in Table 4. A moderate negative correlation was found between the patients' ICUESS scores and the total GCS scores ( $r = -0.569$ ). As the patients' ICUESS scores increase, their GCS scores decrease. A weak negative correlation was found between the patients' ICUESS scores and the physical comfort and sociocultural comfort sub-dimension scores of the GCS scale ( $r = -0.39$  and  $r = -0.36$ ). As the patients' ICUESS scores increase, the physical comfort and sociocultural comfort sub-dimension scores of the GCS scale decrease. A moderately negative correlation was found between the patients' ICUESS scores and the psychospiritual comfort and environmental comfort sub-dimension scores of the GCS scale ( $r = -0.55$  and  $r = -0.59$ ). As the patients' ICUESS scores increase, the psychospiritual comfort and environmental comfort sub-dimension scores of the GCS scale decrease ( $p < 0.001$ ).

The regression line showing the relationship between the patients' total score on ICUESS and GCS total score is shown in figure 1. As seen in

the figure, it was tested that the data were linearly distributed. Simple linear regression analysis was performed to determine whether the total score of the patients' ICUESS was significantly predictive of the total score of GCS. According to the results of the regression analysis, the model was found to be significant ( $F = 52.27$ ;  $p < 0.01$ ). When the  $R^2$  value was examined, it was determined that the total score of ICUESS explained 32% of the total score of GCS. It was determined that ICUESS total score ( $\beta = -0.47$ ,  $p < 0.01$ ) significantly predicted the total score of GCS (Table 5).

The multiple regression model composed with the variables (chronic disease status, previous hospitalization status, perceived general health status, and length of stay) that were significant with the GCS is shown in Table 6. Multiple linear regression analysis was performed to determine whether chronic disease status, previous hospitalization, perceived general health status, and length of stay in the intensive care unit significantly predicted the total score of GCS.

According to the results of the regression analysis, the model was found significant ( $F = 15.12$ ;  $p < 0.001$ ). When the  $R^2$  value was examined, it was found that chronic disease status, previous hospitalization, perceived general health status, and length of stay in the intensive care unit explained 34% of the total GCS score. Previous hospitalization status ( $\beta = -0.20$ ,  $p < 0.05$ ), perceived general health status ( $\beta = -0.32$ ,  $p < 0.001$ ) and length of stay ( $\beta = -0.13$ ,  $p < 0.001$ ) significantly predicted the total GCS score. was done (Table 6).

**Table 1.** Descriptive characteristics of the patients

Characteristics	n	%
<b>Age (years)</b>		
18-30	2	1.8
31-45	5	4.5
46-60	21	18.9
61-75	53	47.7
76 and above	30	27.0
<b>Gender</b>		
Female	39	35.1
Male	72	64.9
<b>Marital status</b>		

Married	84	75.7
Single	27	24.3
<b>Educational status</b>		
Not literate	21	18.9
Literate	2	1.8
Primary	57	51.4
Secondary	7	6.3
High school	15	13.5
University and above	9	8.1
<b>Occupation</b>		
Housewife	38	34.2
Officer	3	2.7
Employee	2	1.8
Retired	56	50.5
Other*	12	10.8
<b>Toplam</b>	111	100

\* Small business (n=7), Farmer (n=5)

**Table 2.** Comparison of ICUESS scores and some descriptive and clinical characteristics of the patients

Descriptive and Clinical Characteristics	ICUSS			Test Value
	n	Mean	Standart Deviation	
<b>Age (years)</b>				
18-30	2	2.3690	0.01684	
31-45	5	2.0905	0.40665	F: 1.059
46-60	21	2.4558	0.37354	p: 0.381
61-75	53	2.3571	0.50131	
76 and above	30	2.4913	0.44869	
<b>Gender</b>				
Female	39	2.4542	0.51186	t: 0.909
Male	72	2.3710	0.42989	p: 0.365
<b>Marrital status</b>				
Married	84	2.3844	0.46656	t: -0.641
Single	27	2.4497	0.44280	p: 0.523

<b>Educational status</b>				
Not literate	21	2.4490	0.54975	
Literate	2	3.0714	0.16836	
Primary	57	2.3693	0.44684	F: 1.351
Secondary	7	2.2959	0.39956	p: 0.249
High school	15	2.3159	0.36360	
University and above	9	2.5556	0.47216	
<b>Having chronic diseases</b>				
Yes	93	2.4373	0.44703	t: 1.953
No	18	2.2090	0.48997	p: 0.053
<b>Previous hospitalization experience</b>				
Yes	97	2.4300	0.45516	t: 1.815
No	14	2.1939	0.45415	p: 0.07
<b>Previous experience of staying in the ICU</b>				
Yes	55	2.4623	0.47315	t: 1.416
No	56	2.3393	0.44196	p: 0.16
<b>Duration of stay in the ICU now (day)</b>				
1	18	2.2672	0.46689	
2-5	81	2.4021	0.45603	F: 1.545
6-9	9	2.5079	0.48328	p: 0.207
10 and above	3	2.8254	0.19392	
<b>Perceived general health status</b>				
Very good	15	2.3698	0.51648	F: 1.807
Good	73	2.3558	0.48320	p: 0.169
Bad	23	2.5611	0.29806	
<b>Average pain severity</b>				
No pain	65	2.3289	0.45053	F: 1.594
Mild pain	11	2.5455	0.38457	p: 0.168
Moderate pain	17	2.6373	0.52181	



Severe pain	7	2.3197	0.25192	
Very severe pain	5	2.4429	0.71242	
Unbearable pain	6	2.2937	0.27383	
<b>Average nausea severity</b>				
No nausea	91	2.3878	0.46745	
Mild nausea	12	2.5615	0.47883	F: 0.674
Moderate nausea	6	2.3333	0.31873	p: 0.570
Severe nausea	2	2.2024	0.35355	

t= Independent sample t test, F=One Way ANOVA

**Table 3.** Comparison of GCS scores and some descriptive and clinical characteristics of the patients

Descriptive and Clinical Characteristics	GCS			Test Value
	n	Mean	Standart Deviation	
<b>Age (years)</b>	2	2.7396	0.07366	
18-30	5	2.8708	0.24887	
31-45	21	2.8700	0.33914	F: 1.027
46-60	53	2.8601	0.38824	p: 0.397
61-75	30	2.7021	0.39725	
76 and above	2	2.7396	0.07366	
<b>Gender</b>				t: -0.720
Female	39	2.7826	0.40053	p: 0.473
Male	72	2.8365	0.36344	
<b>Marrital status</b>				t: 2.867
Married	84	2.8738	0.35242	p: 0.05
Single	27	2.6427	0.39947	
<b>Educational status</b>				F: 1.494
Not literate	21	2.6925	0.44507	p: 0.198
Literate	2	2.3542	0.32409	
Primary	57	2.8761	0.36178	
Secondary	7	2.7976	0.38372	

High school	15	2.7903	0.36217	
University and above	9	2.9028	0.22341	
<b>Having chronic diseases</b>				
Yes	93	2.7836	0.38774	t: -2.201
No	18	2.9931	0.24908	<b>p: 0.03</b>
<b>Previous hospitalization experience</b>				
Yes	97	2.7788	0.38086	t: -4.829
No	14	3.0863	0.18934	<b>p: 0.00</b>
<b>Previous experience of staying in the ICU</b>				
Yes	55	2.7727	0.40670	t: -1248
No	56	2.8616	0.34104	p: 0.215
<b>Duration of stay in the ICU now (day)</b>				
1	18	2.8576	0.37440	F: 4.641
2-5	81	2.8598	0.33635	<b>p: 0.004</b>
6-9	9	2.5440	0.51280	
10 and above	3	2.2569	0.33225	
<b>Perceived general health status</b>				
Very good	15	3.0014	0.37964	F: 21.559
Good	73	2.9013	0.31948	<b>p: 0.00</b>
Bad	23	2.4321	0.28163	
<b>Average pain severity</b>				
No pain	65	2.8891	0.36862	
Mild pain	11	2.7064	0.32801	F: 1.720
Moderate pain	17	2.6826	0.42623	p: 0.136
Severe pain	7	2.8304	0.26144	
Very severe pain	5	2.5375	0.50376	
Unbearable pain	6	2.8472	0.23112	
<b>Average nausea severity</b>				
No nausea	91	2.8526	0.36478	F: 1.761
				p: 0.159



Mild nausea	12	2.6128	0.42709
Moderate nausea	6	2.6806	0.31751
Severe nausea	2	2.8646	0.57452

t= Independent sample t test, F=One Way ANOVA

**Table 4.** Evaluation of the relationship between ICUESS scores and GCS total and Sub-dimension scores of patients

	GCS	Physical Comfort	Psychospiritual Comfort	Environmental Comfort	Socio-Cultural Comfort	
<b>ICUESS</b>	<b>r</b>	-0.569	-0.391	-0.553	-0.590	-0.364
	<b>p</b>	0.00	0.00	0.00	0.00	0.00

\* Pearson correlation analysis

**Table 5.** Evaluation of the effect of ICUESS total score on GCS total score

Variable	Non-standardized coefficients		Standardized coefficients			95% confidence interval for B	
	B	Standard Error	Beta	t	p	Lower limit	Upper limit
Stable	3.94	0.16		25.01	0.00	3.62	4.25
ICUESS	-0.47	0.06	-0.57	-7.23	0.00	-0.59	-0.34

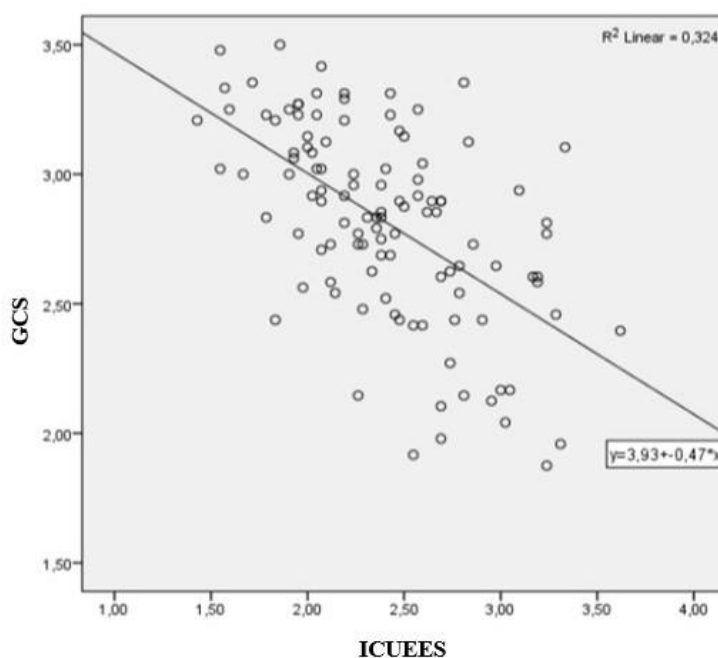
R=0.57, R2=0.32, F=52.27 p=0.00 Durbin Watson=1.9 Regression analysis

**Table 6.** Evaluation of the relationship between significant variables and total GCS score

Variable	Non-standardized coefficients		Standardized coefficients			95% confidence interval for B	
	B	Standard Error	Beta	t	p	Lower limit	Upper limit
Stabil	3.65	0.21		17.08	0.00	3.23	4.077
Chronic disease status	-0.09	0.09	-0.09	-1.03	0.30	-0.27	0.09

Previous hospitalization experience	0.20	0.09	0.18	2.09	0.04	0.01	0.39
Perceived general health status	-0.32	0.05	-0.51	-5.96	0.00	-0.43	-0.22
Duration of stay in the ICU now (day)	-0.13	0.05	-0.21	-2.74	0.00	-0.23	-0.04

R=0.61, Adjusted R<sup>2</sup>=0.34, F=15.12, p= 0.00, Durbin Watson=1.86 Multiple regression analysis



**Figure 1.** The regression line showing the relationship between the ICUESS total score and the GCS total score

## Discussion

This study was carried out to determine the environmental stressor perception and comfort level and the relationship between them in a total of 111 intensive care patients hospitalized in a state hospital in the northernmost part of Turkey.

In our study, the patients' total ICUESS scores ranged from 60 to 152 points; The mean total score of the scale was found to be  $100.81 \pm 19.31$ . In the study of Yava et al. (2011) mean score was  $91.41 \pm 34.91$ , Aktas et al.'s (2015) cardiovascular surgery patients' scale total score average was  $86.7 \pm 2.73$  points, in So and Chan's (2015) study, the patients' scale total score average was 120.88 (Yava, Tosun, Unver & Cicek, 2011; Aktas, Karabulut, Yilmaz & Okzan, 2015; So & Chan,

2004). In a similar study conducted in the surgical ICU, the mean total score of the scale was found to be  $110.22 \pm 15.64$  points, and in the study of Tezcan Karadeniz and Kanan (2019) it was found to be  $69.26 \pm 21.84$  (Tezcan Karadeniz & Kanan, 2019). Although this study is close to the mean scores in the literature, it is seen that different results were obtained in some studies. It is thought that these differences are due to the fact that the studies were carried out in different ICUs and that ICUs have different environmental characteristics.

In our study, no statistically significant difference was found between the socio-demographic and clinical characteristics of the patients and their level of exposure to environmental stressors ( $p > 0.05$ ). This finding is similar to some studies in the literature (Aktas, Karabulut, Yilmaz & Okzan,

2015; Gencer & Kumsar, 2020; Zaybak & Yapucu, 2010). However, in some studies in the literature, it has been found that socio-demographic and some clinical characteristics of patients affect the perception of environmental stressors (Aktas, Karabulut, Yilmaz & Okzan, 2015; Tezcan Karadeniz & Kanan, 2019; Sahin & Kockar, 2018; Donmez, Korkmaz & Gecit, 2020; Hweidi, 2007). These different results obtained in the literature may be due to the differences in the individual characteristics of the ICUs where the studies were carried out and the patients included in the study, as well as the different characteristics of the treatment and care provided by the caregiver healthcare team members.

In this study, it was determined that the most important stressor perceived by the patients hospitalized in the ICU was the lack of privacy. In the study by Gencer and Kumsar (2020), the biggest perceived stressor was found to be the absence of privacy (Gencer & Kumsar, 2020). Lack of privacy was found to be the third most important stressor in the study of Aktas et al. (2015), and the second most important stressor in the study of Zaybak and Cevik (2015)<sup>25</sup>, Yava et al. (2011), on the other hand, it was determined as the 11th stressor (Aktas, Karabulut, Yilmaz & Okzan, 2015; Zaybak & Cevik, 2015; Yava, Tosun, Unver & Cicek, 2011). The fact that the lack of privacy was the first in our study revealed that the necessary importance was not given to this issue in the ICU. It is thought that this stressor can be reduced by considering the patient privacy of the physical conditions of the ICU, instead of the ward type, by planning individually divided areas or separating male and female patients.

In our study, meeting family and friends for a few minutes a day was found to be the second most important stressor. In the study conducted by Akın and Aribogan (2006), this stressor ranked third,<sup>26</sup> while Gultekin et al. (2018),<sup>27</sup> and in the study conducted by Zaybak and Cevik (2015) it was found to be the 17th effective stressor (Akın & Aribogan, 2006; Gultekin, Ozcelik & Akinci, 2018; Zaybak & Cevik, 2015). It is thought that this difference in the studies conducted may be due to the differences in the visitor rules and the fact that the period in which this study was conducted was during the COVID 19 pandemic.

In our study, it was found that the total mean score of the patients on the GCS was  $135.24 \pm 18.04$ , that is, above the average (70.43%). It is seen that there are different rates in the studies in the literature

(Sahin & Rizarlar, 2018; Kubat Bakir & Yurt, 2020). It is thought that these different results are due to the fact that patients from different ICUs were studied and the individual and clinical characteristics of the patient groups were different.

In our study, the comfort level of the patients decreased as the number of chronic diseases increased ( $p < 0.05$ ). While similar results were found in Kubat's (2017) study,<sup>29</sup> Guner and Kumsar's (2020) study did not find a statistically significant relationship between chronic disease status and comfort level (Kubat Bakir & Yurt, 2020; Guner & Kumsar, 2020). We can associate this result obtained in our study with the high mean age of the sample group and therefore the high rate of chronic diseases.

In our study, it was determined that the patient's comfort score decreased as the length of stay in the intensive care unit increased ( $p < 0.05$ ). Similar results were obtained in the study of Kubat (2017) (Kubat Bakir & Yurt, 2020). Poor prognosis of the disease and complications related to the disease and treatments are factors that increase the hospitalization period in the intensive care unit. Such factors will reduce the patient's comfort. In our study, the fact that the health perception of the patients in the ICU increases the comfort level supports this finding.

When the effects of chronic disease status, previous hospitalization status, perceived general health status, and length of stay in the intensive care unit on the total score of the ICU were evaluated by multiple linear regression analysis, it was found that these factors explained 34% of the GCS score, which were found to be significant in our study. All these variables are important factors affecting comfort in intensive care patients.

In our study, it was found that as the stressor perception of the patients increased in the intensive care unit, their comfort level decreased. The regression analysis findings of our study also revealed that environmental stressors reduce the comfort level. In the literature, no study was found in which the relationship between the patients' total ICU ESS score and the GCS sub-dimension scores were evaluated. Due to the nature of intensive care, the stressful care environment affects the comfort by creating pressure on the patients. Environmental stressors such as anxiety about health status, being away from relatives, needing the care of others, uncertainty of the future, observing the interventions made to other

patients, sounds and appearances of devices, attitudes and behaviors of health professionals can be interpreted as factors that reduce the comfort of patients in intensive care.

**Limitations:** An important limitation of the study is that the comfort level of the patients and the perception of environmental stressors are affected by the past experiences of the patients. Another limitation is sampling by excluding the pandemic intensive care units from the scope of the study due to the covid-19 pandemic. Finally, since the study was conducted in only one center, it cannot be generalized to all intensive care patients in Turkey.

**Conclusion:** In our study, it was determined that the environmental stressor perception and comfort level of intensive care patients were above the medium level. It was determined that patients with chronic diseases and previous hospitalization experience had lower comfort scores, and the perceived general health status and length of stay in the intensive care unit decreased the comfort level. The increase in the level of environmental stressors perceived by the patients decreases the comfort level. It was determined that chronic disease status, previous hospitalization status, perceived general health status and length of stay in the intensive care unit explained 34% of the total score of GCS.

## References

- Akin, S., & Aribogan, A. (2006). Evaluation of the factors causing stress in patients treated in the intensive care unit in terms of gender. *Journal of Anesthesia* 14:232-236.
- Aktas, Y. Y., Karabulut, N., Yilmaz, D., & Okzan, A. S. (2015). Environmental Stressors Perceived by Patients Treated in the Cardiovascular Surgery Intensive Care Unit. *Caucasian Journal of Medical Sciences* 5(3):81-86.
- Arslan, S., & Ozer, N. (2016). Touching, music therapy and aroma therapy's effect on the physiological situation of the patients in intensive care unit. *International Journal of Caring Sciences* 9(3):867-875.
- Ballard, K. S. (1981). Identification of environmental stressors for patients in a surgical intensive care unit. *Issues in Mental Health Nursing* 3(1):89-108. <https://doi.org/10.3109/01612848109140863>
- Cinar, S., Aslan, F., & Kurtoglu, T. (2011). Intensive care unit environmental stressors scale: a validity and reliability study. *Journal of Intensive Care Nursing* 15(2): 61-66.
- Cline, M. E., Herman, J., Show, F., & Marton, R. D. (1992). Standardization of the visual analogue scale. *Nursing Research* 41:378-379. <https://doi.org/10.1097/00006199-199211000-00013>
- Cochran, J., & Ganong, L. H. (1989). A comparison of nurses' and patients' perceptions of intensive care unit stressors. *Journal of Advanced Nursing* 14(12):1038-1043. <https://doi.org/10.1111/j.1365-2648.1989.tb01515.x>
- Donmez, C. A., Korkmaz, D. F., & Gecit, S. (2020). Perception of environmental stressors by patients in the intensive care unit. *Turkish Clinical Journal of Nursing Sciences* 12(2):190-197.
- Eti Aslan, F. (2004). Sensitivity and selectivity of visual comparison scale and simple descriptive scale in the assessment of postoperative pain. *Journal of Intensive Care Nursing* 8, 1-6.
- Gencer, A., & Kumsar, A. K. (2020). The effect of environmental stressors perceived by patients treated in the intensive care unit on sleep quality. *Online Turkish Journal of Health Sciences* 5(3): 434-443.
- Gezginci, E., Goktas, S., & Orhan, B. N. (2020). The effects of environmental stressors in intensive care unit on anxiety and depression. *Nursing in Critical Care* 1-7. <https://doi.org/10.1111/nicc.12553>.
- Gultekin, Y., Ozcelik, Z., Akinci, S. B., & Yorganci, H. K. (2018). Evaluation of stressors in intensive care units. *Turkish Journal of Surgery* 34:5-8. <https://doi.org/10.5152/turkjsurg.2017.3736>.
- Guner, A., & Kumsar, A. K. (2020). Comfort level and factors affecting comfort in patients undergoing surgery for lung cancer. *Online Turkish Journal of Health Sciences* 6(2):155-162.
- Henrich, N. J., Dodek, P. M., Gladstone, E., Alden, L., Keenan, S. P., Reynolds, S., & Rodney P. (2017). Consequences of moral distress in the intensive care unit: a qualitative study. *American Journal of Critical Care* 26(4):e48-e57. <https://doi.org/10.4037/ajcc2017786>.
- Hweidi, I. M. (2007). Jordanian patients' perception of stressors in critical care units: a questionnaire survey. *International Journal of Nursing Studies* 44(2):227-235.
- Kolcaba, K. (1992). Holistik comfort: operationalizing the construct as a nurse sensitive outcome. *Advances in Nursing Science* 5(1):1-10.
- Kubat Bakir, G., & Yurt, S. (2020). Evaluation of the comfort level of patients undergoing surgical operation. *Health and Society* 20(3):158-165.
- Kuguoglu, S., & Karabacak, U. (2008). Adaptation of the general comfort scale into Turkish. *Istanbul University Florence Nightingale School of Nursing Journal* 16:16-23.
- McKinley, S., Coote, K., Parbury, S. J. (2002). Development and testing of a faces scale for the assessment of anxiety in critically ill patients. *Journal of Advanced Nursing* 41(1):73-79. <https://doi.org/10.1046/j.1365-2648.2003.02508.x>
- Ozer, N., & Akyil, R. (2008). The effect of providing information to patients on their perception of the

- intensive care unit. *Australian Journal of Advanced Nursing* 25(4):71-78.
- Sahin, M., & Kockar, C. (2018). Intensive care as a stressor. *Life Skills Journal of Psychology* 2(4):207-214.
- Sahin, P. B., & Rizarlar, S. (2018). Investigation of comfort level and affecting factors in patients undergoing surgery. *Journal of Health Sciences and Professions* 5(3):404-413.
- So, H.M., & Chan, D.S.K. (2004). Perception of stressors by patients and nurses of critical care units in Hong Kong. *International Journal of Nursing Studies* 41:77-84. [https://doi.org/10.1016/S0020-7489\(03\)00082-8](https://doi.org/10.1016/S0020-7489(03)00082-8)
- Tezcan Karadeniz, F., & Kanan, N. (2019). The effects of environmental stressors on patients hospitalized in the reanimation intensive care unit. *Journal of Intensive Care Nursing* 23(1):1-8.
- Tuncay, G. Y., Ucar, H. (2010). Opinions of patients on the physical environment characteristics of the intensive care unit. *Hacettepe University Faculty of Health Sciences Journal of Nursing* 17(2):33-46.
- Yava, A., Tosun, N., Unver, V., & Cicek, H. (2011). Patient and nurse perceptions of stressors in the intensive care unit. *Stress and Health* 27(2):e36-e47. <https://doi.org/10.1002/smi.1333>
- Zaybak, A., & Cevik, K. (2015). Perception of stressors in the intensive care unit by patients and nurses. *Journal of Intensive Care* 6(1):4-9.
- Zaybak, A., & Yapucu, G.U. (2010). Investigation of intensive care experience of patients. *Journal of Ege University School of Nursing* 26(2):17-26.