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Authors: Sevim Çelik, Münevver Şengül, Elif Karahan

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Evaluation of nonpharmacological nursing practices related to thirst and the thirst of patients in the intensive care unit

Sevim Çelik [1], Münevver Şengül [2], Elif Karahan [1]

[1] Department of Nursing, Bartin University Faculty of Health Sciences, Bartin, Turkey

[2] Department of Nursing, Bartin University Graduate Education Institute, Bartin, Turkey

Corresponding author: Sevim Çelik, e-mail: sevimakcel@gmail.com

ORCID

SC: 0000-0002-2016-5828

MS: 0000-0003-3761-4463

EK: 0000-0002-6371-871X

ABSTRACT

Introduction and aim. Thirst is a significant symptom and stressor among patients in the intensive care unit. The aim of this study is to assess the severity of thirst and associated symptoms experienced by patients in the intensive care unit, and to evaluate the nursing practices related to addressing thirst.

Material and methods. This descriptive and correlational study involved a total of 66 patients in the intensive care unit. Severity of thirst experienced by these patients was assessed using a numeric rating scale. The nursing practices related to assessing thirst severity on admission to the unit, on the third day, and on the seventh day were also recorded.

Results. Our findings showed a statistically significant increase in the levels of thirst, dry mouth, bad taste and odor in the mouth, as well as sensitivity and dryness in the throat among patients on the seventh day of hospitalization ($p<0.05$).Among nursing interventions, communication with the patient was the most frequently applied intervention during the seven-day period, with a range of 98.5% to 100%. biochemical control (100%), ventilation of the unit (100%), and temperature regulation (100%) were also frequently applied.

Conclusion. The patients had all the symptoms of thirst.The frequency of nursing interventions increased in parallel with the severity of thirst.

Keywords. intensive care patient, nurse, thirst, nursing practices

Introduction

Thirst is a significant symptom and stressor among patients in the intensive care unit.[1] Various factors contribute to the development of thirst in this population, including life-threatening illnesses, endotracheal tubes, pain, immobility, sleep disturbances, frequent examinations or touching, communication difficulties, fear, and anxiety.[2,3] In addition, changes in consciousness, bleeding, preoperative fasting, anesthetic drugs, oxygen therapy, anticholinergics, diuretics, opioids, antihypertensives, hypovolemia, and inadequate oral hydration can also contribute to the development of thirst.[4-8] Studies have reported that a significant proportion of patients in the intensive care unit experience intense or moderate thirst, with prevalence ranging from 66% to 70%.[6,9]

Patients who experience thirst in the intensive care unit may present with a range of complaints, including dryness of the mouth, difficulty in swallowing, tenderness in the throat, changes in kidney function and electrolyte levels, and bad taste and odor in the mouth.[4,10,11] Several studies have investigated the prevalence and severity of thirst in this population. For instance, Vonstein et al. found that the average level of thirst, as measured on a 0-10 rating scale, was 5.5 among non-mechanically ventilated patients and 6.1 among patients who were not fed by mouth, with 66% of patients reporting dryness of the mouth.[12] Similarly, Negro et al. reported that 76.1% of intensive care patients experienced thirst, with a mean thirst level of 5.37 out of a maximum of 10 points.[5]

Prolonged thirst lasting more than 24 hours can have significant negative impacts on the comfort of patients during their healing process, potentially causing fluid and electrolyte imbalances, delirium, and even post-traumatic stress disorder.[5,9,11,13,14] As such, regular assessment of thirst is crucial in order to prevent or mitigate these symptoms.[4] However, the assessment and management of thirst in intensive care patients is often neglected. In addition, nurses may prioritize vital signs over the recognition of thirst.[1,15] When thirst is identified, effective management strategies may be limited by factors such as fluid restriction, concerns about aspiration or vomiting, and the presence of endotracheal tubes.[1]

Intensive care specialists strongly recommend the management of thirst as an important factor in patient prognosis. Various nursing interventions have been found to be effective in managing thirst, such as cooling the oral mucosa, using menthol moisturizer, providing effective oral care, regulating ambient temperature and humidity, gargling with salt water, and moistening the mouth and lips. These interventions have been supported by several studies.[2,7,12,15,18]

Aim

The aim of this study was to assess the severity of thirst and associated symptoms experienced by intensive care patients, as well as to evaluate the nursing interventions used to manage thirst.

Material and methods

Ethical approval

The study received ethical approval from the Social and Human Sciences Ethics Committee of the University (date:07.01.2022, approval number:21). Written consent was obtained from the state hospital affiliated with the provincial health directorate. Informed consent was obtained from the nurses, physicians, and patients for their participation in the study.

Design and sample

A descriptive and correlational design was used. Based on the literature and using the G-Power 3.1.9.7 program, a sample size of 66 patients was calculated to achieve a power of 95% with an alpha level of 0.05 and an effect size of 0.636.[19]

The inclusion criteria for the study were as follows: (i) Patients who were 18 years of age or older, (ii) Patients who were hospitalized in the intensive care unit, (iii) Patients who were treated in the intensive care unit for at least 7 days, (iv) Patients who were able to communicate, (v) Patients who were conscious, (vi) Patients who had no diagnosed mental or mental illness, (vii) Patients who volunteered to participate in the study.

Excluding unconscious patients (n=5) and patients (n=4) hospitalized for less than 7 days ensures that the patients included in the study are able to communicate effectively and have experienced thirst symptoms for a sufficient duration.

Instruments

Survey form

The survey form used in the study had five parts: The first part evaluated the reason for the patient's admission to the intensive care unit and their habits and characteristics before admission. The second part evaluated the characteristics of patients who underwent surgical intervention. The third part evaluated the factors that may cause the patient's thirst and the hemodynamic parameters that may occur as a result of thirst. The fourth part recorded thirst markers using the numeric rating scales (NRS). The last part recorded the practices of nurses for managing thirst in the patients.[19]

Numeric rating scales

The NRS were used to record the intensity of various thirst symptoms on the 0th, 3rd, and 7th days of the patient's stay in the intensive care unit. The symptoms evaluated using the NRS included thirst expression, dryness of mouth, dryness of throat, sensitivity in the throat, difficulty in swallowing, difficulty in speaking, feeling of bad taste and bad smell in the mouth, deterioration in the oral mucosa, and moistness of the lips.

The NRS is a reliable and safe tool for evaluating thirst symptoms, and the mean scores were interpreted as mild (0-3 points), moderate (4-6 points), and severe (7-10 points) thirst.[19-21]

Procedure

The data were collected between March and October 2022 in the intensive care units at a state hospital in Turkey. The demographic and clinical characteristics of the patients on the 0th day of hospitalization in the intensive care unit were recorded using self-reports and medical reports of the patients. Thirst symptoms, except for mouth odor, deterioration of mucosa, and moistness of lips, were recorded using the NRS according to the patients' self-reports on the 0th, 3rd, and 7th days of hospitalization in the intensive care unit. On the other hand, mouth odor, deterioration of mucosa, and moistness of lips were recorded using the NRS by the researcher. The clinical status of the patients on the 3rd and 7th days was documented based on their medical reports. Additionally, the nursing practices related to the severity of thirst, as reported by the nurses themselves, were recorded on the 3rd and 7th days.

Data analysis

The data were analyzed using the SPSS 22.0 package program (IBM, Armonk, NY, USA). The normal distribution was assessed using the Kolmogorov-Smirnov test. Descriptive statistical analysis methods and the chi-square test were used to analyze the data. For data that did not follow a normal distribution, the Friedman test for repeated measures and Spearman correlation analysis were conducted. Pairwise comparisons were examined using the Wilcoxon sign-rank test. The level of significance was set at $p<0.05$.

Results

The study included patients with a mean age of 73.67, where 54.5% were male. A high percentage of patients (89.4%) had a chronic disease and 86.4% were taking medications regularly. The most common chronic disease among the patients was related to the cardiovascular system (71.2%), and more than half of the patients (56.1%) were using antihypertensive drugs. Majority of the patients did not consume alcohol (92.4%) or smoke (80.3%). The majority of patients (53%) were admitted to the COVID intensive care unit (ICU) for the treatment and care of COVID-19, followed by diagnoses of dyspnea and pneumonia (Table 1).

Table 1. The demographic characteristics of the patients (n=66)

Characteristic		**Mean (SD)**
Age		73.67 (11.46)
		n (%)
Gender	Woman	30 (45.5)

	Male	36 (54.5)
Chronic disease (n=59; 89.4%)	Neurological	18 (27.3)
	Cardiovascular	47 (71.2)
	Respiratory	25 (37.9)
	Endocrine	26 (39.4)
	Urogenital	6 (9.1)
	Other (musculoskeletal, psychiatric)	4 (6)
Drug used continuously (n=57; 86.4%)	Antiepileptic	4 (6.1)
	Parasympathomimetic	6 (9.1)
	Proton pump inhibitor	30 (45.5)
	Inhaler	20 (30.3)
	Antihypertensive	37 (56.1)
	Antidiabetic	23 (34.8)
	Diuretic	3 (4.5)
	Anticoagulant	18 (27.3)
	Betablocker	19 (28.8)
	Antipsychotic	1 (1.5)
	Other (Lipid lowering, urological)	7 (10.6)
Alcohol use	Yes	5 (7.6)
	No	61 (92.4)
Smoking	Yes	13 (19.7)
	No	53 (80.3)
Intensive care unit	COVID	35 (53)
	1st level	19 (28.8)
	General	7 (10.6)
	Emergency	5 (7.6)
Diagnosis*	COVID-19 infection	35 (53)
	Acute respiratory failure	17 (25.8)
	Dyspnea	28 (42.4)
	Pneumonia	26 (39.4)
	Pulmonary embolism	4 (6.1)
	Pulmonary edema	5 (7.6)
	Aspiration pneumonia	3 (4.5)
	Acute kidney failure	6 (9.1)
	Atrial fibrillation	6 (9.1)

	Gastrointestinal bleeding	3 (4.5)
	General condition disorder	15 (22.7)
Feeding	Oral	39 (59.1)
	Nasogastric tube	13 (19.7)
	Percutaneous endoscopic gastostomy	1 (1.5)
	Total paranteral nutrition	3 (4.5)
	Peripheral nutrition	10 (15.2)

*more than one answer was given, the percentages were taken according to the number n (66)

The study found that patients diagnosed with acute respiratory failure, male patients, and patients using continuous medication experienced statistically significantly higher levels of thirst at the time of hospitalization compared to other patients (Z=-2.292, p=0.022; Z=-2.412, p=0.016; Z=-2.137, p=0.033, respectively). There was also a weak negative correlation found between the mean age of the patients and the severity of thirst on the 0th day of hospitalization (rho=-0.250, p=0.043). However, there was no statistically significant difference found between the severity of thirst at hospitalization and other descriptive characteristics of the patients (p>0.05).

Table 2 displays the results of the clinical characteristics of the patients during the seven-day follow-up period after their admission to the intensive care unit. No statistically significant difference was found in the vital signs and biochemical analyses of the patients (p>0.05). However, there was a statistically significant increase in the mean scores of oxygen saturation and Glasgow Coma Scale (p<0.001).

Table 2. The clinical characteristics of the patients for 7 days (n=66) *

Clinical characteristics	**0th day**	**3rd day**	**7th day**	χ^2 **p**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	
Body temperature (°C)	36.14 (0.28)	36.44 (0.31)	36.45 (0.30)	3.759; 0.153
Heart rate (beats/min)	90.09 (15.25)	87 (13.18)	86.94 (12.65)	3.512; 0.173
Systolic blood pressure (mmHg)	122.97 (18.22)	120.71 (18.11)	119.39 (18.33)	3.567; 0.168
Diastolic blood pressure (mmHg)	53.52 (7.32)	52.85 (9.21)	51.77 (9.49)	5.567; 0.056
SpO_2 (%)	94.12 (2.08)	94.94 (2.07)	95.53 (2.17)	22.183; <0.001
GCS score	13.88 (1.07)	14.14 (1.02)	14.17 (1.07)	23.439; <0.001
Na^+ (mEq/L)	137.64 (4.99)	137.02 (4.03)	136.68 (3.77)	5.653; 0.059
Cl^- (mEq/L)	102.91 (6.42)	102.05 (5.61)	101.68 (4.75)	3.119; 0.21
K^+ (mEq/L)	4.05 (0.68)	4.72 (4.94)	4.13 (0.64)	0.593; 0.743

Hct (%)	33.60 (6.07)	33.26 (5.56)	32.98 (5.24)	3.848; 0.146
BUN (mg/dl)	70.50 (33.59)	76.36 (32.69)	75.62 (43.39)	7.870; 0.02

* χ^2 – Friedman test; GCS – Glasgow Coma Scale

Table 3 presents the results of the thirst indicators that were monitored for the 7-day hospitalization period in the intensive care units. According to the NRS, the severity of thirst and thirst-related symptoms experienced by the intensive care patients decreased significantly, except for difficulties in swallowing and speaking on the 0th day of hospitalization ($p<0.05$). However, it was not clinically significant.

The results of the Wilcoxon signed-rank test showed that the pairwise comparisons of thirst levels were statistically significant between the third day versus admission day ($Z=-3.120$; $p=0.002$) and on the seventh day versus admission day ($Z=-2.380$; $p=0.017$). Similarly, dryness of mouth levels were statistically significant between the third day versus admission day ($Z=-3.440$; $p=0.001$) and on the seventh day versus third day ($Z=-2.041$; $p=0.041$). Throat tenderness levels were statistically significant between the third day versus admission day ($Z=-3.801$; $p<0.001$) and on the seventh day versus admission day ($Z=-3.229$; $p=0.001$). Bad taste in the mouth levels were statistically significant between the third day versus admission day ($Z=-3.840$; $p<0.001$) and on the seventh day versus admission day ($Z=-2.480$; $p=0.013$). Bad smell in the mouth levels were statistically significant between the third day versus admission day ($Z=-3.397$; $p=0.001$) and on the seventh day versus admission day ($Z=-1.199$; $p=0.046$). The deterioration of the oral mucosa levels were statistically significant between the third day versus admission day ($Z=-5.945$; $p<0.001$) and on the seventh day versus admission day ($Z=-5.059$; $p<0.001$). However, there was no statistically significant difference in the comparison between thirst, dryness of mouth, throat tenderness, bad taste in the mouth, bad smell in the mouth, and deterioration of the oral mucosa levels on the seventh and third days ($p>0.05$).

The dryness of throat levels on the third day versus admission day ($Z=-3.170$; $p=0.002$) and on the seventh day versus admission day ($Z=-2.358$; $p=0.018$) were statistically significant. However, the comparison between dry throat levels on the seventh and third days was not statistically significant ($p>0.05$). The moisture of lips levels on the third day versus admission day ($Z=-4.114$; $p<0.001$), on the seventh day versus admission day ($Z=-3.156$; $p=0.002$), and on the seventh day versus third day ($Z=-2.501$; $p=0.012$), were statistically significant (Table 3).

Table 3. Thirst indicators for 7 days in patients (n=66) *

Indicators	**0th day**	**3rd day**	**7th day**	χ^2 **p**
	Mean (SD)	**Mean (SD)**	**Mean (SD)**	
Expression of thirst	3.45 (1.25)	4.02 (1.70)	3.95 (1.58)	7.011; 0.03
Dryness of mouth	3.73 (1.37)	4.48 (1.72)	4.18 (1.65)	14.468; 0.001

Dryness of throat	2.89 (1.20)	3.47 (1.64)	3.26 (1.47)	15.362; <0.001
Throat tenderness	2.67 (1.50)	3.48 (1.93)	3.35 (1.82)	16.038; <0.001
Difficulty swallowing	2.79 (2.28)	3.03 (2.3)	3.00 (2.41)	2.430; 0.297
Speech difficulties	1.94 (2.38)	1.82 (2.41)	1.92 (2.66)	3.885; 0.143
Bad taste in the mouth	2.29 (1.29)	2.94 (1.39)	2.74 (1.26)	16.247; <0.001
Bad smell in the mouth	2.02 (1.33)	2.56 (1.62)	2.38 (1.6)	11.071; 0.004
Deterioration of the oral mucosa	2.74 (1.2)	4.20 (1.56)	4.00 (1.66)	56.000; <0.001
Moisture of lips	2.88 (1.07)	3.61 (1.42)	3.38 (1.36)	23.545; <0.001

* χ^2 – Friedman test

It seems that there is a weak positive correlation between blood urea nitrogen levels and the severity of thirst experienced by the patients on admission (rho=0.305; p=0.013), the third day (rho=0.258; p=0.036), and the seventh day (rho=0.351; p=0.004) of hospitalization. There is also a weak positive correlation between sodium values on the third day and thirst severity (rho=0.306; p=0.012). However, there is a weak negative correlation between SpO_2 values and thirst levels on the seventh day (rho=-0.298; p=0.015). No significant correlation was found between the follow-up results of other clinical characteristics and thirst levels (p>0.05) (Table 4).

Table 4. The relationship between the results of the 7 day follow-up of the clinical characteristics of the patients and the severity of thirst (n=66) *

Clinical characteristics	**0th day Thirst level**		**3rd day Thirst level**		**7th day Thirst level**	
	rho	**p**	**rho**	**p**	**rho**	**p**
Body temperature (°C)	-0.082	0.515	0.039	0.755	-0.152	0.222
Heart rate (beats/min)	-0.007	0.957	0.098	0.434	0.105	0.402
Systolic blood pressure (mmHg)	0.076	0.546	0.200	0.107	0.139	0.265
Diastolic blood pressure (mmHg)	0.022	0.863	0.235	0.058	0.035	0.782
SpO_2 (%)	-0.184	0.14	-0.110	0.380	-0.298	0.015
GCS score	-0.028	0.822	-0.040	0.75	-0.208	0.094
Na^+ (mEq/L)	-0.057	0.649	0.306	0.012	0.086	0.491
Cl^- (mEq/L)	0.010	0.936	0.015	0.902	-0.097	0.438
K^+ (mEq/L)	0.114	0.362	0.061	0.626	0.167	0.181
Hct (%)	-0.041	0.746	-0.105	0.402	0.105	0.402
BUN (mg/dl)	0.305	0.013	0.258	0.036	0.351	0.004

* rho – Spearman correlation analysis; GCS – Glasgow Coma Scale

It appears that the most frequently applied nursing interventions by nurses for 7 days were communication with the patient (range 98.5-100%), biochemistry control (100%), ventilation of the unit (100%) and lowering the temperature (100%). In addition, giving oral care was followed between 48.5% and 84.8% of the time, and increased oral intake was followed between 77.3% and 75.8% of the time (Table 5).

It seems that there was no significant difference between the severity of thirst at hospitalization and the nursing interventions applied on the day of hospitalization ($p>0.05$). However, there was a significant difference between the severity of thirst on the third day and the frequency of oral care on the third day ($Z=-2.162$; $p=0.031$), as well as between the severity of thirst on the seventh day and the frequency of increasing oral intake on the seventh day ($Z=-2.193$; $p=0.028$). There was no significant difference between the severity of thirst and the frequency of other nursing interventions performed on hospitalization, 3rd and 7th days ($p>0.05$).

Table 5. Nursing practices for thirst for 7 days in patients

Nursing practices	0th day n (%)	3rd day n (%)	7th day n (%)
Effective communication with the patient	65 (98.5)	65 (98.5)	66 (100)
Questioning the presence of thirst	36 (54.5)	45 (68.2)	44 (66.7)
Giving oral care	32 (48.5)	52 (78.8)	56 (84.8)
Using a humidifier	20 (30.3)	34 (51.5)	47 (71.2)
Wetting the lips	21 (31.8)	28 (42.4)	34 (51.5)
Evaluate your agitation	36 (54.5)	38 (57.6)	39 (59.1)
Biochemistry control	66 (100)	66 (100)	66 (100)
Increasing oral intake	51 (77.3)	51 (77.3)	50 (75.8)
Lowering the unit temperature	66 (100)	66 (100)	66 (100)
Venting the unit	66 (100)	66 (100)	66 (100)

Discussion

Thirst is a common stressor in the intensive care unit and can negatively impact the healing process and patient comfort. Nurses play a crucial role in addressing this issue by implementing interventions to manage thirst and its associated symptoms such as dry mouth, bad taste, and throat tenderness.[8,22,23] Effective communication with patients and monitoring of biochemical parameters such as blood urea nitrogen and

sodium levels are important in managing thirst. Additionally, interventions such as oral care and increasing oral intake can help alleviate symptoms associated with thirst.

This study evaluated the severity of thirst in intensive care patients and the nursing interventions for preventing thirst. The findings revealed that patients experienced mild to moderate thirst on the day of hospitalization and on the 3rd and 7th days after hospitalization. However, the severity of thirst increased significantly on the 3rd and 7th days compared to the hospitalization day ($p<0.05$). Previous studies by Leemhuis et al. reported moderate thirst in intensive care patients with 3.57 points, whereas VonStein et al. and Negro et al. reported severe thirst.[5,12,17] These results demonstrate that thirst is a significant problem for intensive care patients that cannot be overlooked.

The study found no significant changes in the vital signs and biochemistry results of patients, except for SpO_2 and GCS scores during the three follow-up periods. The mean SpO_2 and GCS scores of patients showed positive clinical improvements. The blood urea nitrogen value increased as the severity of thirst increased ($p<0.05$). Additionally, there was a positive correlation between sodium values on the third day and severity of thirst. However, the relationship between the severity of thirst on the seventh day and SpO_2 values was negative, with SpO_2 levels decreasing as the severity of thirst increased. It is important to note that the feeling of thirst occurs with a 1% increase in osmolality in the body. The increase in osmolality in the body affects the endocrine, renal, and nervous system functions and disrupts the fluid-electrolyte balance.[24] Hypernatremia is a symptom commonly observed in intensive care patients experiencing thirst due to physiological processes.[25] Previous studies have reported increased sodium and blood urea nitrogen levels as the severity of thirst increases.[5,16] Eren also reported that a decrease in the severity of thirst was accompanied by an increase in SpO_2 values among patients.[19]

The study found that on the day of hospitalization, and on the third and seventh days after hospitalization, thirst was accompanied by dryness of mouth, throat sensitivity, bad taste in the mouth, and deterioration of the oral mucosa at the highest rate ($p<0.05$). Dryness of mouth was found to be the most important symptom accompanying thirst in intensive care patients. The risk of dry mouth in intensive care patients increases due to factors such as old age, chronic diseases, oxygen therapy methods, dependence on mechanical ventilators, inability to express their wishes, and communication difficulties. Patients with dry mouth may experience irritation of the oral mucosa, tenderness in the throat, and bad taste and odor in the mouth, as reported in previous studies.[5,7,11] VonStein et al. reported severe dry mouth with a score of 6.68 in 103 intensive care patients.[12] Kjeldsen et al. used the phrase "I feel like I have a carpet in my mouth" when patients expressed dryness of mouth in their study.[11] In another study, Negro et al. emphasized that lack of oral hydration, use of high-dose diuretics, and failure to prevent dryness of mouth were the causes of thirst intensity in patients.[5] These findings suggest that thirst is often overlooked in intensive care patients, and there is a deficiency in the practices implemented to manage it. Zhang et al. concluded that better management of thirst perception, increased recognition of thirst symptoms, and interventions should be

implemented without increasing the nursing workload.[7] These findings suggest that the issue of thirst in ICU patients should be addressed with greater attention and improved measures are required to manage patients' thirst effectively.

Thirst is a crucial issue that patients in intensive care units often face, yet it may be overlooked due to the focus on other vital risks and intensive care procedures. However, thirst can have a significant impact on the healing process. Nurses are among the healthcare professionals who are directly responsible for addressing patients' thirst.[23,26] Li et al. noted that nurses' perceptions can be a barrier to identifying and addressing patients' thirst, as they may prioritize other more pressing issues and feel overwhelmed by workload and staffing shortages. As a result, they may fail to recognize thirst as a significant concern without patients explicitly expressing their discomfort.[15] We found that the most common practice among nurses to prevent thirst was to communicate with each patient. Since biochemistry control, ambient ventilation, and temperature regulation are already routine operations in clinics, communication is the most common practice after these.

The results suggest that oral care may be an effective intervention in relieving thirst in ICU patients. Studies have shown that oral care with menthol solution or sticks can alleviate dryness of mouth and improve the oral mucosa, which may in turn alleviate thirst symptoms.[16,18,19] The fact that nurses provided more oral care on the third and seventh days, and that this practice increased with the severity of thirst, suggests that nurses may recognize the importance of oral care in managing thirst in ICU patients. However, further research is needed to evaluate the effectiveness of different oral care interventions in relieving thirst and improving patient outcomes. The finding from this study suggests that nurses provide oral care to relieve thirst rather than prevent it. Previous studies have also investigated the effectiveness of oral care in reducing thirst, such as the study by Zhang et al. which found that the severity of thirst decreased on average from 6.59 to 5.42 with the use of oral care and lip moisturizing methods such as vitamin C spray and boiled chilled water.[7]

This study found that there was an effort to prevent thirst by increasing oral intake, which was increased on the seventh day compared to the day of admission. A significant correlation was found between the severity of thirst and the attempt to increase oral intake on the seventh day ($p<0.05$). The attempt of nurses to increase oral fluid intake to prevent thirst is an encouraging finding. Previous research has shown that the severity of thirst is lower in patients who receive oral hydration.[5]

Study limitations

There are several limitations to the present study. Firstly, the study was restricted to conscious patients, which may limit the generalizability of the findings to unconscious patients. Secondly, almost half of the sample consisted of COVID-19 patients, which may limit the generalizability of the findings to other types of patients. Moreover, the mean age of the patients may have limited the generalizability of the findings as

elderly patients may have different thirst levels and nursing practices compared to younger patients. Furthermore, the study was conducted in a single center, which may limit the generalizability of the findings to other settings. The study relied on self-reporting by patients, which may have introduced some bias. The study also did not investigate the impact of thirst management practices on patient outcomes, such as length of hospital stay or mortality. Finally, the study did not examine the impact of other factors, such as medications or comorbidities, on thirst and thirst management practices.

Conclusion

The study concluded that patients in the intensive care unit experienced significant symptoms of thirst that worsened during hospitalization. Furthermore, nursing practices were more frequent as patients' reported thirst levels increased.

In future research, a wider range of age groups could be included in the sample, and subgroup analyses conducted to control for the effects of age on thirst and nursing practices. Moreover, results could be compared with previous studies that included patients of different ages. Additionally, to increase generalizability, future studies could be conducted in multiple centers. Objective measures, such as biomarkers or physiological tests, could be utilized to assess thirst and management practices. The impact of thirst management practices on patient outcomes, such as length of hospital stay and mortality, could also be explored. Finally, the influence of other factors, such as medications and comorbidities, on thirst and thirst management practices could be investigated in future studies.

Declarations

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Author Contributions

Conceptualization, S.Ç.; Methodology, S.Ç.; Software, S.Ç. and E.K..; Validation, S.Ç; Formal Analysis, S.Ç. and E.K.; Investigation, M.Ş.; Resources, S.Ç. and M.Ş.; Writing – Original Draft Preparation, S.Ç., M.Ş. and E.K.; Visualization, S.Ç. and M.Ş.; Supervision, S.Ç.; Project Administration, S.Ç. and M.Ş.; Funding Acquisition, M.Ş.

Conflicts of interest

The author declares no conflicts of interest.

Data availability

Data will be made available on request.

Ethics approval

The study received ethical approval from the Social and Human Sciences Ethics Committee of the University on 07.01.2022/21.

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