Impact of Planned Nursing Care on Patient's Thirst and Mouth Dryness in the Intensive Care Unit

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Abstract

Background: Thirst and dry mouth are common problem in the intensive care unit (ICU) and these are associated with physical discomfort. Thirst should be treated as thirst persisting is associated with multiple complications **Aim** of study was to Evaluate the impact of planned nursing care on Patient's thirst and mouth dryness in the intensive care unit. **Research design**: A Quasi-experimental study design was used. **Setting**: the study was conducted in post-operative intensive care unit at Assiut main University Hospital. **Subjects:** Convenient sample of 60 patients were included in the study and they were assigned randomly to a control group and an intervention group. **Four tools** were used in this study: **I:** Patient assessment sheet, **II**: acute physiology and chronic health evaluation (APACHE II) Score, **III**: Thirst assessment sheet, **IV:** Oral Condition Assessment Checklist **Results:** The Planned nursing care was used had significant reduction of thirst intensity and dry mouth ($P<0.01$) for study group patients. The results showed that 31% of study group versus 9% of control group had no thirst and 68.4% of study group versus 99.9% of control group had mild thirst in the 5th day of study **Conclusion**: Planned nursing care with sterile cold-water spray and lubricating the lips with glycerin lip moisturizer were effective in reducing thirst intensity and mouth dryness. **Recommendations:** Provide continuous assessment of thirst and mouth dryness. Emphasize on educating nurses about the importance of management of thirst and mouth dryness the intensive care unit through planned nursing intervention

Keywords: Dryness, Mouth, Planned, Thirst

Introduction

Hospitalized individuals frequently report experiencing extreme thirst. Thirst "is a prevalent, intense, distressing, and under-appreciated symptom in intensive care patients" and is described as "a perception that provokes the urge to drink fluids." Thirst can be linked to dry mouth. Common sensations like thirst and dry mouth can negatively impact a patient's experience in the intensive care unit (ICU) **(VonStein et al., 2019)**

A homeostatic mechanism that affects water and salt balance is thirst. Both osmotic and hypovolemic stimuli can cause thirst, however hyper-osmolality is the main cause since the renin-angiotensin system and adrenergic activity must be triggered by a 10% drop in blood volume, regardless of osmolality. Antidiuretic hormone is thus released when cellular dehydration results in slight changes in blood osmolality. The feeling of thirst prompts the start of water intake when this compensatory mechanism is not working (**Margo ,2022).**

A number of factors, including mechanical ventilation, not eating or drinking anything, certain drug classes, and medical problems, can make patients in intensive care units more likely to have dry mouth and thirst. Little research has been done on non-pharmacological interventions to manage and minimize thirst and dry mouth in hospitalized adults, especially ICU patients, resulting in a lack of solid evidence for practice. Cold water was the most common approach, with a variety of application techniques **(VonStein et al., 2019)**

Due to the nature of critical illnesses and their treatments, such as dehydration or pharmaceutical side effects, it is impossible to prevent thirst in the intensive care unit. By identifying the many forms of thirst, nurses in intensive care units have the chance and duty to prevent and lessen thirst. Therefore, it is essential to understand nurses' perceptions of patients' thirst **(Li et al., 2022).**

Similar to pain, thirst cannot be treated until it is identified. Therefore, thirst is a symptom that is prevalent in clinical practice but is usually underappreciated by the medical staff, despite the fact that it is always noted in the reports of those who feel it **(Ahmad, 2019).**

Many internal and environmental causes, including hormones, nervous system activity, dietary habits and regimen, insufficient hydration intake, pathologic conditions, decreased saliva production, and drugs, are responsible for it. ICU patients experience thirst but are unable to express it because

of oxygen therapy, tracheostomy, prolonged endotracheal intubation, diminished consciousness, or facial masks. Other reasons of thirst in ICU patients include mechanical ventilation and hypoxia-induced mouth breathing **(Sayadi et al., 2021).**

Significance of the study

In patients in the intensive care unit (ICU), thirst is a common, severe, and upsetting sensation. According to research, among ICU patients, thirst is the most severe and second most prevalent symptom. The most common early post-surgical problems reported by patients in the Post-Anesthesia Care Unit (PACU) were dry mouth (35.4%) and pain (12.7%). Furthermore, 13% of these patients reported having continual thirst, and 60% reported having frequent thirst **(Li et al., 2022).**

Seventy-eight percent of patients in the intensive care unit (ICU) who had discomfort sensations reported having extreme thirst. Thirst sensations were present in more than 80% of critically ill patients receiving tracheotomy, and 70% of the 100 patients in the research reported moderate-to-severe thirst. Furthermore, the majority of respiratory intensive care unit patients who were chronically severely sick reported experiencing extreme thirst **(Lin, Li, Chen, & He, 2023)**

Although numerous studies indicate a prevalence of 71% regarding thirst in intensive care unit (ICU) patients, its prevention, detection, and management remain inadequately understood. While thirst has been studied in other patient populations, little study has been done on its causes in intensive care unit patients **(Negro et al., 2022)**

Aim of the study

The current study's aim was to evaluate the impact of planned nursing care on thirst and mouth dryness in the intensive care unit

The following research hypotheses were developed in order to achieve the aim:

- Patients who receive the planned nursing care will experience less thirst than patients who did not receive the intervention.
- Patients who receive the planned nursing care will experience less mouth dryness than patients who did not receive the intervention.

Patients and methods

Research design

A quasi-experimental research design was utilized in this study. This design is used to determine the impact of planned nursing care on thirst and mouth dryness in the intensive care unit without randomization

Setting

The study was carried out at Assiut University Hospital's post-operative surgical intensive care unit. Post-operative surgical unit is prepared and equipped with 6 beds

Subjects

A convenient sample of sixty adults was gathered from the previously mentioned settings.

Inclusion criteria: The following criteria were used to choose the subjects:

• Adults with conscious minds in the post-operative intensive care units (18 to 60 years) of both sexes. Patients receiving nothing per mouth (NPO)

Exclusion criteria

Recent oral surgery, Patients with psychogenic disorders, Pregnant women, and uncontrolled diabetic patients because diabetic patient differ from other patient due to the physiological changes that diabetes make in body as being very thirst and frequently urinating.

Tools for data collection

Four tools were used in this study.

Tool I: Patient assessment sheet: This tool was developed by the researcher after reviewing of related literature **(Adams et al,2020. Zengin et al ,2020). It** was used to assess patient profile and consisted of three parts**:**

Part I: **Personal characteristics** which includes patient code, age, sex, level of education, and body mass index(BM) which is derived from dividing the weight in Kg by squaring the height in meter

Part II: Clinical information such as previous medical history, diagnosis, duration of stay, vital signs (heart rate, respiratory rate, body temperature, systolic and diastolic blood pressure, mean ABP), CVP measurement, SPO2, fluid balance (liters per 24 hours), amount of time fasted before and after surgery, and type of surgery

Part III: Laboratory investigations: blood urea nitrogen BUN (mg/dl), blood sugar (mg/dl), serum Na (mEq/L), Hemoglobin level (g/dl), and White Blood Cells WBCs.

Tool II: APACHE II sore: used for patient assessment on admission, it consists of (Chronic organ insufficiency or immune-compromise history, Acute Renal Failure, age, body temperature, heart rate, blood pressure, respiratory rate, sodium level, potassium, creatinine, PH, PO_2, Hematocrit, white blood cells (WBCs), Glasgow coma scale) each one take score from +4 to +4 (from normal to abnormal).

Tool III: ***Thirst Intensity Scale*****:** A numeric rating scale NRS was adopted from **(VonStein et al., 2019)**. This tool was used to assess level of patient thirst

Scoring system: It scored from (0-10), it was used to measure thirst intensity before and after intervention in both groups

Furthermore, it encompasses whether or not thirst is present (yes/no). Patients were requested to rate their thirst intensity on a 10-cm VAS, with 0 indicating no thirst, and 10 indicating the worst thirst. The VAS score was classified as follows: mild (1-3), moderate (4-6) and severe (7-10). The Cronbach's alpha coefficient was 0.81.

Tool IV: ***Oral Condition Assessment Checklist***:

It was adopted from **(Ahmed et al., 2017),** who designed this tool after reviewing oral health assessment tool which developed by **Kim MY et al, 2012** who designed this tool. It was used to measure changes of oral condition as regards: lips, tongue, mucosa and saliva,

Scoring system: on a three-point scale, where a lower score indicates better oral health. Lips require 1degree if it is smooth, rosy and moist, two degrees if it is dry or cracked and three degrees if it is ulcerated. Mucosa receives a score of one if it is pink and wet, two if it is red or white coated, and three if it is ulcerated, bleeding or not. The score for saliva is one if it is watery, two if it is thick, and three if it is not present. As respects tongue, score of one if it is pink and papillae present, score of two if it has loss of papillae and score of three if it is cracked. Regarding the tongue, a score of one indicates that it is pink and has papillae; a score of two indicates that papillae have been lost; and a score of three indicates that it is cracked or blistering.

Methods

The study was conducted through three main phases: preparatory, implementation, and evaluation.

Preparatory phase

An official Permission was taken from the hospital's responsible authorities (head of anesthesia department and head of post-operative surgical ICU) to facilitate the study's implementation after explaining the aim of the study. Approval was obtained from the research ethical committee of the faculty of nursing affiliated with Sohag University emphasizing that there was no hazard to the study participants and that the study followed the (The ethical code was 218)

Tools development: The researchers developed the study tool depending on a review of the relevant literature

Validity & Reliability

Face validity of the data collection tools was reviewed by a panel of five experts in the field of critical care and emergency nursing and anesthesia. Also, its reliability was statistically examined. According to reliability, the instruments were tested and demonstrated good internal reliability as Cronbach′s alpha for thirst intensity scale was 0.89 compliant with oral condition assessment scale that was 0.96.

A pilot study

was carried out on six patients who satisfied the established selection criteria in order to evaluate the tool's viability and applicability, and no necessary adjustments were made.

Ethical considerations

The faculty of nursing's ethical committee gave its approval to the research proposal. There is no risk for study subjects during application of the research. The study was followed common ethical principles in clinical research. Formal written consent was obtained from patients that had willing to participate in the study, after explaining the nature and purpose of the study. Confidentiality and anonymity were assured. Research participants had the right to withdraw from the study at any time. The privacy of study participants was considered as data was being collected.

Data collection

Data collection was started from the end of March to the end of September 2024

implementation phase

The researcher presented herself to the staff and patients upon admission, outlining the purpose of the study (assessing thirst intensity and mouth dryness which applied for both study group and control group). The researcher assessed patient's level of consciousness. They were eligible if they are conscious. Personal characteristics data were obtained by using tool I (part I), clinical data assessed by using tool I (part II), and laboratory investigations obtained using tool I (part III) and were recorded in patient sheet.

The researcher asked the patient if he/she feels thirst; If so, the researcher used the Numerical Rating Scale (NRS) of thirst to gauge the degree of thirst (Tool III, part II) range from 0 (No thirst) to 10 (severe thirst) prior to normal care (for the control group) or intervention (for the research group) and recorded in thirst assessment sheet, also physiologic parameters were recorded for both groups. Oral Condition

assessment were done using tool IV. After that, intervention was done for the study group and routine care is given for control group.

For study group planned intervention was done; every two hours during the shift of first day up to five consecutive days to compare between data of each day with the following day and to obtain largest possible data that gives reliable results. patients were given sterile cold-water spray then the lips were lubricating with glycerin lip moisturizer.

For control group routine care was done, patients were given oral swaps of water upon request.

Evaluation phase

The study tool (questionnaire sheet) used in order to determine the intensity of thirst among critically ill patients, evaluate the effect of planned nursing interventions on relieving thirst and reducing mouth dryness. Reassessment of intensity of thirst using tool III and oral Condition assessment using tool IV were done for both groups after 30 min of intervention or routine care in both groups. Clinical data, laboratory investigations, also arterial blood gases were recorded by the researcher before and after planned intervention or routine care.

Data analysis

The Statistical Package for Social Science (SPSS) software version 20 was used for data entry and analysis since it includes the significance test that can be found in a typical statistical book. Collected data were summarized, tabulated and analyzed. Descriptive and inferential statistics were tested to examine the differences and similarities. Statistics were considered significant at P value (≤ 0.05).

Results

Table (1) shows Personal characteristics in both the intervention group and control groups. About 40 % of the intervention group and 27% of the control groups were between the ages of 36-50 years old. Regarding sex, age, and body mass index, there was no statistically significant difference between the two groups (P=0.42, P=0.28, &0.89respectively).

Table (2): Reveal health related data among study group and control group, no statistically significant difference between both groups in relation to medical diagnosis, past medical history, APACHII score, pre and post fasting time, type of surgery, but there was a statistically significant difference amount of blood loss P=0.03*

Table (3): demonstrates that there was no statistically significant difference between the study group and the control group as regard temperature, and pulse, but there was a highly statistically significant difference in relation to MABP on the 3rd and 5th day after intervention (P=0.01) and in relation to CPV on the first, third and fifth day after intervention P=0.009, 0.002, 0.005

Table (4): show that there was highly statistically significant difference between the study group and the control group regarding to condition of lips, tongue, mucosa and saliva on the first, third and fifth day after intervention P<0.001 in all days

Figure (1): show that 53% of study group patients and 50% of control group patients had no thirst, about 37% of study group and 33% of control group patients had mild thirst and 10% of study group patients and about 17% of control group patients had moderate thirst in the 1st day before intervention. Regarding to the 1st day after intervention, 30% of study group patients versus 23% of control group patients had no thirst, 70% of study group versus 60 % of control group patients had mild thirst, no patients in study group versus 16.7% of control group patients had moderate thirst. In the 5th day before intervention, 16% of study group patients versus 9% of control group patients, 84% of study group patients versus 63 % of control group patients had mild thirst, no patients in study group versus 13.6% of control group patients had moderate and sever thirst. In the 5th day after intervention 31.6% of study group patients versus 9% of control group patients had no thirst, 68.4% of study group patients versus 90.9% of control group patients had mild thirst

Results

Table (1):Distribution of Personal characteristics among study group and control group n=60

Items	Study		Control		P. value
	No.	%	No.	%	
Age					
18-35	9	30	7	23.3	0.422
36-50	11	36.7	8	26.7	
51-60	10	33.3	15	50	
Sex					
Male	9	30	13	43.3	0.284
Female	21	70	17	56.7	
Body Mass Index					
Normal wight	10	33.3	7	23.3	0.691
Overweight	14	46.7	16	53.3	
Obese	6	20	7	23.3	
Mean±SD	27.5±4.1		27.6±3.5		0.891
Range	22.3-34.9		22.5-33.3		

Independent samples T Test and Chi-square test,

* Statistically significant difference ($p<0.05$), ** Highly statistically significant difference ($p<0.01$).

Table (2) Distribution of Clinical data among study group and control group n=60

Items	Study		Control		P. value
	No.	%	No.	%	
Past medical history					
Hypertension (HTN)	3	10	5	16.7	0.32
Diabetes (DM)	10	36.7	8	26.7	
DM&HTN	8	26.7	10	33.3	
Heart Failure	9	20.0	7	23.3	
APACHE score					0.792
Mean±SD	8.57±3.03		8.9±3.9		
Type of surgery					
Hernia repair	5	16.6	7	23.3	0.32
Colostomy	7	23.3	8	26.6	
Liver surgery	6	20	8	26.6	
Appendectomy	8	26.6	4	13.3	
Abdominal exploration	4	13.3	3	10	
Pre-fasting time					
less than 12 hr	13	43.3	12	40	0.793
equal or more than 12 hr	17	56.7	18	60	
Post-fasting time					
8hr	9	30	16	53.3	0.259
12 hr	10	33.3	4	13.3	
24 hr	6	20	5	16.7	
more than 24hrs	5	16.7	5	16.7	
Operation time					
1-2hr	12	40	8	26.7	0.058
2-3hr	8	26.7	17	56.7	
≥3hr	10	33.3	5	16.7	
Mean ±SD					
Serum glucose	150±60		153±57		0.8
Mean ±SD					
Fluid intake L/24h	3.3±1.2		3.4±1.2		0.8
Fluid output L/24h	2.8±1.1		2.9±1.1		
Amount of blood loss					
No	12	40	8	26.7	0.8
less than 500cc	10	33.6	15	50	0.03
more than 500 cc	8	26.7	7	23.3	0.06

Independent samples T Test and Chi-square test,

* Statistically significant difference ($p<0.05$), ** Highly statistically significant difference ($P<0.01$).

Table(3): Comparison between study group and control group in relation to Vital signs n=60

Vital signs	1st day			3rd day			5th day		
	Study group	Control group	p-value	Study group	Control group	p-value	Study group	Control group	p-value
Temperature									
Before	37.83±0.83	37.85±0.74	0.922	37.67±0.87	37.67±0.99	1.000	37.69±0.54	37.81±0.84	0.621
After	37.62±0.52	37.78±0.56	0.237	37.56±0.64	37.72±0.9	0.492	37.51±0.39	37.47±0.51	0.830
Pulse									
Before	92.33±18.19	94.63±36.92	0.761	88.29±10.9	98.04±26.4	0.119	94.2±12.18	102.41±31.62	0.346
After	92.93±11.75	95.43±21.87	0.583	89.43±8.79	94.89±27.21	0.382	95.07±14.81	96.45±30.27	0.871
MABP									
Before	89.77±16	86.66±19.51	0.502	88.19±11.49	85.44±8.07	0.335	95.86±7.58	94.55±11.1	0.7
After	88.99±9.56	84.2±15.98	0.164	92.84±15.9	82.46±12.52	**0.01***	93.32±6.13	85.3±10.28	**0.010***
CVP									
Before	8.1±3.74	6.4±3.99	0.094	10.71±2.53	8.74±4.17	0.063	10±2.45	9.77±3.85	0.07
After	8.8±5.28	5.93±2.36	**0.009****	10.76±2.88	7.7±3.48	**0.002****	10.93±2.43	7.18±4.45	**0.005****

MABP: mean arterial blood pressure -Independent samples T Test - * Statistically significant difference (p<0.05), ** Highly statistically significant difference (p<0.01)

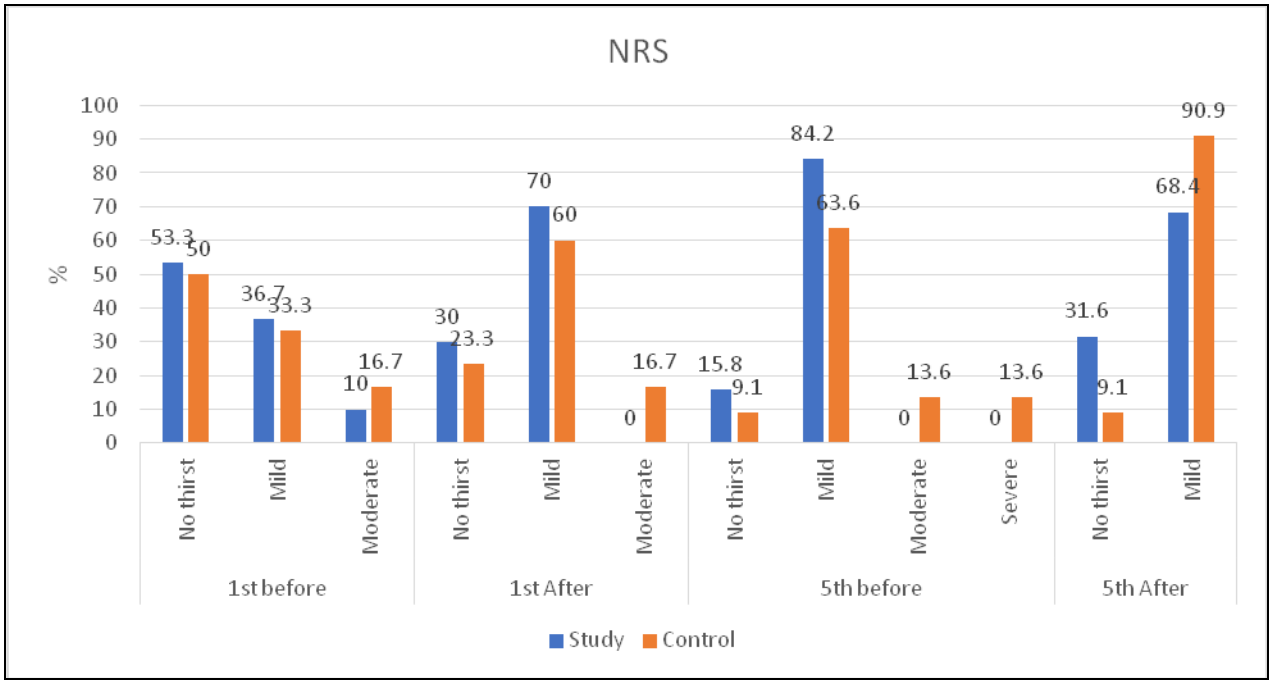
Table (4): Comparison between study group and control group in relation to Oral condition before and after intervention and routine care n=60

items	1st day			3rd day			5th day		
	Study group	Control group	p-value	Study group	Control group	p-value	Study group	Control group	p-value
Lips									
Before	2.07±0.78	2.13±0.82	0.749	1.6±0.67	2.03±0.76	**0.023***	1.63±0.72	1.97±0.76	0.087
After	1.3±0.47	1.9±0.8	**0.001****	1.57±0.68	1.8±0.76	**0.015***	1.1±0.31	1.77±0.82	**<0.001****
Tongue									
Before	2±0.79	2.1±0.84	0.637	1.53±0.68	2.07±0.83	**0.008****	1.77±0.73	1.7±0.79	0.736
After	1.33±0.48	1.83±0.75	**0.003****	1.5±0.69	1.7±0.75	**0.005****	1.07±0.25	1.5±0.77	**<0.001****
Mucosa									
Before	1.93±0.83	2±0.79	0.750	1.6±0.56	1.97±0.81	0.046	1.43±0.57	1.97±0.81	**0.005****
After	1.07±0.25	1.7±0.79	**<0.001****	1.5±0.57	1.83±0.79	0.193	1.1±0.05	1.53±0.73	**<0.001****
Saliva									
Before	1.93±0.83	2±0.79	0.750	1.7±0.65	2±0.79	0.113	1.53±0.72	2±0.79	**0.021****
After	1.1±0.31	1.9±0.71	**<0.001****	1.43±0.63	1.93±0.78	**0.008****	1.12±0.11	1.67±0.66	**<0.001****

Independent samples T Test

* Statistically significant difference (p<0.05), ** Highly statistically significant difference (P<0.01).

Figure1: comparison between study group and control group in relation thirst intensity by numeric rating scale NRS



Discussion

Dry mouth and excessive thirst are the most distressing factors that usually afflict intensive care unit patients. Particularly, individuals receiving cancer treatment and surgery have increased thirst compared to healthy patients. In intensive care unit patients, managing thirst is the key to lowering oral health problems and easing dry mouth and thirst, both of which negatively impact the patient's health **(Abo et al., 2024).** Finding out how glycerin lip moisturizer and cold-water spray affected mouth dryness and thirst in the intensive care unit was the goal of this study.

The findings of the present study indicate that there was no statistically significant difference in body mass index, age, or sex between the study group and the control group. This is in the line with **(Doi et al., 2021)**, who found that there was no significant difference in the risk factors investigated in their study. Also agree with **(Lin, Li, Chen, & Mm, 2023)** who reported that no significant differences were observed in age, sex,

The current study shows that there was no statistically significant difference between control and study groups regarding to the health-related information as past medical history, APACHEII score, Pre and Post-fasting time, type of surgery, serum glucose level and operation time. This is in the line with **(Zhang et al., 2022)**, who found no statistical difference between control and study groups in relation patient health data as APACHEII score, serum electrolytes and blood glucose.

The current study shows that the majority of study group patients and control group patients had experienced pre-fasting time for about 12hr.This is standard procedure in our hospitals to reduce difficulties from anesthesia and adverse effects on the digestive system. This was in agreement with **(Abo et al., 2024)**, who reported that most of patients in intervention group and control group has pre-operative fasting time more than 12hrs. The finding was against **(Coutinho, 2024)**,who found that no association between pre-fasting time and post-operative complications as patient's thirst

According to the current study's findings, there was no statistically significant difference between the two groups, with half of the control group and one-third of the study group experiencing postoperative blood loss of more than 500 cc. Blood loss contribute in thirst feeling and dry mouth after surgery. This agree with **(Taghavi, 2024)**, who stated that Patients experiencing volume depletion may have orthostatic hypotension, cramping in their muscles, and/or thirst.

Study results shows patients' vital signs with no statistically significant difference between control and study groups before and after intervention regarding to body temperature and pulse but there was highly significant statistical difference in relation to mean arterial blood pressure and central venous pressure after intervention. This can be attributed to blood loss

during surgery which can lead to body fluid imbalance which in turn reflected in the values of mean arterial blood pressure and central venous pressure. This finding was agree with **(Lin, Li, Chen, & Mm, 2023)** regarding body temperature and against him in relation to CVP and MAP as he found no significant difference between both groups of research in relation to body temperature ,systolic and diastolic blood pressure, BMI and central venous pressure.

Results of this study present that the mean score of each element related to the oral condition was highly statistically significant lower in study group than that of control group after intervention in the first, third and fifth day of study work showing gradual improvement in oral condition status, this reflect the effect of the intervention that was performed. This is in the line with **(Nayera et al., 2024),** who reported that hydrating gel gave positive results in controlling symptoms of oral dryness. Also in the line with **(Abo et al., 2024)**, who reported that total oral condition scores were statistically significantly lower in the intervention group compared to the control group. Also in the line with **(Metyazidy,2024.),**who reported significant improvement among studied group in relation to mouth dryness. Additionally, in keeping with **Sharma, 2020**, who found that when thirst bundles are applied to admitted patients in intensive care units, mouth dryness considerably decreases (in the experimental group).

The present study shows that there was a decrease in the intensity of thirst from moderate thirst intensity before intervention to mild and no thirst degree after intervention with significant difference between both groups. This is due to the fact that study interventions provided beneficial treatment for thirst. This is consistent with **(Abo et al., 2024)**, who found that there was a decrease in the intensity of thirst from severe to mild degree along the time of study after implementing the thirst bundle steps. Also, in the line with **Sharma, 2020** who reported that level of thirst significantly falls (in experimental group) after applying thirst bundle among admitted patients in ICUs.

Conclusion

Patients in the study group showed a statistically significant improvement in their intensity of thirst and mouth dryness following the planned intervention, with the use of sterile cold-water spray then the lips were lubricating with glycerin lip moisturizer demonstrating the better improvement when this maneuver.

Recommendations

In accordance with the study's conclusions, the following suggestions were offered:

Planned nursing care with sterile cold-water spray and lubricating the lips with glycerin lip moisturizer should be a part of routine nursing care in intensive care units. Additionally, the further studies should be repeated on lager samples

Limitations

The study had limitations because of small sample size, which could restrict how broadly the findings can be applied.

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