

Effectiveness of an Intervention Bundle on Thirst Intensity and Dry Mouth among Patients Admitted in ICU

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ABSTRACT

Background: Thirst and dry mouth are frequent impelling desire or need to drink water or any fluid. Intensive care unit (ICU) patients are exposed to many sources of distress. “Intensive care patients report thirst intensity as one of the most distressful of 10 symptoms; thirst is rated as the second prevalent symptom among patients. Thirst and Dry mouth are being the most neglected stressors during nursing care in ICU. There are multiple factors which drive the sensation of thirst in ICU: fasting, drugs used during anesthesia, endo tracheal intubation, surgical intra operative bleeding, dehydration, patients' age, treatments with drugs like diuretics, sedatives, high dose antibiotics, analgesics which stimulate the physiology of thirst and enhance it. With this background, systematic literature search was carried out.

Objective: To collect the data and review various studies.

Methodology: The study design was systematic review. The study includes the studies those which are related to occurrence of thirst and dry mouth among patients, predictors of thirst and dry mouth among patients and interventions to reduce thirst and dry mouth among patients.

Analysis: Studies were identified through searches of MEDLINE, PUBMED, Elsevier and Google Scholar. Abstracted information is about the study design, interventions and outcomes.

Conclusion: This systematic review has concluded that intervention bundle consisting of more than one intervention is significantly effective in reducing thirst and dry among patients admitted in ICU.

Key words: Thirst, Dry Mouth, Intervention Bundle

INTRODUCTION

Thirst and dry mouth are frequent compelling desire or need to drink water or any fluid. ^[1] Intensive care unit (ICU) patients are exposed to many sources of distress. ^[2] “Intensive care patients report thirst intensity as one of the most distressful of 10 symptoms; thirst is rated as the second prevalent symptom among patients. Thirst and Dry mouth are being the most neglected stressors during nursing care in ICU. There are multiple factors which drive the

sensation of thirst in ICU: fasting, drugs used during anesthesia, endo tracheal intubation, surgical intra operative bleeding, dehydration, patients' age, treatments with drugs like diuretics, sedatives, high dose antibiotics, analgesics which stimulate the physiology of thirst and enhance it. ^[3]

During stay in an Intensive care unit the patients often report their desire to drink fluids, but most of the time it remains undocumented by nurses, patients feel more distress and discomfort during their stay due

to thirst intensity. Most of the nurses do not assess the patients for thirst and dry mouth, which by and large lead to some severe complications like: increase in intensity of pain and dyspnea. Osmoreceptors are present in the mouth and the esophagus respond to chemical, tactile, pressure and temperature stimuli and ingestion of cold liquid in the mouth can reduce the perception of thirst. The fact indicates that cold fluids reduce thirst with more effectiveness than hot or warm fluids. [4]

Nurses and physicians usually carry the perception that nothing can be done to overcome thirst and dry mouth. Also, it remains undocumented by and neglected in critical areas of hospital. [5] As far by now, no permanent assessment strategies are being carried off to assess thirst and dry mouth. This highlights the fact that there is a lack of database interventions in hospitals to reduce the intensity and distress of thirst and dry mouth. [6] There is an alarming need to view and observe thirst and dry mouth as distressful symptoms and by keeping that as one important factor.

MATERIALS AND METHODS

Research Design: Systematic Review

Inclusion Criteria: The study includes the studies those which are related the assessment of thirst and dry mouth among ICU patients, predictors which increases thirst and dry mouth and interventions to relieve thirst and dry mouth.

Data Analysis: The data was grouped and analyzed in terms of Meta analysis. Relevant articles based on thirst and dry mouth among ICU patients and interventions were identified by search of significant articles. PubMed/Medline, SCOPUS, CINAHL, PsychoINFO, Elsevier and Google Scholar with the following key words: thirst, dry mouth, intervention bundle.

RESULTS

A systematic review was done to assess effectiveness of intervention bundle on thirst and dry mouth among ICU

patients. Total 50 studies were selected for review out of which 20 were found appropriate for systematic review. Data was divided into three different sections.

LITERATURE RELATED TO OCCURRENCE OF THIRST AND DRY MOUTH

A Prospective study was done to characterize Self-reported symptom experience of critically ill cancer patients receiving intensive care with a present or past diagnosis of cancer and was consecutively admitted to a medical ICU during an 8-month period. This study was done at tertiary-care, urban medical center. A sample size of One hundred cancer patients treated in a medical ICU was taken. Data was collected by using the Edmonton Symptom Assessment Scale (ESAS). The ratings of pain or discomfort associated with ICU diagnostic/therapeutic procedures and of stress associated with conditions in the ICU were assessed. The results of the study revealed that Hospital mortality for the group was 56%. Fifty patients had the capacity to respond to the ESAS, among whom 100% provided symptom reports. Between 55% and 75% of ESAS responders reported experiencing pain, discomfort, anxiety, sleep disturbance, or unsatisfied hunger or thirst that they rated as moderate or severe, whereas depression and dyspnea at these levels were reported by approximately 40% and 33% of responders, respectively. The study also suggested that Significant pain, discomfort, or both were associated with common ICU procedures, but most procedure-related symptoms were controlled adequately for a majority of patients and Inability to communicate, sleep disruption, and limitations on visiting were particularly stressful among ICU conditions for patients. The study suggests more effective strategies for symptom control and direct decisions about appropriate use of ICU therapies. [7]

A Prospective, observational study on symptoms experienced by intensive care unit patients at high risk of dying was done. The study was conducted in two intensive

care units in a tertiary medical center in the western United States. The sample size of One hundred seventy-one intensive care unit patients who were at high risk of dying. The data was collected by interview technique by interviewing patients every other day for up to 14 days. Patients were asked to rate the presence, intensity (1 = mild; 2 = moderate; 3 = severe), and distress (1 = not very distressing; 2 = moderately distressing; 3 = very distressing) of ten symptoms (that is, pain, tired, short of breath, restless, anxious, sad, hungry, scared, thirsty, confused). The Confusion Assessment Method–Intensive Care Unit was used to ascertain the presence of delirium. A total of 405 symptom assessments were completed by 171 patients. The study measured the results that Patients' average age was 58 ± 15 yrs and 64% were males. Patients were mechanically ventilated (34%) of the 405 assessments, and 22% died in the hospital. Symptom prevalence ranged from 75% (tired) to 27% (confused). Thirst was moderately intense, and shortness of breath, scared, confusion, and pain were moderately distressful. Delirium was found in 34.2% of the 152 patients who could be evaluated. Delirious patients were more acutely ill and received significantly higher doses of opioids. Delirious patients were significantly more likely to report feeling confused (43% vs. 22%, $p = .004$) and sad (46% vs. 31%, $p = .04$) and less likely to report being tired (57% vs. 77%, $p = .006$) than non delirious patients. The Study findings suggest that unrelieved and distressing symptoms are present for the majority of intensive care unit patients, including those with delirium.

A qualitative study was done to explore patients' experience of thirst while being conscious and mechanically ventilated at Denmark. This hermeneutic study used qualitative interviews of 12 patients. The data were analyzed based on content analysis. Interviews were conducted between September and October 2014 in two large ICUs in Denmark. The results of the study suggested identification of Four

themes relating to the patients' experiences of thirst during MV: a paramount thirst, a different sense in the mouth, deprivation of the opportunity to quench thirst and difficulties associated with thirst. The study also concluded that Patients associate feelings of desperation, anxiety and powerlessness with the experience of thirst. These feelings have a negative impact on their psychological well-being. A strategy in the ICU that includes no sedation for critically ill patients in need of MV introduces new demands on the nurses who must care for patients who are struggling with thirst. ^[8]

A qualitative study was conducted to assess perceptions of the nursing team regarding thirst in surgical patients at large university hospital in southern Brazil. The study assessed the perception of the nursing team in patient units with respect to thirst in surgical patients and the factors that interfere with the implementation of management strategies. Qualitative descriptive study design was used with sample size of 12 nursing technicians of a university hospital. The selection of the sample considered participants' willingness to participate in the survey and the data saturation in the discourses collected. Data collection was performed using a semistructured interview with the questions for e.g. What are the greatest discomforts that the patients feel during the pre-and postoperative period? How do you detect that the patients are thirsty? What makes surgical patients feel thirsty? What is your behavior in the face of the discomfort caused by thirst reported by the patients? and How do you feel about providing care to surgical patients who are thirsty? The Discourse of the Collective Subject method was used for the analysis and the categories established were: thirst – a little valued discomfort; perceiving patients' thirst; and performing in the face of thirst. The study concluded that the nursing technicians did not regard thirst as a primordial discomfort, making it an undervalued, underreported and unsystematically assessed symptom.

For the management of thirst, they did not use evidence-based strategies due to the lack of knowledge about the topic and fear of possible complications. The study also focused on need of continuing education actions aimed at sensitizing the professionals for intentional assessment and intervention in surgical patients who suffer from thirst without being cared. The study also stated that Thirst is an important discomfort usually undervalued from the perspective of nursing care. Within the work routine, the nursing technicians identified visible and objective discomforts in the surgical patients, such as pain, hypothermia and nausea. However, subjective discomforts, such as thirst, were often unnoticed. According to study, thirst is regarded as a common suffering that the patients had to undergo within an institutional routine strongly characterized by the culture of prolonged and total fasting. The staff nurses are able to recognize the severity of thirst as discomfort in the patients, despite of that they did not record nor assessed thirst. The nursing technicians used management strategies in an empirical manner but there was no updating management done. It also has been concluded that thirst produced compassion in the nursing just like pain but valued less. [9]

LITERATURE RELATED TO PREDICTORS OF THIRST AND DRY MOUTH

A descriptive cross-sectional study was conducted to identify predictors of the presence, intensity, and distress of thirst in ICU patients at university of California San Francisco, USA. The sample size was of 353 patients taken from three ICUs (medical-surgical, cardiac, and neurological). The data was collected by using numeric rating scales. The Predictor variables in study were demographic (e.g., age), treatment-related (e.g., opioids), and biological (e.g., total body water). The study results revealed that Thirst presence was increased by high opioid doses (≥ 50 mg), high furosemide doses (> 60 mg), selective

serotonin reuptake inhibitors, and low ionized calcium and Thirst intensity was increased by patients not receiving oral fluid and having a gastrointestinal (GI) diagnosis whereas Thirst distress was predicted by mechanical ventilation, negative fluid balance, antihypertensive medications, and a GI or “other” diagnosis. Predicted probabilities of thirst presence from the final model correlated with thirst presence ($r = 0.306$) and predicted 9.4% of the variance in the presence of thirst. The study concluded that Thirst presence is initiated by selected medications (e.g., opioids). Thirst intensity and/or thirst distress is initiated by other treatments (e.g., mechanical ventilation) and medical diagnoses (e.g., GI). The study concludes that it is one of the first studies describing predictors of the multidimensional characteristics of thirst. [20]

A cross-sectional observational study was performed on terminally ill cancer patients receiving inpatient hospice care at Seirei Mikatabara Hospital, Hamamatsu, Shizuoka, Japan. A sample size was 88 patients admitted for palliative care were taken. Patients were asked to report intensity of thirst on a visual analogue scale (VAS). The researchers prospectively evaluated factors that might potentially be contributing to the symptom. The results of the study showed that the mean VAS score for thirst was 5.0 ± 2.8 , and 18% of the patients complained of severe thirst with a VAS score of $>$ or $= 8$. Researchers didn't find significant relationship between the VAS score for thirst and the values of total protein, blood urea nitrogen (BUN), creatinine, sodium, osmolality, hematocrit, atrial natriuretic peptide (ANP), and biochemical dehydration defined by the levels of BUN, creatinine, sodium and osmolality. Whereas dehydration defined by ANP level ($<$ or $= 15$ pg/ml), hyperosmolality ($>$ or $= 300$ mosmol/kg), gastrointestinal cancer, survival, performance status, oral intake, vomiting, and stomatitis were significantly associated with the severity of thirst. The study also concluded that mouth breathing and opioids

were determined to be a potential clinical cause of severe thirst. The findings of the study states that the sensation of thirst is associated with dehydration, hyperosmolality, poor general conditions, stomatitis, oral breathing, and opioids. Therefore, there is a need for careful assessments and treatment of underlying causes is important to alleviate patients' thirst distress. [10]

A descriptive study was done to determine the prevalence of xerostomia and hyposalivation in Haemodialysis (HD) patients in Spain. The sample size for the study was 50 Haemodialysis patients. The data were collected by a questionnaire containing demographic and clinical variables, a visual analogue scale (VAS) for xerostomia, IDWG (intra dialytic weight gain) and an oral health impact profile questionnaire (OHIP-14). Unstimulated whole saliva (UWS) and stimulated whole saliva (SWS) were also collected by researchers. The results of the study concluded that around 56% patients suffered xerostomia and it was associated with hypertension (OR, 5.24; 95% CI, 1.11-24.89) and benzodiazepine consumption (OR, 5.96; 95% CI, 1.05-33.99). The mean xerostomia VAS and OHIP-14 scores were 31.74 ± 14.88 and 24.38 ± 11.98 , respectively. No significant relationship was observed between IDWG% and VAS and OHIP total score. However, a positive significant relationship between VAS level of thirst and IDWG% was found ($r=0.48$ $p=0.0001$). The study revealed that Xerostomia in Haemodialysis has a multifactorial aetiology due to accumulative risks as advanced age, systemic disorders, drugs, fluid intake restriction, and salivary parenchymal fibrosis and atrophy. Therefore, it is important to detect possible xerostomia risk factors to treat it in haemodialysis patients and to avoid systemic complications. [11]

An observational study was done to analyse the clinical significance and related factors of thirst and xerostomia and to find methods to alleviate thirst and xerostomia in

maintenance hemodialysis (MHD) patients Fudan University, Shanghai, China. The sample consisted of Forty-two MHD patients and eleven patients were enrolled for crossover trial. Data was collected by using 100-mm visual analog scales (VAS) and dialysis thirst inventory (DTI) for assessment of thirst, whereas xerostomia was assessed by VAS and xerostomia inventory (XI). Depression, kidney disease quality of life (KDQOL), salivary flow rates and inter dialytic weight gain (IDWG) were also measured. The data were analyzed by ANOVA and correlation coefficient was used to assess the correlations between continuous variables. The results of crossover trial showed significant positive relationship among DTI, VAS thirst score, XI and VAS xerostomia score were ($P=0.000$). Daily IDWG had significant positive relationship with VAS thirst score ($r=0.315$, $P=0.042$) and DTI ($r=0.391$, $P=0.010$). UWS (unstimulated whole saliva) was negatively correlated with VAS xerostomia score ($r=-0.308$, $P=0.048$). Residual urine output had negative relationship with DTI ($r=-0.402$, $P=0.008$), VAS xerostomia score ($r=-0.461$, $P=0.002$) and XI ($r=-0.403$, $P=0.008$). In the crossover trial, DTI, XI, IDWG2d, IDWG3d, VAS thirst and xerostomia score were significantly reduced by the use of chewing gum ($P=0.000$, 0.001 , 0.009 , 0.017 , 0.038 , 0.001). The VAS thirst score, DTI and IDWG3d were significantly reduced by receiving straw ($P=0.016$, 0.003 , 0.049). The study concluded that Thirst and xerostomia might affect the quality of life in MHD patients and use of chewing gum and straw could decrease thirst and IDWG among patients. [12]

LITERATURE RELATED TO INTERVENTIONS TO REDUCE OF THIRST AND DRY MOUTH

A randomized clinical trial study was done to assess the effectiveness of intervention bundle to decrease thirst intensity and dry mouth among ICU patients at University of California, USA. A total of 252 cognitively intact patients were asked to

report thirst intensity or thirst distress and dry mouth on numeric rating scales (NRS), patients with scores ≥ 3 on 0-10 scale were randomized to intervention or usual care groups. Intervention bundle administered to the intervention group: oral swab wipes, sterile ice-cold water sprays, and a lip moisturizer, and thirst intensity and dry mouth scores were observed among patients in the usual care group. Multilevel linear regression determined that the average decreases in TI and TD scores from pre-procedure to post-procedure were significantly greater in the intervention group (2.3 and 1.8 NRS points, respectively) versus the usual care group (0.6 and 0.4 points, respectively) ($p < 0.05$). The usual care group was 1.9 times more likely than the intervention group to report dry mouth for each additional session on day 1.

An experimental study was conducted to evaluate the effectiveness of ice chips on intensity of thirst and fluid intake in patients undergoing hemodialysis at Mashhad University of Medical Sciences, Mashhad, Iran. Cross-over study design with sample size of 49 patients was taken. Patients were randomly divided into two groups of A and B. Both groups were trained on how to complete the check lists, measurement of liquids and fluid intake at intervals between sessions. Afterward, group A was trained about the use of alternating liquid and ice and registered in the check List and group B only about taking up the liquids and registered in the check List. In addition, the intervals between two dialysis sessions were reminded to patients by researcher by SMS for intervention and completion of the check List. Sixth week, intervention between two groups was moved. In all these sessions, intensity of thirst measured before and after and at the middle of each dialysis session. The results of the study revealed that there was no significant differences between the use of ice chips with severity of thirst ($p=0.806$). Ice chips decreased fluid intake from 2375.4 ± 654.2 to 2112.9 ± 656.4

($p < 0.001$), but frequency thirst increased from 12.2 ± 3.7 to 16.5 ± 5.4 ($p < 0.00$). The study concluded that Ice chips had no effect on the intensity of thirst in patients undergoing hemodialysis despite increasing the frequency of thirst but result in reducing fluid intake. [13]

A randomized clinical trial was done to investigate the effect of chewing gum or a saliva substitute on xerostomia, thirst and interdialytic weight gain among patients undergoing haemodialysis. A sample size of sixty-five Haemodialysis patients (42 men, 54.6 ± 14.1 years; 23 women, 54.7 ± 16.3 years) was taken in the study. The tools used to assess Xerostomia and thirst were validated questionnaires as xerostomia inventory (XI) and dialysis thirst inventory (DTI), at baseline and after each treatment period, as were IWG and salivary flow rates. After the use of chewing gum or saliva substitute for 2 weeks, a wash-out period of 2 weeks was introduced and thereafter the other regimen was carried out. The results of the study suggested that Chewing gum decreased XI from 29.9 ± 9.5 to 28.1 ± 9.1 ($P < 0.05$). Chewing gum as well as a saliva substitute reduced DTI significantly ($P < 0.05$), but no differences occurred for the average IWG or salivary flow rates. The study concluded that use of chewing gum and, to a lesser extent, a saliva substitute may alleviate thirst and xerostomia in some HD patients. [14]

An experimental and cross sectional study to evaluate simple and safe strategies to mitigate thirst in the immediate postoperative period (IPO) at large university hospital, a regional reference center for burns and trauma, Loderina, Brazil. The sample size consisted of 133 patients in the Post- Anesthesia Care Unit (PACU) who underwent surgical procedures during the research period. The inclusion criteria for the composition of the sample included: patients aged between 18 and 70 years, with ASA I, II or III, undergoing any surgical procedure; patients were alert / oriented, with localized pain, glottal reflex was present, spontaneous breathing on room

air with O₂ saturation greater than 94%; patients who were able to verbalize thirst in the immediate postoperative period (IPO) and authorization was obtained from the responsible anesthesiologist to administer water or ice; patients accepted and signed the Terms of Free and Informed Consent preoperatively. Data Collection was done by using an instrument developed by the authors based on the objectives proposed in this study, which was divided into three parts: the first, to understand demographics and hospitalization of the patient, followed by the questionnaire with data relevant to the IPP (surgery date, time of entry into the operating room (OR), type of surgery, type of anesthesia, use of medications that interfere with the sensation of thirst, complications during surgery, and departure time from the OR). The third included the period of recovery from anesthesia and determination of the verbalization of thirst and its measurement, authorization by the anesthesiologist for the administration of water or ice, and the consequent administration of these to the patient. In order to measure the intensity of thirst in surgical patients, numeric rating scale was used from range of 1 to 10. The results of the study suggested that 96 (75%) patients reported thirst. The preoperative fasting period varied from 8 to 37 hours, and there was no association between the type of anesthesia, bleeding, fasting time and thirst. The intensity of initial thirst was 5.1 for the water group, and 6.1 for the ice group. The methods tested were effective in relieving thirst in the Immediate Post Operative period. The ice group had a final intensity of 1.51, as compared to 2.33 in the water group. Two (2.2%) patients experienced vomiting during the study. And also there was a significant difference in the first moment, before the administration of water or ice, when the sensation of thirst was higher in the Ice Group than in the Water Group ($p = 0.2344$). After the first dose of water or ice, there was an important and significant fall in intensity of thirst of both the Water and Ice groups, with no

significant difference of this magnitude between the two ($p = 0.56$). The study concluded that Thirst is a real discomfort and causes great suffering in the patient.^[7]

A Randomized Clinical Trial was done to determine the effect of an early liberal regimen of ice chips and water on adverse events and thirst after cardiothoracic surgery. A sample of 149 patients from an 18-bed CTICU was taken. Patients were randomized to usual care group (6-hour fast post-extubation) and liberal regimen during the pre-operative visit. The researchers assessed patients after fasting 1 hour post-extubation, patients in the liberal regimen with a 6-item protocol for oral intake readiness, and administered ice chips and advanced to water. The results of the study shows that mean age was 66 ± 12.4 years and majority of patients were male (73.8%), two groups were equivalent except for the post-operative mean dose of ketorolac that was higher in the UC group ($p = .04$). The result shows no differences in nausea, vomiting, or dysphagia between the UC vs. liberal group, and no aspiration pneumonia. Thirst levels were higher in usual care group after extubation. In analysis adjusted for relevant demographic and clinical variables (logistic regression), patients in the liberal group were less likely to report high thirst levels, compared with UC patients ($B = -.299$, $OR = .273$, 95% CI .118-.630). Patients in the liberal group reported high thirst levels, compared with UC patients ($B = -.299$, $OR = .273$, 95% CI .118-.630). The study also concluded that early initiation of ice chips and water post-extubation after CT surgery was not associated with adverse events, but was associated with significantly less thirst. In appropriate patients, early oral intake can reduce thirst.^[15]

A quasi-experimental study was conducted to compare the effectiveness between wet gauze with cold normal saline and wet gauze with cold water on post operative thirst and oral cavity condition experienced by patients at Dong A university, Korea. The sample size of 56

participants and data were collected using visual analog scale for thirst, oral assessment guide for oral cavity condition and acidity tape for saliva pH. The scores were taken before applying the gauze and at 15min, 30min, and 45min after applying gauze. The experimental group received wet gauze with cold normal saline, and control group received wet gauze with cold water for three times at 15 minute intervals. Data were analyzed using repeated measured ANOVA. Thirst, oral cavity condition, and saliva pH improved in both groups with increasing number of gauze application. Thirst for the experimental group improved more than for the control group ($F=4.29$, $p=.009$), oral cavity condition except saliva, and saliva pH were not significantly different between the groups. The study concluded that nurses can apply wet gauze with cold normal saline to reduce thirst and saliva acidity, and also to improve the oral cavity condition for postoperative patients. [16]

An experimental study was done to identify the effects of cold water gargling on thirst, oral cavity condition and sore throat in orthopedics surgery patients who underwent general anesthesia at Dong University, Korea. The study was done in post operative unit. The design for the study was Pretest-posttest non-synchronized design with a nonequivalent control group. The sample size of 52 participants was selected conveniently and assigned randomly to experimental and control group. The experimental group gargled hourly with cold water for 8 hours after operation. The control group received wet gauze as needed. The thirst, oral cavity condition and sore throat was assessed and compared at 0, 2, 4 and 8 hours after operation. The study revealed that the score of thirst and oral cavity condition was lower in the experimental group than in the control group. The study concluded that there were no significant differences in the levels of sore throat between the experimental and control group. The findings also suggest that cold water gargling can be a useful nursing

intervention for alleviating thirst and improving oral condition for patients with orthopedic surgery after general anesthesia. [17]

A quasi-experimental study was done to examine the effects of using gauze frozen with normal saline or ice on thirst-relief and oral condition of laparoscopic cholecystectomy patients at Chosun University Hospital, Gwangju, Korea. The design of the study was nonequivalent control group, pretest-posttest design and sample size was 53. Patients received either gauze frozen with normal saline ($n=17$), ice ($n=18$) or wet gauze ($n=18$) for thirst-relief. The subjective thirst level and oral condition of the participants were assessed before the intervention, 15 min after the first intervention and 15 min after the second intervention. The results of the study showed significant differences in thirst level among the groups. When oral care was provided twice, the oral condition of tongue, saliva, mucosal membrane, and gingiva was improved in patients receiving gauze frozen with normal saline or ice. The study also concluded that Gauze frozen with normal saline and ice can be effective for oral care in reducing the thirst level and improving the condition of the oral cavity. [18]

A quasi experimental study was done which compared the effectiveness of oral care with ice cold saline versus room temperature saline on thirst and oral condition among post-operative patients undergone abdominal surgeries at GGS hospital, Faridkot, Convenience sampling technique has been used to allocate the study subjects. A sample of 60 patients who had undergone abdominal surgeries was taken. Subjective thirst scoring and objective oral assessment (with room temperature saline in group I and ice cold normal saline in group II), pre and post intervention was done. The tool used was a structured questionnaire enquiring demographic and bio physiological profile, numeric rating scale (NRS) for thirst assessment and objective oral assessment tool for assessing oral conditions. The study

findings revealed that the mean score of the thirst levels of the subjects in the ice cold saline group experienced less thirst after the intervention as compared to the subjects in room temperature saline group. The paired t test value 5.37 of the subjective thirst assessment was found to be statistically significant at 0.00 level. The study focused on the need for adopting modified oral care procedures such as use of ice cold saline for effective thirst management in post operative patients. [19]

A Randomized clinic trial was done to determine the safety and tolerability of early oral rehydration compared with delayed oral rehydration after general anesthesia at West China Hospital, Sichuan University, China. One thousand anesthesiology (ASA) I to III adult patients undergoing non-gastrointestinal surgery with general anesthesia were randomly assigned into two groups: DOH (n=500, patients were given water 4 h after general anesthesia), EOH (n=500, patients were given 0.5 ml/kg water once recovered from general anesthesia.) in the postanesthesia care unit (PACU). Patients were evaluated for nausea, vomiting, drink desire, thirsty scale, oropharyngeal discomfort scale, and satisfaction scale. The results of study showed data for 983 patients (EOH=488, DOH=495) and revealed that twenty minutes after receiving water the incidence of vomiting in EOH group was very low. And there was no significant difference between the two groups at the same time point ($p > 0.05$). Compared with DOH group, after receiving water there was a significant decrease of patients' thirsty scales ($p < 0.0001$) and oropharyngeal discomfort scales ($p < 0.0001$) in EOH group. Significantly more patients' satisfaction were reported in EOH group ($p < 0.001$). The study concluded that for patients undergoing non-gastrointestinal surgery, early oral hydration after recovery from general anesthesia was safe, with lower thirsty scale and oropharyngeal discomfort scales, and higher satisfaction. [20]

An experimental study was done to evaluate the effectiveness of acupuncture in minimizing the severity of radiation-induced xerostomia in patients with head and neck cancer at University of São Paulo, São Paulo, SP, Brazil. A total of 24 consecutive patients receiving > 5000 cGy radiotherapy (RT) involving the major salivary glands bilaterally were assigned to either the preventive acupuncture group (PA, n = 12), treated with acupuncture before and during RT, or the control group (CT, n = 12), treated with RT and not receiving acupuncture. After RT completion, clinical response was assessed in all patients by sialometry, measuring the resting (RSFR) and stimulated (SSFR) salivary flow rates, and by the visual analogue scale (VAS) regarding dry mouth-related symptoms. The results shows that all patients exhibited some degree of impairment in salivary gland functioning after RT, significant differences were found between the groups. Patients in the PA group showed improved salivary flow rates (RSFR, SSFR; $p < 0.001$) and decreased xerostomia-related symptoms (VAS, $p < 0.05$) compared with patients in the CT group. Although PA treatment did not prevent the oral sequelae of RT completely, it significantly minimized the severity of radiation-induced xerostomia. The results suggest that acupuncture focused in a preventive approach can be a useful therapy in the management of patients with head and neck cancer undergoing RT. [21]

A randomized double-blind clinical trial was conducted to assess the clinical effectiveness of a topical sialogogue on spray (malic acid, 1%) in the treatment of xerostomia induced by antihypertensive drugs at University of Granada, Granada, Spain. The sample size consisted of 45 patients suffering from hypertensive drugs-induced xerostomia and were divided into 2 groups. The first group (25 patients) received a topical sialogogue on spray (malic acid, 1%) whereas the second group (20 patients) received a placebo. Both of the groups were administered on demand for 2

weeks. The data was collected by Dry Mouth Questionnaire (DMQ) in order to evaluate xerostomia levels before and after product/placebo application. Unstimulated and stimulated salivary flows rates, before and after application, were measured by the researcher. The results of the study shows that DMQ scores increased significantly (clinical recovery) from 1.21 to 3.36 points ($p < 0.05$) after malic acid (1%) application whereas DMQ scores increased from 1.18 to 1.34 points ($p > 0.05$) after placebo application. After two weeks of treatment with malic acid, unstimulated salivary flow increased from 0.17 to 0.242 mL/min whereas the stimulated one increased from 0.66 to 0.92 mL/min ($p < 0.05$). After placebo application unstimulated flow ranged from 0.152 to 0.146 mL/min and stimulated flow increased from 0.67 to 0.70 mL/min ($p > 0.05$). Therefore, study concludes that use of Malic acid 1% spray improved antihypertensive-induced xerostomia and stimulated the production of saliva among patients. [22]

An experimental study was done to assess effectiveness of nursing interventions on thirst and interdialytic weight gain of patients with chronic kidney disease subjected to hemodialysis in the dialysis unit at a tertiary care teaching hospital in Chennai. The study also assessed relationship between thirst distress and interdialytic weight gain; association between selected variables and thirst distress. Pretest posttest control group design was utilized in the study. The sample size consisted 40 patients with CKD subjected to haemodialysis in the dialysis unit at a tertiary care teaching hospital in Chennai. The patients were selected conveniently and they were assigned to the study and control group using lottery method. The Thirst Distress Scale was used to measure the intensity of thirst. The study group participants were given specific nursing interventions of sucking ice cubes of 5ml each with a maximum allowance of 10 cubes per day and mouthwash of 100 ml of water, with a maximum of 5 mouth

washes per day for 3-4 minutes. The participants of control group received the routine nursing care. The results of the study shows that, In the study group, nine (45.00%) were between the age of 21-30 years, nine (45.00%) in the study group were male. The study group had decreased levels of thirst distress when compared to the control group in the posttest which was statistically significant at the level of $p < 0.01$. Thirst distress and interdialytic weight gain (IDWG) was reduced in the study group after nursing intervention. There was no significant association between the thirst distress and sample characteristics. The finding of the study suggests the importance of specific nursing interventions that is Sucking ice cubes reduced thirst distress and improves compliance among patients with CKD subjected to hemodialysis. [23]

CONCLUSION

The studies concluded that thirst and dry mouth are not assessed as stressors but cause distress among ICU patients. Multiple factors increases thirst and dry mouth like drugs, \episodes of vomiting, hematocrit, creatinine, sodium level, intake output of patient, glucose levels. A bundle consisted more than one intervention is effective in relieving thirst and dry mouth among ICU patients

REFERENCES

1. N., & Puntillo, K. (2013). Thirst in Critically Ill Patients: From Physiology to Sensation. *American Journal of Critical Care*, 22(4), 328–335. <http://doi.org/10.4037/ajcc2013533>
2. Arai, S., Stotts, N., & Puntillo, K. (2013). Thirst in Critically Ill Patients: From Physiology to Sensation. *American Journal of Critical Care*, 22(4), 328–335. <http://doi.org/10.4037/ajcc2013533>
3. 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(1), 77–84. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/14670397>

4. Hatch, R., McKechnie, S., & Griffiths, J. (2011). Psychological intervention to prevent ICU-related PTSD: who, when and for how long? *Critical Care (London, England)*, 15(2), 141. <http://doi.org/10.1186/cc10054>
5. Peris, A., Bonizzoli, M., Iozzelli, D., Migliaccio, M. L., Zagli, G., Bacchereti, A., ... Belloni, L. (2011). Early intra-intensive care unit psychological intervention promotes recovery from post traumatic stress disorders, anxiety and depression symptoms in critically ill patients. *Critical Care (London, England)*, 15(1), R41. <http://doi.org/10.1186/cc10003>
6. Dying of Thirst: Managing a Distressing ICU Symptom. (n.d.). Retrieved May 1, 2017, from <http://www.esicm.org/news-article/article-review-thirst-ICU-NAHP-Calvino>
7. Nelson JE, Meier DE, Oei EJ, Nierman DM, Senzel RS, Manfredi PL, et al. Self-reported symptom experience of critically ill cancer patients receiving intensive care. *Crit Care Med [Internet]*. 2001 Feb [cited 2017 May 1];29(2):277–82. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11246306>
8. Kjeldsen CL, Hansen MS, Jensen K, Holm A, Haahr A, Dreyer P. Patients' experience of thirst while being conscious and mechanically ventilated in the intensive care unit. *Nurs Crit Care [Internet]*. 2017 Jan 25 [cited 2017 Jun 4]; Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28124464>
9. Internación UDE. Original Article Thirst in Surgical Patients: Perceptions of the Nursing Team in Inpatient Units. 2016;10(9).
10. Morita T, Tei Y, Tsunoda J, Inoue S, Chihara S. Determinants of the sensation of thirst in terminally ill cancer patients. *Support Care Cancer [Internet]*. 2001 May [cited 2017 May 1];9(3):177–86. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11401102>
11. Shirzaiy M, Bagheri F. Prevalence of Xerostomia and its Related Factors in Patients Referred to Zahedan Dental School in Iran. *Dent Clin Exp J [Internet]*. Kowsar; 2016 Feb 27 [cited 2017 May 1];In Press(In Press). Available from: <http://dentalcej.com/en/articles/7138.ht>
12. Fan W-F, Zhang Q, Luo L-H, Niu J-Y, Gu Y. Study on the clinical significance and related factors of thirst and xerostomia in maintenance hemodialysis patients. *Kidney Blood Press Res [Internet]*. Karger Publishers; 2013 [cited 2017 Jun 4];37(4-5):464–74. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24247643>
13. Maslom S, Tanha HER, Dalir zahra, Sharifipour F, Zerati A. Effect of ice chips on intensity of thirst and fluid intake in patients undergoing hemodialysis. doi.org [Internet]. School of Nursing and Midwifery; 2013 [cited 2017 May 1];3(3):59–68. Available from: http://ebcj.mums.ac.ir/article_1797_132.htm
14. Bots CP, Brand HS, Veerman ECI, Korevaar JC, Valentijn-Benz M, Bezemer PD, et al. Chewing gum and a saliva substitute alleviate thirst and xerostomia in patients on haemodialysis. *Nephrol Dial Transplant [Internet]*. 2005 Mar 1 [cited 2017 May 1];20(3):578–84. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15665029>
15. Ford C, McCormick D, Teng W, Parkosewich J. Abstract 13586: Early Initiation of Oral Intake in Adult Patients After Cardiothoracic Surgery is Safe and Reduces Thirst: Results of a Randomized Clinical Trial. *Circulation [Internet]*. 2015 [cited 2017 May 1];132(Suppl 3). Available from: http://circ.ahajournals.org/content/132/Suppl_3/A13586
16. Moon YH, Lee YH, Jeong IS. A Comparison of Effect between Wet Gauze with Cold Normal Saline and Wet Gauze with Cold Water on Postoperative Thirst, Oral Cavity Condition, and Saliva pH*. *J Korean Acad Fundam Nurs [Internet]*. 2015 Nov 30 [cited 2017 May 1];22(4):398–405. Available from: <http://j.kafn.or.kr/journal/view.php?doi=10.7739/jkafn.2015.22.4.398>
17. Korean Academic Society of Rehabilitation Nursing. MH, Yoo YS, Lee DY, Koo GH. Korean journal of rehabilitation nursing [Internet]. Vol. 13, J Korean Acad Fundam Nurs. Korean Academic Society of Rehabilitation Nursing; 2006 [cited 2017 May 1]. 217-224 p. Available from:

- <https://komci.org/GSResult.php?RID=0116KJRN/2011.14.2.136&DT=1>
18. Cho EA, Kim KH, Park JY. Effects of Frozen Gauze with Normal Saline and Ice on Thirst and Oral Condition of Laparoscopic Cholecystectomy Patients: Pilot Study. *J Korean Acad Nurs* [Internet]. 2010 Oct [cited 2017 May 1];40(5):714. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21157173>
 19. LOK N, BULDUKOGLU K. Innovational Journal of Nursing and Healthcare (IJNH). InnovationalpublishersCom [Internet]. Available from: http://innovationalpublishers.com/Content/uploads/PDF/410612074_9IPPSAOCT2014.pdf
 20. Yin X, Ye L, Zhao L, Li L, Song J. Early versus delayed postoperative oral hydration after general anesthesia: a prospective randomized trial. *Int J Clin Exp Med* [Internet]. e-Century Publishing Corporation; 2014 [cited 2017 Jun 3];7(10):3491–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25419388>
 21. Braga F do PF, Lemos Junior CA, Alves FA, Migliari DA. Acupuncture for the prevention of radiation-induced xerostomia in patients with head and neck cancer. *Braz Oral Res* [Internet]. Sociedade Brasileira de Pesquisa Odontológica; 2011 Apr [cited 2017 Jun 3];25(2):180–5. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1806-83242011000200014&lng=en&tlng=en
 22. Gómez-Moreno G, Guardia J, Aguilar-Salvatierra A, Cabrera-Ayala M, Maté-Sánchez de-Val J-E, Calvo-Guirado J-L. Effectiveness of malic acid 1% in patients with xerostomia induced by antihypertensive drugs. *Med Oral Patol Oral Cir Bucal* [Internet]. Medicina Oral S.L; 2013 Jan 1 [cited 2017 Jun 3];18(1):e49–55. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22926481>
 23. Sacrias G, Rathinasamy E, Elavally S, Arjunan. Effect of nursing interventions on thirst and interdialytic weight gain of patients with chronic kidney disease subjected to hemodialysis. *Brunei Darussalam J Heal* [Internet]. 2015 [cited 2017 Jun 3];6(1):13–9. Available from: <http://bdjh.ubd.edu.bn/Current issue/VOL 6/>

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