

Effectiveness of A Care Bundle on Postoperative Thirst Relief and Oral Condition among Patients Undergoing Abdominal Surgeries

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Abstract: Thirst in the perioperative period is capable of generating distress and temporary incapacity. Nurses are not prepared to deal with thirst during the perioperative period and often ignore thirst when patients ask for water. The aim of the study was to evaluate the effectiveness of using ice cold normal saline with menthol versus routine care on thirst relief and oral condition among immediate postoperative patients undergoing abdominal surgery. The study was conducted in surgical wards, at one of the hospitals affiliated to Cairo University. A quasi-experimental design was utilized in the study. A convenient sample of 60 adult patients who undergone abdominal surgeries were recruited in the current study. Demographic and biomedical data tool, thirst intensity scale, and oral condition assessment tool were used for data collection. Results: The study and control groups' participants were homogeneous as there was no statistical significant difference between them in relation to demographic characteristics, bio-medical data, thirst intensity, and oral condition pre intervention. There was a statistical significant difference between the study and control group regarding thirst intensity, tongue and saliva pre and post intervention. Conclusion: Based on the results using ice cold normal saline with menthol (care bundle) was significantly relief thirst intensity and improve tongue and saliva among immediate postoperative patients who undergone abdominal surgeries. Recommendations: Further research studies should be carried out to investigate the effectiveness of care bundle on relieving thirst intensity and improve oral condition among postoperative patients undergoing different types of surgeries.

Keywords: Care bundle, post-operative thirst, abdominal surgeries.

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I. Introduction

Abdominal surgery is a surgical operation that is performed on the organs that constitute the abdomen. Abdominal surgery patients typically need at least five to six days of recovery time before heading home from the hospital [1]. Study conducted by [2] reported that the mean length of stay was 4.5 days for patient undergoing incisional hernia repair. Another study conducted by [3] found that the median hospital stay after surgical management was 7 days for the hernia group, and 8 days for the adhesive obstruction group. The median length of hospital stay for patient undergoing cholecystectomy was 7 days [4].

During perioperative period, the nursing of the affected person plays a significant role in helping him/her to a speedy recovery. Common complaints include nausea, vomiting, surgical pain, sore throat, headache, drowsiness, dizziness, dental damage, peripheral nerve injury, and superficial thrombosis [5]. Patient suffers from other discomforts especially thirst during first two days as patient is kept fasting or nothing per mouth (NPO) according to their medical conditions as well surgeon instructions. Patients often have a dry mouth following surgery, which can be relieved with oral sponges dipped in ice water or lemon ginger mouth swabs [6].

The American Society of Anesthesiologists [7] released Practice Guidelines for Preoperative Fasting which recommended patients for all ages to forego clear liquids for two hours before procedures requiring general anesthesia, or regional anesthesia; for soft diet and milk, a six-hour fast is accepted for children and adults, and for meals including fried foods, fats or meat, it is recommended fasting for eight hours or more. However, in clinical setting, the time observed for fasting of liquids and solids is the same, despite documented facts in the literature. This fact denotes that the nurses' actions are based on an institutional routine that makes patients undergo fasting for an extended time and indiscriminately as documented by [8].

Postoperative thirst is a real stressful high-incidence discomfort which varies between 43.8 and 75% [9]. However, it has been little valued, investigated, documented, and managed by the health team [9], [10] and [11]. A study conducted by [12] found that thirst is triggered and worsen as a result of perioperative anxiety and fear which contribute to increase the thirst due to the activation of the sympathetic system and reduction of salivary secretion, in addition to other factors that might trigger thirst as fasting, intubation, blood loss, and medication in the anesthetic-surgical process, since one of its side effects is the reduction of salivary secretion.

Management of thirst in immediate postoperative period is challenging; there is contraindication to oral fluid intake due to the disturbed level of consciousness from both the anesthetic drugs and the presence of nausea and vomiting that might lead to development of pulmonary aspiration. Therefore, finding easy and safe ways to alleviate thirst among patients postoperatively is a major challenge and crucial issue for health care professionals [13].

The absence of adopted protocols by health care facility for management of thirst open the way for applying unplanned and disorganized actions about the best strategy and the safe volume used, without adequately assessing and/or recording the effect of these actions. The researchers viewed nurses as powerless as they did not know how to proceed regarding postoperative thirst, they perpetuated the actions and procedures that culturally inherited and established in the health care facility. In the same regard, [8] assumed that most of the nurses were not aware of the studies that were being conducted to address such issue. Thirst produced compassion in the nursing personnel; however, it was less valued. Although nurses recognized the rigorousness of thirst among postoperative patients, they neither record nor assessed thirst in a systematic manner.

A systemic review of ten primary studies conducted by [14] regarding strategies for thirst relief of hospitalized patients were low temperature fluids, using frozen gauze, ice chips, and gargling with cold water, menthol associated with cold strategies, salivary stimulation through chewing gum, acupuncture, the use of a thin straw, salivary substitute, and early fluid ingestion. The authors reported one study which used menthol to relieve thirst, where a bundle was applied consisting of cold water spray, oral swabs and mentholated lip hydration.

A study done by [15] found 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. However, [9], and [16] mentioned that the use of wet gauze or cotton for relieving thirst has no proven efficacy and, when compared with cold water gargling, the latter has significant effect in reducing the intensity of thirst, in addition to improving the oral conditions. Research studies conducted by [10], [11], and [17], reported that administration of ice chips proved to be more effective in the relief. Additionally, [16], and [18] reported that the use of ice has greater efficacy in relieving thirst, because it stimulates oropharyngeal receptors, ice in small volumes and menthol-related substances can decrease the intensity of thirst, in addition to enabling the improvement of oral conditions, such as dry mouth and lips.

Saline is a solution which has the decomposing salt secretions and bacteria reduction effect, as reported by [19], and promoting saliva secretion [20]. In particular, the saline will not cause damage to the oral mucosa either anatomically or physiologically that can be used without a prescription; an effect of retarding the deterioration of the oral conditions was documented in study conducted by [21]. The effectiveness of frozen gauze pads with normal saline, wet gauze, or ice was documented in a study done by [11] among post-laparoscopic cholecystectomy patients. Recently a study done by [22] mentioned that saline may be used for oral care to maintain oral mucous membrane integrity; saline is reported to have no harmful effects on oral mucosa; the stability of the oral mucosa in the saline group is thought to be the cause of normal leukocyte counts.

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1.1. Significance of the study

Thirst is a powerful symptom that surpasses all other sensations. In the presence of thirst, the hunger for water is so imperative that it cannot be ignored. Thirst is described by patients as an intense discomfort; it has a negative impact on surgical experience and has high incidence in the immediate postoperative period, reaching 75% [11]. Despite the magnitude of thirst, it has however been considered a minor complication in the perioperative period and its impact on patients is poorly studied. It is observed that thirst has been undervalued, underestimated, unmeasured, unrecorded, and undertreated by health team members. Health professionals allow patients to remain thirsty for extended periods in both pre and postoperative periods. The researchers observed in practice unprepared nursing teams to deal with thirst during the perioperative period and nurses often ignore thirst when patients ask for water.

Even so, the assessment, and application of thirst-relief strategies for the perioperative period if any implemented occur sporadic, occasional, not-standardized and not based on scientific evidence. There is a scarcity of studies related to either evaluating this discomfort or proposing standardized actions for management of it. National and international anaesthesiologist and perioperative nursing associations still disregard this construct in their manuals of best practices they are not even listed in the classifications of nursing diagnoses. In

face of the high incidence of thirst among post-operative patients undergoing abdominal surgeries, and considering the lack of evidence with respect to safe and effective strategies for management of thirst, the researchers decided to meet this challenge of a lack of knowledge about this discomfort in postoperative patients while considering the fact that nursing team represents the link between the discomfort experienced by patients and the possible use of intervention measures.

1.2. Contribution of the study

The researchers conducted the current study to evaluate the effectiveness of using iced normal saline with menthol versus routine care on thirst relief and oral condition among immediate postoperative patients undergoing abdominal surgery. The researchers assumed that this study represents an approach that will allow for a greater humanization of care provided to patients who have thirst. If the use of the iced normal saline proves to be effective, it can provide relief of thirst with small volume of liquid, representing available strategy for the management of thirst in the post-operative period.

1.3. Operational definitions

Thirst: patient feels thirsty to drink water, in the current study, thirst is measured by the scores of visual analogue scale as patient reports. Oral condition: it means overall health of mouth, in the current study it is measured by scores of oral health assessment tool.

A care bundle: is a set of interventions that, when used together, significantly improve patient outcomes, in the current study an ice cold normal saline with menthol was used to relief thirst and improve the oral condition for immediate postoperative patients undergoing abdominal surgery.

II. Subjects and Methods

The aim of the current study is to evaluate the effectiveness of using ice cold normal saline with menthol versus routine care on thirst relief and oral condition among immediate postoperative patients undergoing abdominal surgery.

To fulfill the aim of the current study, the following hypotheses were formulated:

Hypothesis 1: patients who will use ice cold normal saline with menthol (care bundle) will be less thirsty than the patient who will receive routine care as measured by numeric thirst rating scale.

Hypothesis 2: patients who will use ice cold normal saline with menthol (care bundle) will have much better oral condition than the patient who will receive routine care as measured by oral health assessment tool.

2.1. Design

A quasi-experimental design was utilized to study the impact of the independent variable (care bundle intervention) on the dependent variables (thirst and oral condition). The strength of the quasi-experimental design is that it is practical and it is suitable for the nature of nursing research [23].

2.2. Setting

The current study was conducted in surgical wards, at one of the hospitals affiliated to Cairo University, where health services were rendered to people for free.

2.3. Sample

A convenient sample of 60 patients who undergone abdominal surgeries were recruited in the current study according to the following criteria:

Inclusion criteria:

- Adult, male or female with an age ranged between 20 – 60 years.
- Post-operative patient undergone abdominal surgery with general anesthesia.
- Willing to participate in the study.
- Had the ability to communicate.

Exclusion criteria:

- Patients have malignancy or liver, kidney, respiratory or heart failure
- Mouth breather patients.
- Patients who have intake or swallowing restrictions.
- Patients who developed complications during surgery, and/or the period of recovery from anesthesia.

Random assignment was done to determine the two groups; the experimental group used an intervention (ice saline with menthol) and the control group used (routine care). This procedure was carried out through allocation of the study participants to different days of week.

2.4. Data collection tools

Data was collected through a structured interview to gather data using the following three tools:

2.4.1. Demographic and biomedical data tool: A questionnaire form including demographic and disease related data was developed by the researchers and divided into two parts. Part I was related to demographic variables (age, and gender). Part II included variables relevant to disease-related variables as, surgery date, time of surgery, and type of surgery.

2.4.2. Thirst intensity scale: Thirst intensity refers to the severity, strength, or amount of thirst [23]. A visual analogue scale (VAS) was used to measure thirst intensity in postoperative patients. In addition to determination of the verbalization of thirst (Yes/No), patients were requested to rate their thirst intensity on a 10-cm VAS, with 0 indicating no thirst at all, and 10 indicating the worst possible thirst that the patient had experienced. The reliability was checked by interrelated reliability method. The VAS scores were classified based on the study by [15] as follows: mild (0-3), moderate (4-6), and severe (7-10).

2.4.3. Oral Condition assessment tool: It is designed by the researchers after extensive review of literature and adapted from oral health assessment tool which developed by Korean Institute of Health and Welfare Caring for oral health in Korean residential care [24]. Content validity was checked by a panel of five experts in medical surgical nursing. It is designed to measure changes of oral condition as regards: lips, tongue, mucosa and saliva, and the items were scored on a 3-point scale (the lower the score, the better the oral condition). Lip has a one score if it is smooth, pink and moist, two scores if it is dry or cracked and three scores if it is ulcerated. As regards 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 blistered or cracked. Mucosa has a score of one if it is pink & moist, score of two if it is red or white coated, score of three if it is ulcerated with or without bleeding. Saliva has a score of one if it is watery, score of two if it is thick and score of three if it is absent.

Content validity of the research instruments was assessed by 5 experts in the Medical Surgical Nursing field and approved it. To assess the reliability as well test retest method was done. A pilot study was done with 6 patients to assess the instrument's feasibility and applicability and required modifications were done accordingly and those patients were excluded from the study.

2.5. Pilot study

A pilot study was done with 6 patients to assess the instrument's feasibility and applicability and to test needed time for filling the tools. Required modifications were done accordingly and those patients were excluded from the study.

2.6. Ethical considerations

After taking the approvals from the authoritative person at the selected setting to conduct the current study a written informed consent were obtained from each participant prior starting the data collection. Each participant was informed about the purpose of the study and participant's anonymity was kept as well as the confidentiality of the data. Each participant was informed that he has the right to withdraw from the research at any time or refuse to share without any affection in their treatment.

2.7. Procedures for data collection:

An official permission to carry out the study was granted from the head manager of the surgical departments at the university hospital to proceed with the study. Patients in the preoperative period who met the inclusion criteria were approached individually and written consent from patients who accepted to share in the study was taken. The researchers explained the purpose of the study to the patients. After obtaining informed consent, the participants were randomly assigned either to the study group who will receive ice cold normal saline with menthol (intervention bundle) or control group who will receive routine care using random assignment. Data collection occurred during the period of May to August, 2016.

In the preoperative period, all study participants who met the inclusion criteria were approached, invited to participate in the research and the first tool was filled up by the researchers. In the immediate post-operative period, as soon as the patient discharged from recovery room with no complications either in operating room and/or recovery room; patients met the other specified inclusion criteria were questioned about the presence of thirst, if they positively responded, then thirst and oral condition were assessed (Base line assessment). Before application of each thirst bundle intervention to the study group, the assigned anesthesiologist performed an additional evaluation and authorized or prevented the administration of the study intervention. Consultation with the assigned anesthesiologist and surgeon recommended the use of 3 ml of ice saline, as this is a small amount and it was possible to have greater control over any complications if any. Therefore, the study group received a 3 ml form of ice cube of normal saline mixed with 2 drops of menthol, which was placed in the patient's mouth to completely dissolve. The control group received the routine care regarding thirst and oral care. After one hour of the first intervention, the assessment was done regarding thirst

intensity and oral condition (1st post intervention assessment). One hour later of the intervention, the researchers re-administered the care bundle, and then the patient was questioned about the presence of thirst using numeric rating scale of thirst and oral condition (2nd post intervention assessment).

2.8. Statistical analysis

Data was entered and analyzed using Statistical Package for Social Science software (SPSS version 22); Data related descriptive statistics were summarized using mean as an average, standard deviation as a measure of dispersion of result around the mean. Also frequency and percentage of for each variable studied. T test was used for comparison of mean in addition to repeated measure ANOVA. The alpha level of .05 was utilized for all tests of significance. The internal consistency of all tools was conducted by Cronbach alpha.

III. Results

Results of the study are presented in two major parts; the first part presented data related to demographic and medical related data and the second part presented hypothesis testing and other supportive findings.

Part I: Demographic and medical related data.

Table (1): Homogeneity of demographic and bio-medical data between the study and control groups’ participants (n=60).

Variables	Category	Study group		Control group		X ²	p-value
		N	%	N	%		
Gender	Male	13	43.3	13	43.3	t	1
	Female	17	56.6	17	56.6		
Age	20 -	5	16.6	5	16.6	t	1
	30 -	7	23.3	7	23.3		
	40 -	10	33.3	10	33.3		
	50 > 60	8	26.6	8	26.6		
	Mean ± SD	42.46 ± 9.95		42.90 ± 10.19			
Diagnosis	Intestinal obstruction repair	7	23.3	7	23.3	t	1
	Open cholecystectomy	10	33.3	10	33.3		
	Open herniorrhaphy	13	43.3	13	43.3		
Operation Time	2 > 3 hours	18	60	18	60	t	0.625
	3 ≥ 4 hours	12	40	12	40		
	Mean±SD	2.76 ± 0.58		2.80 ± 0.74			

Table (1) shows that one third (33.3%) of the study and the control group participants had age range from 40 to 50 years, with an equal percentage of male and female in both groups. Regarding diagnosis, both study & control group participants had intestinal obstruction repair, open chelcytectomy and open herniorrhaphy (23.3% 33.3% & 43.3 respectively). In addition, (60%) of the study and control group participants had a an operation time ranged from 2 to less than 3 hours and (40%) had a 3 hours to less than 4 hours. The study and control group participants were to be homogeneous group as there was no statistical significant difference between both groups in relation to demographic characteristics and bio-medical data.

Part II: Hypothesis testing and other supportive findings.

Table (2): Homogeneity between the study and control groups’ participants regarding thirst intensity and oral condition pre intervention (n=60).

Variables	Study group Mean ± SD	Control group Mean ± SD	T	P
Thirst	8.90 ± 0.30	7.80 ± 0.40	1.795	0.083
Oral condition:				
Lip	2.76 ± 0.12	2.66 ± 0.23	1.36	0.84
Tongue	2.80 ± 0.10	2.73 ± 0.14	1.43	0.16
Mucosa	2.60 ± 0.29	2.70 ± 0.16	1.14	0.26
Saliva	2.62 ± 0.15	2.65 ± 0.28	0.372	0.71

Table (2) reveals that there was no statistically significant difference of thirst intensity among the study group & control group participants at base line measurement as t= 1.795 at p = 0.083. Regarding oral condition of lip, tongue, mucosa and saliva at base line measurement there was no statistically significant difference between the study groups participants at t= 1.36 at p=0.84, t= 1.43 at p= 0.16, t= 1.14 at p= 0.26 & t= 0.372 at p= 0.71 respectively.

Table (3) illustrates a gradual decrement in the mean values of thirst intensity of both study and control groups participants throughout the study period, with a highly significant statistical differences between the

control and study group ($F=79.33$ at $p = 0.001$). Regarding lip, the same table shows a slight decrements in the mean values of both study and control groups throughout the study period with no statistical differences between the study and control group ($F=0.75$ at $p = 0.61$). Regarding tongue, there is a gradual decrements in the mean values of both study and control groups throughout the study period with a significant statistical differences between the two studied groups ($F=3.22$ at $p = 0.05$).

Table (3): Mean Difference between the study group and control regarding thirst intensity and oral condition pre and post intervention using repeated measures ANOVA (n=60).

Variable	Base line		One hour post 1 st intervention		Two hours post 2 nd intervention		F / P
	Mean ± SD		Mean ± SD		Mean ± SD		
	Study group	Control group	Study group	Control group	Study group	Control group	
Thirst	8.90±0.30	7.80±0.40	4.80±0.40	5.80±0.40	3.80±0.33	3.80±0.50	79.33 0.001**
Lip	2.76±0.12	2.66±0.23	2.65±0.19	2.62±0.27	2.50±0.37	2.57±0.39	0.75 0.61
Tongue	2.80±0.10	2.73±0.14	2.20±0.13	2.50±0.30	2.18±0.26	2.44±0.25	3.22 0.05*
Mucosa	2.60±0.29	2.70±0.16	2.50±0.27	2.70±0.36	2.50±0.30	2.60±0.32	5.33 0.60
Saliva	2.62±0.15	2.65±0.28	2.45±0.38	2.50±0.31	2.25±0.21	2.45±0.31	8.77 0.04*

*Significant P value ≥ 0.05

IV. Discussion

Thirst is an intense discomfort with high incidence in the immediate postoperative period with high incidence, even if the patient understands the necessity of this fasting, this does not relieve his discomfort and suffering; however, it is highly neglected in clinical practice by health care professionals. Thirst is a major stressor from the patients’ perspective in postoperative period; it was classified as the fifth among 34 stressors as reported in a study done by [26], [10] and [27]. The purpose of the study was to evaluate the effectiveness of using iced normal saline with menthol versus routine care on thirst relief and oral condition among immediate postoperative patients undergoing abdominal surgery.

Findings of the current study showed similarity between the two groups’ participants in the demographic characteristics and bio medical data, and there was no statistical significant difference between both groups in relation to those variables, so that it had no influence on the research results. Similarly [28] in their study, there was no statistically significant differences between the experimental and control groups regarding the related data.

Participants of the study as well as the control group complained from thirst. On the same line, [10] reported that 75% of their study’ participants complained from thirst. The analysis of intervention proposed by researchers in regard to hypothesis 1 “patients who will use ice cold normal saline with menthol (care bundle) will be less thirsty than the patient who will receive routine care as measured by numeric thirst rating scale” showed thirst intensity score changes in the experimental group as well in the control group, mean thirst scores of experimental group throughout the study period, with a highly significant statistical differences between the control and study group.

On the same line, [29] in their study compared the hydrating effect of gargling ice water and application of moist gauze versus humidification of the oral cavity on reduction of thirst and dryness of the mouth after nasal surgery. The intensity of the group's thirst which gargled with ice water was less, indicating more effective method than other strategies. Similarly, [11] who examined the effects of using gauze with a cold saline solution or ice to relieve thirst and oral condition in patients undergoing laparoscopic cholecystectomy, reported thirst score changes along the study; however, the difference was significantly higher in the experimental group who received frozen gauze with saline solution than the control group who received, ice or wet sponge.

A study conducted by [17] identified the effects of gargling with cold water postoperatively to relieve thirst and condition of the oral cavity in patients of the orthopedic clinic. The group that received the intervention (hourly gargling with cold water for eight hours postoperatively) exhibited reduced thirst and better

condition of the oral cavity. The authors concluded 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.

A randomized clinical trial of an intervention to relieve thirst and dry mouth in intensive care unit patients was conducted by [16] tested the effect of an intervention bundle (cold water spray, mentholated lip hydration and oral swabs) on thirst intensity and thirst discomfort among patients admitted to intensive care. The study concluded that, there was a significant decrease in the mean thirst intensity and suffering in the intervention group compared to the usual care group. The usual care group was 1.9 times more likely to report dry mouth for each intervention session. Similarly [28] compared the effect of wet gauze with cold saline versus wet gauze with cold water on thirst found that thirst improved in both groups; however the improvement for the group which used cold saline was more than for the group which used cold water. A recent study conducted by [27], found greater efficacy of ice popsicle than water at room temperature for thirst management in the immediate postoperative period.

In contrast to the current study finding, [10] assessed strategies to alleviate thirst in the immediate postoperative period. The comparison between the use of ice (2 ml) and room temperature water (2 ml) to alleviate patient's thirst in the immediate postoperative period revealed that the initial mean intensity of thirst was 5.1 (water group) and 6.1 (group ice), and the final intensity was 2.33 and 1.51 respectively. The difference was not statistically significant; it was inferred that the small volume of ice was not allowed the biggest difference between the groups.

Regarding lip, and oral mucosa the study findings revealed a slight decrements in the mean values of both study and control groups throughout the study period, however, the difference between the study and control group was not statistically significant ($F=0.75$ at $p = 0.61$ and $F=5.33$, $p=0.60$, respectively). There was a gradual decrements in the mean values of both study and control group throughout the study period in regard to tongue and saliva, and the difference was found to be statistically significant between the study and control group ($F=3.22$, and $p = 0.05$, $F=8.77$, and $p=0.04$ respectively) [24].

In agreement with the current study findings, [30] in their research entitled "The effects of oral care with normal saline on oral state of patients in intensive care unit" found a significant difference in the oral cavity state between the experimental group that had used normal saline and the control group that had used tantum solution. Similarly, [11] in their study about "Effects of frozen gauze with normal saline and ice on thirst and oral condition of laparoscopic cholecystectomy patients" concluded that providing oral care using gauze frozen with normal saline and ice twice, improved the oral condition of tongue, saliva, mucosal membrane, and gingiva in patients. [15] in a study investigating "The effects of cold water gargling on thirst, oral cavity condition, and sore throat in orthopedics surgery patients" reported a lower score of thirst and oral cavity condition in the experimental group than in the control group.

In regard to the effects of mouth care with cold sterile normal saline [25] in their study among patients with head and neck cancer undergoing concurrent chemo-radiotherapy reported that mouth care using cold sterile normal reduced oral dryness, oral discomfort and severity of oral mucositis and emphasized that nurses could consider using it routinely as an intervention to improve oral discomfort of patients; thirst level, condition of tongue, saliva, mucosal membrane, and gingiva was improved as well. On the same line, [28] in a study entitled "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" found that oral cavity condition except saliva, and saliva pH were not significantly different between the groups.

V. Conclusion

The study results answered the two proposed hypotheses whereas, using ice cold normal saline with menthol (care bundle) was significantly relief thirst intensity among immediate postoperative patients who undergone abdominal surgeries and this support the first hypothesis. As regards oral condition it was found that care bundle improved only tongue and saliva for immediate postoperative patients who undergone abdominal surgery. So the second hypothesis is partially supported.

VI. Limitation

The findings of this study are limited to the application of a care bundle on patients with abdominal surgeries (intestinal obstruction repair, open cholecystectomy and open herniorrhaphy) and based on data from one health care facility, therefore, the results might be neither representative nor generalized.

VII. Implications and recommendations

There is a growing emphasis on the role of nurses in implementation of independent interventions of minimal or no risk to maintain patients' safety and comfort. The care bundle (ice cold normal saline with menthol) is considered a safe, easy and cheap nursing management that relieved thirst intensity and enhanced oral condition among immediate postoperative patients who undergone abdominal surgeries.

More emphasis should be devoted toward the pivotal role of nurses in managing patients' complaints postoperative through application of such scientific evidence-based management. The researchers hope to include care bundle as a one of additional nursing management of postoperative thirst after performing clinical assessment to check level of consciousness, cough, swallowing, nausea and vomiting.

Continuing education actions are necessary for these professionals, so that they can take into consideration this important discomfort that causes so much suffering to the patients and adopt safe and effective management measures to deal with patients' thirst.

Further research studies should be carried out to investigate the effectiveness of care bundle on relieving thirst intensity and improve oral condition among postoperative patients undergoing different types of surgeries. Replication of the study on larger sample, undergoing different types of surgeries in different settings is recommended before generalization of the study findings.

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