ORIGINAL ARTICLE

Inter-rater Reliability Testing of the Safety Protocol for Thirst Management

Leonel A. do Nascimento, MSN, Ligia F. Fonseca, BSN, PhD, Claudia B. dos Santos, PhD

Purpose: *Thirst is one of the most common and yet undertreated symptoms in the postoperative period, mainly because of the lack of safety criteria to support indication for thirst management strategies. A Safety Protocol for Thirst Management was developed and validated, and the objective of this article was to evaluate the inter-rater reliability of the protocol.*
Design: *This is a methodological and applied study carried out in a teaching hospital in Brazil.*
Methods: *Safety criteria selected were the assessment of level of consciousness, presence of coughing and swallowing, and absence of nausea and vomiting.*
Findings: *Agreement between evaluators was almost perfect (Bachelors of Science in Nursing—Kappa of 0.968; nursing technicians—Kappa of 0.867).*
Conclusions: *The protocol is presented as a viable and useful tool to evaluate safety criteria that allow administration of strategies to mitigate thirst of patients in the postoperative period.*

Keywords: *thirst, perioperative nursing, clinical protocols, reliability.*

PATIENTS POSTOPERATIVE SIGNS and symptoms have been widely researched, including hypothermia, pain, nausea, vomiting, hypoxia, hypotension, tachycardia, tremors, hypertension, respiratory depression, and delusions.[1-3] Paradoxically, thirst despite being one of the most pressing and intense sensations in the perioperative period is insufficiently valued, assessed, and treated by staff directly caring for patients in the immediate postoperative period.[4-6]

Despite the magnitude of this symptom and its consequences to patients, professional associations specializing in perioperative nursing and anesthesia do not have protocols or guidelines regarding thirst management. Likewise, nursing diagnosis classifications only mention thirst as a defining characteristic for deficient fluid volume. Thirst is a complex symptom and cannot be defined solely by fluid imbalance.[7]

Thirst poses a challenge for perioperative care. There is a confluence of factors that lead to an increase in the thirst incidence and patient distress: extended fasting times both preoperatively and postoperatively, intubation, blood loss, electrolyte imbalance, and effect of anesthetic drugs.[8-10]

Although commonly occurring strategies to address thirst are not part of protocols in clinical practice. Thirst management—identification,

Leonel A. do Nascimento, MSN, Head Nurse, Med Surg Department, Dr Anísio Figueiredo Hospital, Londrina, Paraná, Brazil; Ligia F. Fonseca, BSN, PhD, Adjunct Professor, Londrina State University, Londrina, Paraná, Brazil; and Claudia B. dos Santos, PhD, Associate Professor, Ribeirão Preto Nursing School, University of São Paulo, Ribeirão Preto, São Paulo, Brazil.

Conflict of interest: None to report.

Address correspondence to Leonel A. do Nascimento, Med Surg Department, Dr Anísio Figueiredo Hospital, 649, Rio Grande do Sul, Centro, Londrina, Paraná 86026-080, Brazil; e-mail address: leonel_lan@hotmail.com.

1089-9472/$36.00
http://dx.doi.org/10.1016/j.jopan.2016.07.008

assessment, safety evaluation, and treatment—is not usually a priority of the perioperative team. The high incidence may be because of an extremely generalized and conservative approach of prolonged fasting dictated by a fear of bronchoaspiration when the patient is recovering from anesthesia, without performing a proper assessment of the actual risk involved for that particular patient. Although bronchoaspiration occurs in approximately 3 to 10 per 10,000 operations with an increased incidence in obstetric and pediatric anesthesia, it can lead to a series of diseases such as infectious pneumonia, chemical pneumonitis, or respiratory distress syndrome with increased morbidity. Patients are most at risk during induction of anesthesia and extubation.[11] Lack of studies exploring perioperative thirst and protocols to guide clinical conducts in this scenario hinder care for this symptom even further.[5,12]

Up to now a standardized protocol to assess the safety of administering a thirst relief method in the postanesthesia care unit (PACU) had not been developed. This led to unnecessary and prolonged distress of patients because of fear of potential bronchoaspiration. Aiming to fill this gap, the authors developed and validated a Safety Protocol for Thirst Management (SPTM; Figure 1) to establish criteria to assess whether it is safe to administer methods of thirst relief.[13] Validation and reproducibility are required for a tool to be relevant and used in clinical practice. This article presents the reliability results of the SPTM when applied by Bachelor of Science in Nursing (BSN) nurses and nursing technicians in a PACU in a large hospital in Brazil.[14] Nurse technicians are Registered Nurses who have completed a 2 years of nursing program after high school and share responsibility for primary care.

Background

Thirst affects a large proportion of surgical patients and is associated with extreme discomfort and distress both in preoperative and postoperative periods. Thirst incidence ranges from 48.6% (n = 53)[15] to 75% (n = 128).[5] A study with patients in the PACU after a laparoscopic cholecystectomy, for example, demonstrated a mean intensity of discomfort of 6.1 (standard deviation [SD] = 2.18)[5] and 8.17 (SD = 1.467) when evaluated with a numeric analog scale of 0 to 10.[16]

Studies carried out with postoperative patients in intensive care units (ICUs) indicate that the feelings of thirst cause suffering for patients. The following statement reinforces this perception: "it was very hard […] we nearly died of thirst […], you see the person washing the floor, you hear the splashing of water, it makes you want to jump in there […]."[17]

The incidence and magnitude of thirst in the ICU was demonstrated in another study with 171 patients. Patients were interviewed every other day for up to 14 days. In a list of 10 symptoms of discomfort, including shortness of breath, being scared, confusion, thirst, and pain, thirst being the second most frequently cited by 70.8% of patients. Thirst ranked first when intensity of discomfort was assessed, with a mean intensity rating of 2.16 (where mild = 1, moderate = 2, and severe = 3), for patients who reported symptom to be present. Hunger and breathlessness had an intensity of 1.89 reported for each.[18]

When surgical patients arrive at the PACU and start recovering from anesthesia, they are already thirsty. A challenge in the postoperative period, therefore, is to find safe ways to relieve the already present thirst sensation using strategies that can reduce or mitigate it, without jeopardizing patient safety.

Satiation of thirst occurs by two mechanisms: postabsorption satiation with fluid intake that decreases blood osmolarity and preabsorption satiation that occurs with the activation of oropharyngeal receptors called transient receptor potential melastatin 8. These receptors are sensitive to low temperatures (cold water and ice lollipops) and to mentholated substances. Menthol is an isomer extracted from mint plants. They are present in a wide range of products such as candy, cigarettes, and toothpastes among others.[6,19,20] The activation of these receptors triggers a sensation of freshness and satiation, relieving the discomfort without the need of ingesting large volumes of fluid. Preliminary evidence exists that oral receptor stimulation interventions may provide a viable alternative for thirst management in the postoperative period.[5,12,20-23] The risk of bronchoaspiration is reduced with a fluid volume of less than 50 mL. Small volumes of liquid, therefore, are desirable when considering strategies to manage thirst.[24]

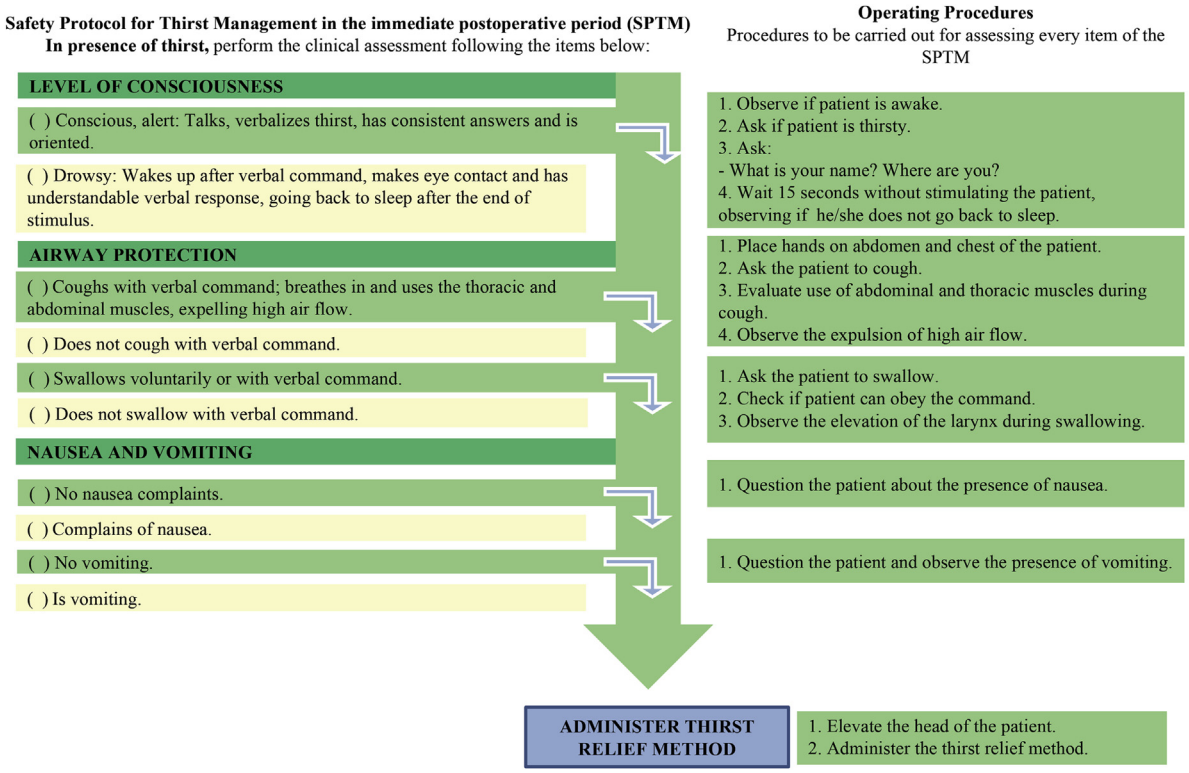

Figure 1. Safety protocol for thirst management in immediate postoperative period. This figure is available in color online at www.jopan.org.

In clinical practice, surgical staff members do not intentionally assess thirst and are not aware of its management strategies. Particularly during the postoperative period, a conservative approach is adopted where fasting is strictly enforced. When interventions are occasionally made, such as applying wet cotton to the mouth, they are nonstandardized and do not follow any protocols.

The SPTM was elaborated and validated to provide a tool for the intentional assessment of safety criteria for thirst and its abatement. After an extensive literature review and input from a panel of experts, the following safety criteria for the protocol were chosen: patients' level of consciousness, protection of airway (coughing and swallowing), and absence of nausea and vomiting. Topics are presented in this protocol in a manner to allow for a sequential evaluation. During the assessment, noncompliance with any of the standards will automatically indicate the interruption of the process.[13]

The first criterion, *level of consciousness* is defined by the individual's ability to recognize him or herself and correctly respond to pain, voice, and other environmental stimuli.[25] In the SPTM, the patient is assessed for orientation to person, place, and time. The decrease in a person's level of consciousness may be predictive for risk of bronchoaspiration.[26] During recovery from anesthesia a patient's level of consciousness is significantly affected by anesthetic agents and barbiturates. The American Society of Anesthesiologists (ASA) recommends a periodic assessment of a patient's mental status for identification and resolution of possible complications.[27]

Airway protection comprises a set of physiological mechanisms that work concurrently to avoid bronchoaspiration, including the ability to cough and swallow. *Coughing* is related to the elimination of secretions by increasing positive pleural pressure, producing a high-speed outward airflow from within the airway.[28,29] In the PACU, the combination of the relatively supine position with the residual action of anesthetic agents and muscle relaxants negatively affects muscle contraction, which interferes with airway

protection. *Swallowing* is the movement of a bolus or fluid from the mouth to the stomach. Different stimuli initiate the process of swallowing, and the reflex is more responsive to cold stimuli than those closer to body temperature.[27,30] The return of the swallowing reflex is an indicator of emergence from anesthesia.

Postoperative nausea and vomiting are complications in the postoperative period with an incidence between 20% and 30%. The risk for postoperative nausea and vomiting may be related to three factors: patient, anesthetic techniques, and surgical procedure.[31] *Nausea*, a subjective feeling of the need to vomit, is characterized by muscle contractions of vomiting without expulsion of gastric contents.[28] *Vomiting or emesis* is the contraction of the diaphragm and abdominal muscles along with the relaxation of the esophageal sphincter, resulting in the expelling the gastric contents.[28,31] The risk of aspiration pneumonia is higher when patients have not recovered their airway protection reflexes. Preoperative fasting is advocated to prevent this complication, although it is unnecessarily prolonged in practice.[32,33]

Theoretical Framework

The theory of symptom management was the conceptual framework chosen to understand thirst as a symptom. It is a deductive theory focused on three dimensions—*symptom experience*, *symptom management strategies*, and *results*—and three domains—person, environment, and health/disease. The choice of this theory for the analysis of postoperative thirst is justified by its six basic assumptions: symptom experiences, symptom management strategies, and symptom outcomes (dimensions) and person, environment, and state of health/illness (domains). The main assumption is based on the perception of the individual experiencing the symptom and his or her self-report.[12,34,35]

The first dimension of the *symptom experience* is subdivided into three categories: symptom awareness, assessment of symptoms, and the response to symptoms. It refers to the way an individual experiences thirst, his/her individual perspective, and assessment of the significance of this symptom, and how he/she responds to it. The second dimension of the theory, *symptom management strategies*, advocates for the prevention or delay of the onset of the symptom and its consequent negative impact, which is the focus of this article.[12,34,35] The third dimension, outcomes, consists of eight factors including functional status, emotional status, mortality, morbidity and comorbidity, quality of life, symptom status, cost, and self-care related to thirst.

Concerning the domains, *person* describes the individual factors that affect the onset, perception, and response to thirst and include personal, demographic, psychological, sociologic, and physiological variables.[12,34,35] The second domain, *environment*, refers to the combination of conditions or the context in which thirst occurs, including physical, social, and cultural variables.[12,34,35] The third domain, *health/illness* elucidates the patient's health status variables that affect postoperative thirst.[12,34,35]

Significance for Postoperative Care

Surgical patients seek a favorable outcome of their surgery and expect safety in all processes related to their health. It is vital to establish safety policies for thirst relief and protocols based on clinical evidence for the patient in the postoperative period.

The SPTM is a tool that fills an important gap in the study of postoperative thirst. It allows for an intentional, systematic, and thorough evaluation of a patient's condition. This tool has the potential to indicate safe administration thirst relief methods during anesthesia recovery, which will decrease suffering for surgical patients.

In an earlier phase of this research, procedures for semantic and content validity of the protocol were carried out, both with high levels of agreement among judges. Content validity was obtained using the Delphi technique with 18 experts. Judgment by judges required expertise in anesthetic recovery and experience with caring for thirsty postoperative patients. In two validation rounds, all safety criteria listed in the protocol and its operational manual achieved high levels of agreement among experts. Safety criteria involving the level of consciousness and the absence of nausea and vomiting presented complete agreement among experts. Items related to protective airway reflexes

(coughing and swallowing) received 93% to 97% levels of agreement (content validity index = 1). Operational procedures presented an agreement of 96% to 100%. The high level of agreement among judges indicated that the protocol was satisfactorily validated, thereby standardizing nursing actions in the management of thirst.

This article presents the inter-rater reliability analysis for the SPTM with the objective of measuring whether the protocol can be generalized and replicated in other settings.

Objective

This study aims to test the inter-rater reliability of the SPTM in clinical use with patients who suffer from thirst in the postoperative period.

Methods

Design

This is a quantitative, observational, methodological, and applied study, carried out at the PACU of a tertiary public teaching hospital located in the south of Brazil. The institution has 313 beds, a surgical center with seven operating rooms and a PACU with seven beds. Data collection was from December 2012 to June 2013.

Reliability and agreement are important aspects in the process of developing measurement instruments. They relate to the quality of the instrument and the ability to achieve the same result with successive evaluations. Reliability and agreement also can be obtained among evaluators, providing information on the amount of error inherent in the measurement.[14,36]

The inter-rater equivalence is a method to estimate the reliability by applying the same instrument to measure the same phenomena by different observers with equal training in an independent and simultaneous way. This type of reliability measurement is recommended mainly for clinical instruments in which there is considerable evidence of variance among examiners. When two or more observers rate the phenomenon in a congruent way, scores are likely to be accurate and reliable.[14,37-39]

Sample/Setting

Inclusion criteria for the selection of patients included recovering from anesthesia, reporting thirst, aged more than 12 years, and acceptance to participate in the study preoperatively.

Instruments

SPTM: The SPTM was the result of an extensive literature review and devised with the expertise of many health care professionals (nurses, anesthesiologists, and physiotherapists) with ample PACU experience. Safety criteria listed in the SPTM include the assessment of level of consciousness, return of protective airway reflexes (coughing and swallowing), and absence of nausea and vomiting[13] (Figure 1).

Using the format of a flowchart, safety criteria were sequentially assessed using detailed instructions found in the Operating Manual where each step of the protocol was presented in operationalized statements, such as, “Place one hand on the abdomen and another on the chest.” If the patient did not present the established safety criterion, the assessment was interrupted and restarted if the patient’s clinical status changed.

The Operating Manual provided theoretical framework that substantiated its concepts and established procedures to be carried out when collecting the required information. For each safety criterion, the descriptor, scientific rationale, operational procedures, criteria for qualification, and periodicity of evaluation were indicated.[13]

The SPTM satisfied the standards of face and content validity. Using Delphi technique in two rounds, content validity index was 1, with high levels of agreement (93% to 100%) among nine experts (five experienced BSN nurses and four anesthesiologists) who evaluated the instrument.

Procedures

To assess the degree of agreement among raters, two pairs of nursing staff (BSN nurses and nursing technicians) with experience in patient care during the postanesthesia recovery were selected. In Brazil, nursing technicians with proper training provide care for patients in the PACU under the

direct supervision of a BSN. One pair of nursing technicians and one pair of BSN nurses were chosen by convenience, according to their work schedule and willingness to participate in the research. All participants were trained and evaluated on the use of the SPTM. Data collection occurred during a selected period of time.

Procedures for Protection of the Rights of Participants

The study met Brazilian standards for ethics in research with human subjects and was approved by the Research Ethics Committee of the institution (CAAE: 02299412.6.0000.5231). Participants were informed about the study's objectives and procedures for participation, and after acceptance, signed the consent form to participate. Parents were present in the PACU and signed the consent for minors to participate in the study.

Collection Procedures

The pair of BSN nurses independently and simultaneously applied the SPTM to 78 patients during recovery from anesthesia without communication among evaluators. In cases where patients did not meet safety criteria proposed by the SPTM, assessment was resumed in 15-minute intervals until all safety criteria were met or they were discharged from the PACU. Similarly, the duo of nursing technicians applied the protocol to 40 patients. In cases where patients met all safety criteria established in the SPTM, patients received a small dose (3 mL) of water in the form of ice chips.

Data Analysis

Kappa statistics was used to calculate the difference between how much agreement is actually present (observed agreement) compared with how much agreement would be expected to be present by chance alone.[36] Kappa values range from −1 to +1. The closer to +1, the greater the agreement among evaluators and the smaller the variation in the instrument. Interpretation of the strength of Kappa values agreement is as follows: 0 to 0.2 (poor agreement); 0.21 to 0.4 (slight); 0.41 to 0.6 (fair); 0.61 to 0.8 (moderate); and 0.81 to 1 (almost perfect).[14] For data analysis SPSS (Statistical Package for Social Sciences) version 20.0 was used.

Results

One hundred eighteen patients who were thirsty during postanesthesia recovery participated in the study. Female gender was predominant (58.5%, n = 69), ranging between 12 and 83 years with a mean of 36.4 years of age (SD = 17.34), ASA classification 1 was the most common (51.7%, n = 61), followed by ASA 2 (40.7%, n = 48).

Surgical specialty gynecology and obstetrics were predominant (36.4%, n = 43), followed by orthopaedics (15.3%, n = 18). Intraoperative bleeding was classified as light (79.7%, n = 94), moderate (17.8%, n = 21), and intense (2.5%, n = 3). The level of discomfort was measured with a numeric analogical scale ranging from 0 to 10 and the average level of thirst was 6.16 (SD = 2.48). Spinal anesthesia with sedation was the most frequent type of anesthesia provided, in 47.5% (n = 56) of cases, followed by balanced general anesthesia with 28% (n = 33).

The SPTM was applied by BSNs, 118 times for 78 patients. When the safety criteria were not met, a new assessment was conducted with the same patient 15 minutes later. For patients who reached the safety criteria, a single application was predominant (76.9%, n = 60), followed by three times (10.3%, n = 8), four times (7.7%, n = 6), and two times (5.1%, n = 4).

Table 1 shows the agreement for safety criteria, as well as its percentages and Kappa coefficient. Table 2 shows the percentage of agreement between the BSN nurse evaluators and nursing technicians related to safety criteria of the SPTM. The overall Kappa in the reliability evaluation with BSN nurses was 0.968.

Nursing technicians assessed 40 patients using 48 applications of SPTM. When assessments were conducted and safety criteria were met, a single application was predominant (87.5%, n = 35), followed by two times (5%, n = 2) and three times (7.5%, n = 3). The percentage of agreement and Kappa coefficient as well as the agreement in approval and disapproval on safety criteria are presented in Tables 1 and 2, respectively. The overall Kappa coefficient on the reliability phase with nursing technicians was 0.867.

Table 1. Agreement Among Nurse Evaluators and Nursing Technician Evaluators in the Application of SPTM in a Postanesthesia Care Unit at a Teaching Hospital in Brazil

Dimensions of SPTM	Agreement (%)	Kappa	95% CI
Nurses (n = 118)			
Level of consciousness	99.2	0.98	0.79-1
Airway protection (coughing)	99.2	0.85	0.67-1
Airway protection (swallowing)	100	*	*
Nausea	100	1.00	0.82-1
Vomiting	100	1.00	0.82-1
Nursing technicians (n = 48)			
Level of consciousness	95	0.791	0.51-1
Airway protection (coughing)	100	1	0.72-1
Airway protection (swallowing)	100	1	0.72-1
Nausea	97.5	0.878	0.60-1
Vomiting	100	1	0.72-1

CI, confidence interval; SPTM, Safety Protocol for Thirst Management.
*Total agreement on the presence of spontaneous swallowing. *P* value .001.

Discussion

The SPTM was designed to be used both by BSN nurses and nursing technicians in the PACU. The analysis of inter-rater reliability of the SPTM for BSN nurses and nursing technicians was achieved in this study.[40] The average intensity of thirst discomfort was found to be 6.16 (SD = 2.48), which is very similar to other studies: 6.1 (SD = 2.18)[5] and 8.17 (SD = 1.47).[16] Results of clinical trials on thirst support the close correlation between serum osmolarity values and patients' thirst ratings, therefore self-reported analogical scales can be used to evaluate thirst.[41] These findings reinforce the magnitude of the symptom of thirst in the postoperative period and the relevance of its investigation.

In spite of the robustness of thirst incidence and intensity in clinical practice, health care professionals tend to minimize the importance of this symptom. First, health care providers believe that the infusion of intravascular volume alone plays a role in reducing or preventing thirst. It also is a common thought that patients undergoing sedation do not suffer from thirst. Although it is certainly true that hypovolemic and osmotic thirst are basically triggered by fluid imbalances, there is much more to thirst as a multidimensional symptom. Dehydration of the oral mucosa, caused by anxiety, medication,

Table 2. Agreement and Disagreement Among Nurse Evaluators and Nursing Technician Evaluators Regarding the Dimensions of SPTM, in Absolute Numbers, in Brazil

Dimensions of SPTM	Level of Consciousness	Airway Protection (Coughing)	Airway Protection (Swallowing)	Nausea	Vomiting
Nurses					
Approval	83	114	118	109	117
Disapproval	34	3	0	9	1
Disagreement	1	1	0	0	0
Total	118	118	118	118	118
Nursing technicians					
Approval	33	47	47	43	47
Disapproval	11	1	1	4	1
Disagreement	4	0	0	1	0
Total	48	48	48	48	48

SPTM, Safety Protocol for Thirst Management.

and intubation, also are responsible for triggering thirst and vasopressin release.[42] Xerostomia signs—cracked lips, dry mouth, bitter taste, thick tongue—are usually present in the very thirsty patient causing great distress and may not be relieved solely by intravenous infusions.[7]

The undervaluation of thirst as a discomfort negatively impacts care for patients.[43] In a study conducted with 58 nursing staff in the ICU, nursing staff partially noted the discomfort caused by thirst from a list of 42 discomforts, BSN nurses indicated thirst was the fifth most stressful discomfort in the ICU, and nursing technicians rated it in the ninth place.[4] Patients, however, rated thirst as the second most remembered and the first most intense discomfort.[18]

Results of this study evaluating the reliability of the SPTM, presented an almost perfect Kappa coefficient for BSN nurses within all safety criteria. As for the nursing technicians, the safety criterion of level of consciousness reached a moderate agreement, whereas the other two were in almost perfect agreement.[14] During anesthetic recovery, the level of consciousness improves with anesthetic emergence and the elimination of medications. The patient can be responsive and interact with the staff but then go back to sleep when no longer stimulated. The SPTM protocol clearly distinguishes between *awake* and *drowsy*, requiring the evaluator to wait for 15 seconds to determine whether the patient goes back to sleep when not stimulated by verbal command. Rigor was purposely designed in the SPTM when assessing the level of consciousness as there is a correlation between the level of consciousness and aspiration status.[26] The criterion, therefore, was the most important one in terms of safety when administering methods of thirst relief.

Data in Table 2 show a high frequency of patients who met safe criteria established by the SPTM. In clinical practice, many patients do not receive thirst relief methods even when the conditions are safe. The sequential application of SPTM allows for the assessment and identification of such patients, therefore decreasing their suffering because of thirst. A study evaluating the use of SPTM on 50 patients found that after an average of 30 minutes, 67.9% of thirsty patients recovering from general anesthesia were already eligible to have their thirst mitigated.[15]

A high percentage of agreement was also observed among evaluators, both in approval as in disapproval of safety criteria. The pair reported that the application of SPTM was easy and fast—each assessment taking approximately 2 minutes on average.

Limitations of the Study

Fulltime participation of nursing technicians during data collection was difficult, which prolonged the time allocated for this phase of research. This was because nursing technicians were divided between work activities and the application of the SPTM, which did not occur with the pair of BSNs. Measurement errors can be observed in quantitative, methodological research. In this study, it is noted that some transient personal factors (eg, having to abandon a task to carry out the assessment) may have influenced the assessment at this stage.[34] Such difficulty resulted in a smaller sample of assessments with the pair of nursing technicians.

Another limitation is that these results cannot be generalized to patients with special needs, such as hearing impairment, and with children aged less than 12 years. It is imperative that patients are able to communicate and understand instructions clearly. Further investigation is also necessary to validate the SPTM with children with various ages.

Recommendations for Clinical Practice

Surgical patients could benefit from the administration of thirst relief methods in the immediate postoperative period. Nursing staff, however, hesitate to use strategies to mitigate thirst during this period for fear of complications. The existence of a tool that effectively assesses safety conditions fills this gap and can act as a bridge between effective strategies and the thirsty patient, positively impacting the patient's overall sense of well-being. The SPTM represents a breakthrough for nursing practice, and it generates support for the health care team for proper clinical assessment while providing safe care.

The assessment of intensity and distress of thirst management is important. A postoperative thirst distress scale is being further elaborated in our

Research and Study Group on Thirst from Londrina State University in Brazil. Strategies for thirst relief in the PACU are also being investigated, such as the use of ice lollipops and mentholated lollipops and lip balms.

Recommendations for Future Research

Further studies should be conducted with a larger number of patients from various facilities and realities, to strengthen the results of psychometric measures of the protocol. Studies assessing the use of SPTM with different groups of patients, such as children, elderly, obese, and others should also be carried out. Furthermore, it is important to investigate the adequacy of assessment moments, allowing for its integration in nursing care during postanesthesia recovery.

Conclusions

On the basis of the results obtained, it was concluded that the SPTM showed high levels of agreement with almost perfect Kappa values. The SPTM allows systematic evaluation of safety criteria in the administration of thirst relief methods in the postoperative period. The high levels of agreement indicate that the instrument has inter-rater equivalence and may be used in clinical practice.

Thirst management should be a concern for nurses who work in the PACU, because it is an intense discomfort of high incidence during the postoperative period. The SPTM is intended to standardize and systematize nursing actions in the control and relief of thirst, minimize fears of complications such as nausea, vomiting, and consequent aspiration pneumonia, which, until now, were thought of as impediments in the management of thirst.

Acknowledgments

The authors thank the members of the Research and Study Group on Thirst from Londrina State University, Brazil, for their input and suggestions throughout this study.

References

1. Capello RG, Alves ALS, Júnior AC, Carvalho R. Nursing interventions during anesthetic recovery: Control of pain, nausea, hypothermia and other postoperative complications. Rev Dor. Available at: http://dor.org.br/revistador/Dor/2009/volume_10/n%C3%BAmero_2/pdf/Volume_10_n_2_pags_113-119.pdf. Accessed January 14, 2013.

2. Popov DC, Peniche ACG. Nurse interventions and the complications in the post-anesthesia recovery room. *Rev Esc Enferm USP*. 2009;43:953-961.

3. Mattia AL, Maia LF, Silva SS, Oliveira TC. Diagnósticos de enfermagem nas complicações em sala de recuperação anestésica. *Enfermería Glob*. 2010;18:1-11.

4. Gois CFL, Dantas RAS. Stressors in care at a thoracic surgery postoperative unit: Nursing evaluation. *Rev Latinoam Enfermagem*. 2004;12:22-27.

5. Aroni P, Nascimento LA, Fonseca LF. Assessment strategies for the management of thirst in the post-anesthetic recovery room. *Acta Paul Enferm*. 2012;25:530-536.

6. Arai S, Stotts N, Puntillo KA. Thirst in critically ill patients: From physiology to sensation. *Am J Crit Care*. 2013;22:328-335.

7. Leiper J. Thirst. In: Caballero B, Allen L, Prentice A. Encyclopedia of Human Nutrition. 2nd ed. University of Aberdeen, UK: Elsevier Academic Press; 2005:278–286.

8. Glare P, Walsh D, Sheehan D. The adverse effects of morphine: A prospective survey of common symptoms during repeated dosing for chronic cancer pain. *Am J Hosp Palliat Med*. 2006;23:229-235.

9. Glore RJ, Spiteri-Staines K, Paleri V. A patient with dry mouth. *Clin Otolaryngol*. 2009;34:358-363.

10. Stotts NA, Arai SR, Cooper BA, Nelson JE, Puntillo KA. Predictors of thirst in intensive care unit patients. *J Pain Symptom Manage*. 2015;49:530-538.

11. Beck-Schimmer B, Bonvini JM. Bronchoaspiration: Incidence, consequences and management. *Eur J Anaesthesiol*. 2011;28:78-84.

12. Conchon MF, Nascimento LA, Fonseca LF, Aroni P. Perioperative thirst: An analysis from the perspective of the Symptom Management Theory. *Rev Esc Enferm USP*. 2015;49:122-128.

13. Nascimento LA, Fonseca LF, Rosseto EG, Santos CB. Development of a Safety Protocol for Thirst Management in the immediate postoperative period. *Rev Esc Enferm USP*. 2014;48:834-843.

14. Kottner J, Audigé L, Brorson S, et al. Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were proposed. *J Clin Epidemiol*. 2011;64:96-106.

15. Oliveira ST, Nascimento LA, Fonseca LF. Safety protocol for thirst management: Association of unmet safety criteria with application periodicity [in Portuguese]. *IX EPCC—Encontro Internacional de Produção Científica UniCesumar*. 2015; 9:4-8. Available at: http://www.cesumar.br/prppge/pesquisa/epcc2015/anais/leonel_alves_do_nascimento_1.pdf. Accessed March 24, 2017.

16. 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*. 2010;40:714-723.

17. Gois CFL, Aguillar OM, Santos V, Lapa-Rodriguez EO. Stress factors for patients undergoing cardiac surgery. *Invest Educ Enferm*. 2012;30:312-319.

18. Puntillo KA, Arai S, Cohen NH, et al. Symptoms experienced by intensive care unit patients at high risk of dying. *Crit Care Med*. 2010;38:2155-2160.

19. Saker P, Farrell MJ, Adib FRM, Egan GF, McKinley MJ, Denton DA. Regional brain responses associated with drinking water during thirst and after its satiation. *Proc Natl Acad Sci U S A*. 2014;111:5379-5384.

20. Eccles R, Du-Plessis L, Dommels Y, Wilkinson JE. Cold pleasure. Why we like ice drinks, ice-lollies and ice cream. *Appetite*. 2013;71:357-360.

21. Yoon SY, Min HS. The effects of cold water gargling on thirst, oral cavity condition, and sore throat in orthopedics surgery patients. *Korean J Rehabil Nurs*. 2011;14:136-144.

22. Bathala S, Eccles R. RE: The use of ice lollies for pain relief post-pediatric tonsillectomy. *Clin Otolaryngol*. 2012;37:162-163.

23. Conchon MF, Fonseca LF. Ice and water efficiency in the management of thirst in the immediate postoperative period: Randomized clinical trial. *J Nurs UFPE Online*. 2014;8:1435-1440.

24. Perlas A, Davis L, Khan M, et al. Gastric sonography in the fasted surgical patient: A prospective descriptive study. *Anesth Analg*. 2011;113:93-97.

25. Iwańczuk W, Guźniczak P. Neurophysiological foundations of sleep, arousal, awareness and consciousness phenomena. Part 1. *Anaesthesiol Intensive Ther*. 2015;47:162-167.

26. Leder SB, Suiter DM, Lisitano WH. Answering orientation questions and following single-step verbal commands: Effect on aspiration status. *Dysphagia*. 2009;24:290-295.

27. Apfelbaum JL. Task Force on Postanesthetic Care. Practice guidelines for postanesthetic care: An updated report by the American Society of Anesthesiologists Task Force on Postanesthetic Care. *Anesthesiology*. 2013;118:291-307.

28. Guyton AC, Hall JE. *Tratado de Fisiologia Médica*, 11th ed. Rio de Janeiro: Elsevier Ed.; 2011.

29. Taylor-Clark TE. Peripheral neural circuitry in cough. *Curr Opin Pharmacol*. 2015;22:9-17.

30. Pereira NAV, Motta AR, Vicente LCC. Reflexo da deglutição: análise sobre eficiência de diferentes estímulos em jovens sadios. *Pró-Fono Revista de Atualização Científica*. 2008;20:159-164.

31. Lages N, Fonseca C, Neves A, et al. Postoperative nausea and vomiting: A review of the "minor-major" problem. *Rev Bras Anestesiol*. 2005;55:575-585.

32. Gebremedhn EG, Nagaratnam VB. Audit on preoperative fasting of elective surgical patients in an African Academic Medical Center. *World J Surg*. 2014;38:2200-2204.

33. Andrew-Romit JJ, Van de Mortel TF. Ritualistic preoperative fasting: Is it still occurring and what can we do about it? *ACORN: J Perioper Nurs Aust*. 2011;24:14-19.

34. Linder L. Analysis of the UCSF Symptom Management Theory: Implications for pediatric oncology nursing. *J Pediatr Oncol Nurs*. 2010;27:316-324.

35. Dodd M, Janson S, Facione N, et al. Advancing the science of symptom management. *J Adv Nurs*. 2001;33:668-676.

36. Viera AJ, Garrett JM. Understanding interobserver agreement: the Kappa statistic. *Fam Med*. 2005;37:360-363.

37. Polit DF, Benck CT, Hungler BP. *Fundamentos de pesquisa em enfermagem: métodos, avaliação e utilização*, 7th ed. Porto Alegre: Artmed; 2011.

38. Trochim WMK. *Research Methods: Knowledge Bases*. 2006. Available at: http://socialresearchmethods.net/kb/. Accessed February 03, 2013.

39. Terwee CB, Bot SD, de Boer MR, et al. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol*. 2007;60:34-42.

40. Lourenço MB, Peniche ACG, Costa ALS. Post anesthesia care units of Brazilian hospitals: Organizational and care aspects. *Rev SOBECC*. 2013;18:25-32.

41. Arai SR, Butzlaff A, Stotts NA, Puntillo KA. Quench the thirst: Lessons from clinical thirst trials. *Biol Res Nurs*. 2014;16:456-466.

42. Brunstrom JM, Tribbeck PM, MacRae AW. The role of mouth state in the termination of drinking behavior in humans. *Physiol Behav*. 2000;68:579-583.

43. Landström M, Rehn IM, Frisman GH. Perceptions of registered and enrolled nurses on thirst in mechanically ventilated adult patients in intensive care units—a phenomenographic study. *Intensive Crit Care Nurs*. 2009;25:133-139.