

Assessment of the thirst dimension: integrative review*

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ABSTRACT

Thirst is a multifactorial and subjective symptom that request multiple measuring instruments. The objective of this study was to identify the assessment dimensions of thirst and the measurement tools used. We included studies published between 2005 and 2015 from the databases Lilacs, PubMed and SciELO. Eighteen articles composed the final sample that showed thirst dimensions: intensity, frequency, and discomfort. We also assessed the xerostomia and its intensity. These dimensions were identified by Visual Analogic Scales, Verbal Numeric Scales, Face's Scales and Likert-type Scales, used in the Thirst Inventory, Xerostomia Inventory, and Thirst Discomfort Scale. We assessed thirst especially in dialytic patients and the ones admitted to the intensive care unit. Although thirst is a symptom, in general, its assessment concentrates in its intensity, and it is conducted in specific populations.

Descriptors: Thirst; Evaluation; Scales; Nursing.

INTRODUCTION

The regulation of water consumption is controlled by thirst. Although physiological mechanisms regulate it, habits, manners and, social rituals from the individual influence the behavior of fluid ingestion⁽¹⁾. The thirst's role in the fluid homeostasis implicates on a complex network of neural and hormonal processes, as an answer to some imbalance in the relationship of water and sodium in the body⁽²⁻³⁾.

For patients in health environments, thirst is one of the most prevalent and uncomfortable symptoms, and it can overdo all other sensations^(1,4-5). Patients at the intensive care unit (ICU), dialytic and those in pre- or post-surgery, describe it as an uncomfortable and intense experience, and they use allusive figures to madness and even death⁽⁵⁾. Its prevalence can reach up to 75% during the immediate post-operative period^(5,9).

It is a subjective experience, responsible for changes in the biopsychosocial functioning, in sensations and event in the cognition of the individual⁽¹⁰⁾. Thirst is a multifactorial, subjective and complex symptom; its identification and mensuration should be careful and detailed, aiming to characterize its dimensions so that it can allow directed actions for its maintenance and relief.

Thirst can be assessed through laboratory exams, by the blood osmolarity and dosage of the antidiuretic hormone (ADH). Technological advances identify thirst through the mapping of involved cerebral areas, using induction techniques and concomitant analysis of images obtained with tomography and resonance⁽¹¹⁾.

The methods based on the thirst neurophysiology allow its identification, but they are not unique, once thirst is a symptom, and it can become an intense and uncomfortable experience, characterized by its subjectivity and individuality, making its assessment a challenge. In this context, self-reporting is a measurement option^(1,3-4).

In the clinical practice, thirst is not intentionally and systematically assessed. Registers of its assessments are few – when not inexistent – and overall, they contemplate its intensity. Thirst assessment should englobe its multi-factors, within the dimensions referring to prevalence, incidence, frequency, duration and discomfort⁽²⁻⁴⁾.

The need to comprehend how thirst, in its magnitude and complexity, is assessed, justified the present study. This integrative review aimed to identify the assessment dimensions of thirst and its measurement instruments. The development of future research, the availability of the compiled knowledge about possible strategies to measure a basic human need frequently undervalued and under assessed⁽¹²⁾ will certainly contribute to the implementation in its clinical practice.

METHODS

We conducted an integrative review of the literature, a process that gathers and synthesizes results from experimental and non-experimental studies in a systematic and organized manner, from the delimitation of a theme⁽¹³⁾.

The following question guided the investigation: What is the available scientific evidence about the assessment of thirst dimensions? We based our searches for studies on Health Sciences Descriptors: thirst; xerostomia; water deprivation; dehydration; assessment; scales and nursing. We used the descriptors isolated and combined.

For the search of studies, we selected the databases Scientific Electronic Library Online (SciELO), Latin-American and Caribbean Literature in Health Sciences (Lilacs) and the U.S National Library of Medicine (PubMed). Once we selected the primary studies, we searched for studies that also answered the review question mentioned in reference lists of the chosen texts. We conducted the searches between May and June of 2015.

To select the included publications, we adopted the PRISMA recommendations (Figure 1). The

inclusion criteria were: studies published in Portuguese, English or Spanish, between 2005 and 2015 and, available in full-text.

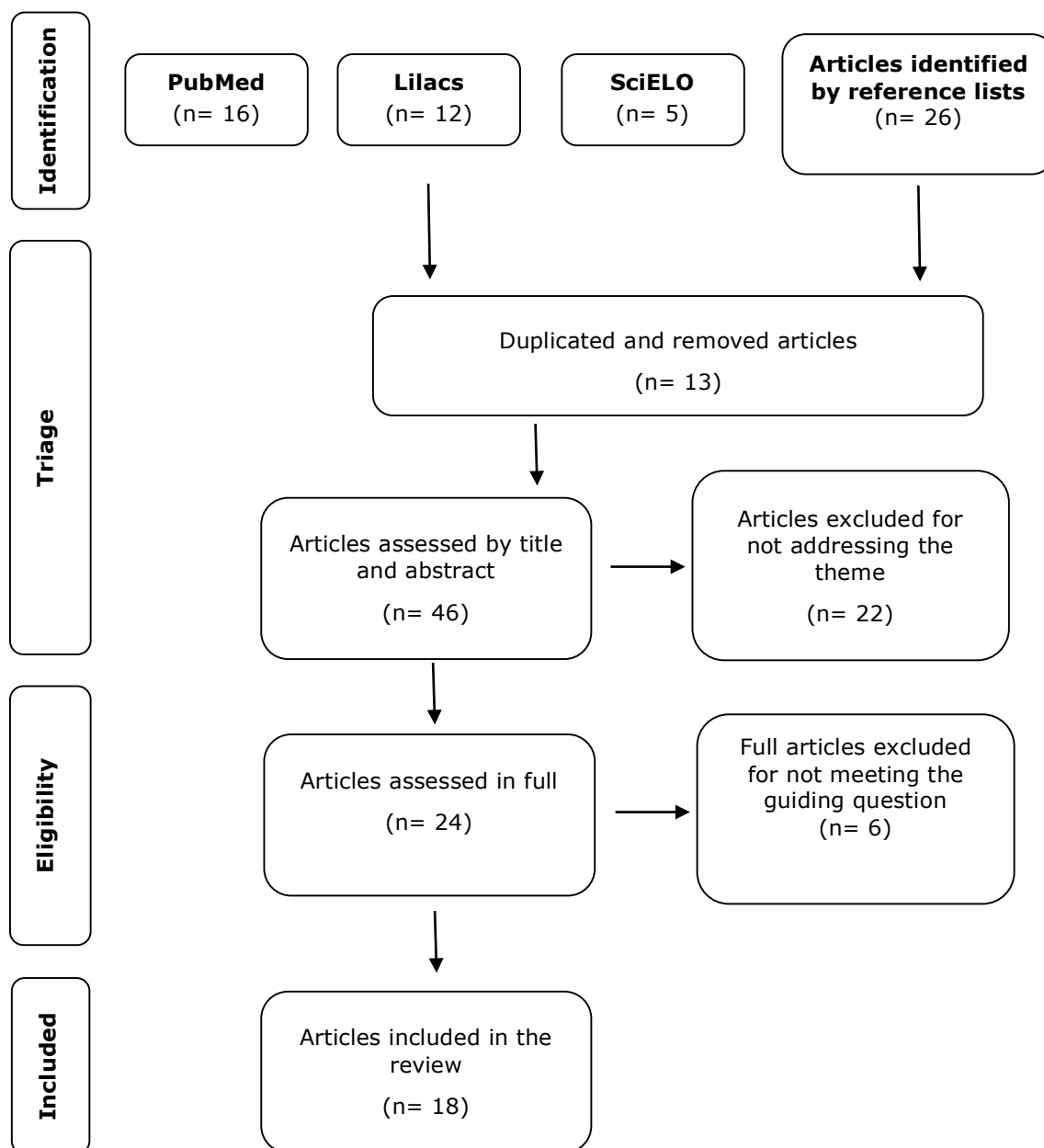


Figure 1: Fluxogram of the selection process of studies for the integrative literature review, based on the PRISMA recommendations. Londrina, PR, Brazil, 2015.

At the first analysis, based on the reading of titles and abstracts, we excluded articles that did not address the third assessment. At the second analysis, through the full reading of papers, we excluded those that did not contemplate the evaluation of third dimensions by scales.

According to the instrument created by the authors, we extracted the information related to authorship, year of publication, title, method, objectives, third dimension addressed in the assessment and

study results.

RESULTS

We analyzed the titles and abstracts of 46 scientific papers, obtained through databases and references. From those, we excluded 22 because they did not contemplate the study theme. After a second analysis of the full paper, the final sample was composed of 18 articles, being five identified from Lilacs, five from PubMed, and we obtained eight through the analysis of reference lists of included studies. The studies identified on SciELO were duplicates, and they did not meet the study theme (Figure 1). One study was published in Portuguese, all others in English. From the 18 included studies, 11 (61.1%) were from the United States, four (22.2%) from England; France, Nigeria, and Brazil produced one study each (5.6%), being 2010 and 2014 the years of most publications.

Randomized controlled trials were predominant (33%). The thirst assessment occurred mainly in patients with chronic kidney disease submitted to hemodialysis, found in seven studies⁽¹⁴⁻²⁰⁾. Four studies were conducted with ICU patients⁽²¹⁻²⁴⁾, one study was conducted with immediate pre-operative patient⁽⁶⁾, one of patients with sickle cell anemia⁽²⁵⁾ and, one with patients that recovered from a septic shock state⁽²⁶⁾. Two studies involved adults without a disease condition⁽²⁷⁻²⁸⁾, and other two studies were conducted with children⁽²⁹⁻³⁰⁾.

The assessment of thirst dimension was carried out to identify the intensity(15)^(9,16-18,20-30), discomfort (4)^(17,22-24) and frequency of the symptom (3)⁽¹⁴⁻¹⁶⁾, as well as, to assess xerostomia and its intensity (5)^(14-16,18-19). We also saw other finalities: to correlate thirst with dialytic weight gain (3)^(14,18-19), the reduction of salivary secretion (2)^(15,18) and quality of life in patients at hemodialysis (7)⁽¹⁴⁻²⁰⁾. Also, to assess thirst after an intervention – as room temperature water and ice chips (1)⁽⁹⁾, chewing gum and saliva substitutes (1)⁽¹⁴⁾ —, an intervention package composed by oral swabs, water sprays, menthol lip moisturizer (1)⁽²³⁾, and the administration of pilocarpine (1)⁽¹⁸⁾. At last, to compare the thirst scores with the gastric residual content in children (1)⁽²⁹⁾ and with thirst activated cerebral areas and its satiety (1)⁽²⁷⁾.

The scales used to assess thirst were: Analogical Visual Scale (AVE), Verbal Numeric Scale (VNS), Face's Scale (FS) and Likert-type scales. Thirst intensity dimension was addressed using the AVE in eight studies^(16-18,25-28,30), the VNS in six^(9,20-21,23-24,29), and the FS in two⁽²⁹⁻³⁰⁾. One unique study⁽²²⁾ adopted the 3-point Likert-type scale to assess intensity and discomfort caused by thirst.

The AVE, VNS, and FS, in conjunction with the Scales of Verbal Descriptors (SVD), are valid and reliable instruments to assess pain in different populations⁽³¹⁻³⁴⁾. These four types of scales were adapted to assess thirst. None studies in our sample mentioned the SVD.

The AVE consists of a 10-centimeter line or 100 millimeters, where the extremities represent the thirst extremes, and the rest of the line represents the intermediate levels⁽³⁴⁾. The respondent should mark the point in the line representing his thirst; consequently, the patient should have visual contact with the scale, requiring good visual and cognitive acuity to classify his thirst⁽³³⁻³⁴⁾.

However, the VNS allows the subject to rank his thirst in a scale from zero to ten, where zero corresponds to “no thirst”, and ten, “the worst possible thirst”⁽³⁴⁻³⁵⁾. The VNS application does not require visual contact⁽³³⁾.

The FS adoption occurred in studies of intensity identification of thirst in children. The FS initially developed for children, is being used in adults with communication issues⁽³⁶⁾.

In an exploratory study⁽¹⁷⁾, a valid and reliable five-point Likert-type scale was used to identify thirst discomfort in patients submitted to hemodialysis, showing high scores of thirst. The VNS also assessed discomfort in two studies⁽²³⁻²⁴⁾. In three studies⁽¹⁴⁻¹⁶⁾, xerostomia was measured by a five-point Likert-type scale, attached on the Xerostomia Inventory; the VNS measured its identification in three publications^(16,18-19). The frequency domain was present in three studies⁽¹⁴⁻¹⁶⁾, in the Dialysis Thirst Inventory directed to hemodialysis patients, with items referring to the periodicity of the symptom appearance, correlated to the hemodialysis sessions.

Six publications^(14-17,29-30) adopted more than one instrument to measure the thirst dimensions.

The Chart 1 presents the main information extracted from the publications.

Chart 1: Publications about the assessment of thirst dimension, according to authors, year, method, objective, and assessed thirst dimension (2005 to 2015). Londrina, PR, Brazil, 2015.

Authors/ Year	Methods and Objective	Assessed thirst dimension/Instrument used
Aroni, Nascimento, Fonseca (2012) ⁽⁹⁾	Quase-experimental; to assess the strategies to relief thirst in 90 immediate post-operative patients.	Assessment of the thirst assessment through Verbal Numeric Scale (0 to 10)
Bots, Brand, Veerman, Korevaar, Valentijn-Benz, Bezemer et al. (2005) ⁽¹⁴⁾	Randomized controlled trial; to investigate the potential effect of the sugar-free chewing gum and a saliva substitute in xerostomia, thirst and weight gain in 65 patients with chronic kidney failure in final stage submitted to dialysis.	Thirst frequency assessment by a five-point Likert-type Scale – Thirst Inventory
		Xerostomia assessment by a five-point Likert-type Scale – Xerostomia Inventory
Bots, Brand, Poorterman, Amerongen, Valentijn-Benz, Veerman et al. (2007) ⁽¹⁵⁾	Longitudinal and observational; to compare aspects of the oral cavity, saliva secretion, xerostomia in 43 individuals with chronic kidney failure after kidney transplantation.	Thirst frequency assessment by a five-point Likert-type Scale – Thirst Inventory
		Xerostomia assessment by a five-point Likert-type Scale – Xerostomia Inventory
Fan, Zhang, Luo, Niu, Gu (2013) ⁽¹⁶⁾	Randomized controlled trial; to investigate the clinical meaning and factors related to thirst and xerostomia in 42 dialysis patients.	Thirst and xerostomia intensity assessment by Analogic Visual Scale (0 to 10).
		Thirst frequency assessment by a five-point Likert-type Scale - Thirst Inventory
		Xerostomia assessment by a five-point Likert-type Scale – Xerostomia Inventory
Porcu, Fanton, Zampieron (2007) ⁽¹⁷⁾	Correlational; to describe the thirst perceptions and correlate with the symptoms experienced by 107 patients submitted to dialysis.	Thirst intensity assessment by Analogic Visual Scale (0 to 10).
		Thirst discomfort assessment by a five-point Likert-type Scale – Thirst Discomfort Scale
Sung, Kuo, Guo, Chuang, Lee, Huang (2005) ⁽¹⁸⁾	Randomized controlled trial; to determine if the reduction in the saliva secretion contributes to thirst increase and weight gain in 90 patients submitted to dialysis. To assess the pilocarpine action in reducing	Thirst and xerostomia intensity assessment by a Visual Analogic Scale (0 to 10)
Sung, Kuo, Guo, Chuang, Lee, Huang (2006) ⁽¹⁹⁾	Prospective cohort; to investigate the relationship of xerostomia and dialytic weight gain in 116 patients without diabetes mellitus and in 68 diabetic patients submitted to dialysis.	Xerostomia intensity assessment by a Visual Analogic Scale (0 to 10)
Yang, Yates, Chin, Kao (2010) ⁽²⁰⁾	Single-blind randomized controlled trial; to assess the efficacy of non-invasive acupuncture to increase saliva secretion and to reduce thirst in 28 dialysis patients.	Thirst intensity assessment through the Verbal Numeric Scale (0 to 10)
Li, Puntillo (2006) ⁽²¹⁾	Prospective pilot study; survey of the prevalence and intensity of nine symptoms experienced by 15 ICU intubated patients.	Thirst intensity assessment through the Verbal Numeric Scale (0 to 10)
Puntillo, Arai, Cohen, Gropper, Neuhaus, Paul (et al. 2010) ⁽²²⁾	Observational and prospective; to assess the symptoms experienced by 171 ICU patients.	Thirst intensity and discomfort assessment by a three-point Likert-type scale
Puntillo, Arai, Cooper, Stotts, Nelson (2014) ⁽²³⁾	Randomized controlled trial; to test a package of interventions to reduce thirst and dry mouth intensity and discomfort in 252 ICU patients.	Thirst intensity and discomfort assessment by a Verbal Numeric Scale (0 to 10)
Stotts, Arai, Cooper, Nelson, Puntillo (2015) ⁽²⁴⁾	Descriptive cross-sectional; To identify predictors of the thirst presence, intensity and discomfort in 353 ICU patients.	Thirst intensity and discomfort assessment by a Verbal Numeric Scale (0 to 10)
Ozoene, Enosolease, Ajayi, Agoreyo, Obika (2009) ⁽²⁵⁾	Analytical cross-sectional; to examine the perception of thirst in 20 voluntaries with and without sickle cell anemia during 13 hours of water privation.	Thirst intensity assessment by the Analogic Visual Scale (0 to 10)
Siami, Polito, Porcher, Hissem, Blanchard, Boucly et al. (2013) ⁽²⁶⁾	Prospective and interventional; to describe the assessment of the plasmatic vasopressin (ADH) after saline infusion in 30 patients that recovered from the septic shock.	Thirst intensity assessment by the Analogic Visual Scale (0 to 10)

Authors/ Year	Methods and Objective	Assessed thirst dimension/Instrument used
Farrel, Zamarripa, Shade, Phillips, McKinley, Fox et al. (2008) ⁽²⁷⁾	Experimental; to investigate the appearance of thirst in 12 elderly and ten young individuals through the infusion of hypertonic saline solution.	Thirst intensity assessment by the Analogic Visual Scale (0 to 10)
Pross, Demazières, Girard, Barnouin, Metzger, Klein et al. (2014) ⁽²⁸⁾	Quasi-experimental; to assess the effects of the increase and reduction of water ingestion in the humor and few sensations in 52 volunteers.	Thirst intensity assessment by the Analogic Visual Scale (0 to 10)
Buehrer, Hanke, Klaghofer, Fruehauf, Weiss, Schmitz (2014) ⁽²⁹⁾	Experimental; to compare scoring of hunger and thirst with magnetic resonance imaging of the residual gastric content, in 30 voluntary children of 6 to 12 years.	Thirst intensity assessment by the Verbal Numeric Scale (0 to 10)
		Thirst intensity assessment by Face's Scale
Klemetti, Kinnunen, Suominen, Antila, Vahlberg, Grenman et al. (2010) ⁽³⁰⁾	Randomized controlled trial;	Thirst intensity assessment by the Analogic Visual Scale (0 to 10)
	To analyze if the face-to-face nutritional pre-operative fasting counseling can increase hunger and thirst responses in 116 children, of 4 to 10 years, in the post-operative after tonsillectomy surgery.	Thirst intensity assessment by Face's Scale

DISCUSSION

Thirst is described as the desire to drink water; it is a subjective and multifactorial symptom, influenced by cultural, social, environmental aspects, and by habits and manners of the individual^(1,4). Therefore, to measure it is a challenge due to the complexity to assess its multiple dimensions and aspects. This study contributes for the deepening in the comprehension of the thirst symptom as it identifies and compiles assessment dimensions and the measurement instruments used to assess it, inside and outside of hospital environments.

In the analyzed publications, the assessment of the thirst intensity dimension was predominant. The intensity was identified through the application of scales commonly used to assess pain: VAS, VNS, and, FS, The VAS also assessed the xerostomia intensity.

The behavior resulting in the water ingestion is mainly a result of volume changes and hydro-electrolytic balance⁽¹⁾. Due to the need to assess the osmotic alterations by non-invasive methods, clinical trials investigate the applicability and sensibility of the VAS and VNS in the thirst assessment, correlating with results from laboratory exams. We found a significant correlation of high scores of thirst with high blood osmolality in 10 publications; in eight, we found a correlation with high ADH levels⁽²⁾. Therefore, the VAS and VNS are seen in the clinical practice as a simple method indicative of osmotic changes, and it can help the health team to measure thirst.

The origin of thirst, besides englobing physiological mechanisms, suffers the action of neuronal and hormonal factors, learned behaviors, as the signs referring to dry mouth and throat and, full stomach sensation^(1,24,37). Despite that, many guidelines of scientific associations, within them the North-American Nursing Diagnoses Association (NANDA), address thirst exclusively from the fluid balance and unbalance perspective. However, the mechanisms that identify it, as well as, the ones that alleviate thirst involve complex interaction processes with the environment, processes of health and disease, personal habits, within others. Thus, it is important to identify these components to implement actions for thirst management^(3-4,37). Thirst is expressed through multiple attributes or signals; some are thick saliva, dry lips and thick tongue, which needs consideration when the objective is to measure thirst.

The results of our study indicate that the identified thirst dimensions are considered isolated or independent in the measurement instruments, predominantly focused on the intensity and symptoms related to mucus dryness and in specific populations, as patients submitted to hemodialysis.

Individuals experiencing thirst describes oral cavity dryness as the most unpleasant attribute and the most frequent⁽¹⁾. Thus, instruments were developed to specifically measure it.

The Xerostomia Inventory is a valid and reliable instrument tested with elderly⁽³⁸⁾. However, it is used in patients with chronic kidney disease submitted to hemodialysis, to identify the frequency of thirst, in conjunction with the also valid and reliable Dialysis Thirst Inventory⁽³⁹⁾.

The Xerostomia Inventory includes 11 items; and the thirst, seven. Both consists of a five-point Likert-type scale, where one corresponds to “never” and five corresponds to “frequently”, about the assessed

item⁽³⁸⁻³⁹⁾. A final score of 11 in the Xerostomia Inventory means that “the mouth is not dry”, while 55 indicates that “the mouth is extremely dry”⁽³⁸⁾. The final score of seven in the Thirst Inventory corresponds to “not thirsty”; of 35, to “very thirsty”⁽³⁹⁾.

The dry mouth attribute, although it indicates the thirst perception, it should not be the only determinant to characterize and manage it. The discomfort provokes changes that surpass physical limits, expanding to the psychological, social, spiritual and even environmental limits of a person⁽⁴⁰⁾. Thus, it is important to measure not only the objective thirst attribute but also the discomfort coming from it.

The thirst discomfort is the level in which the individual is uncomfortable with it or an associated discomfort. To assess thirst discomfort in dialytic patients, a scale was created and went through the validation process. The Thirst Discomfort Scale also consists of a five-point Likert-type scale composed of six items, where the score one corresponds to “extremely disagree”, and five to “extremely agree” with the assessed item⁽⁴¹⁾.

In a study conducted with ICU patients, the discomfort and the intensity of symptoms were measured by two three-point Likert-type scales – within them, thirst – experienced by patients. In the discomfort assessment, they answered “not too uncomfortable”, “moderate discomfort” and “very uncomfortable”⁽²²⁾. The assessment was global, without showing components and dimensions interfering in the patient’s discomfort. For the thirst intensity, the patients classified it as “medium”, “moderate” and “severe”⁽²²⁾.

These instruments are in fact valid and reliable to assess xerostomia, thirst, and discomfort caused by it in patients with chronic clinical conditions, which predispose them to develop thirst. However, due to its extension, it can be difficult to apply to some groups of patients, as the surgical ones in anesthetic recovery.

Thus, although we identified the scales assessing the thirst dimensions, studies are lacking, incipient and with predominantly focus on intensity. They are focused on patients submitted to hemodialysis sessions and admitted to the ICU, and only one study assessed thirst in surgical patients⁽⁹⁾.

The surgical patients are exposed to a confluence of factors resulting in thirst: pre-operative fasting, intubation, drugs used for surgical anesthesia, intraoperative bleeding and prolonged oxygen therapy^(4,9). As result of these factors, which predispose them to develop thirst, the demand for instruments to explore and characterize not only the thirst intensity is real. Also, the various discomfort dimensions experienced by patients during the perioperative period. We verified that in the selected studies, the discomfort assessment does not exactly discriminate the peripheral components that cause it, like dry mouth, chapped lips and thick saliva.

Thirst is a prevalent symptom in diverse clinical practice scenarios, and it causes intense discomfort in hemodialysis patients⁽⁴¹⁾, patients in ICU^(3,7), children⁽⁴²⁾ and surgical patient^(5,9). Patients reported desperation feelings and even mentioned death when they are encouraged to describe their thirst experience⁽⁵⁾.

However, the value of this symptom given by the team is still insufficient⁽¹²⁾, the use of measurement instruments and, strategies to treat it. A better characterization of thirst experienced by patients and, the intentional approach of more than one dimension during the assessment, could be the beginning to

comprehend and treat this symptom more effectively.

CONCLUSION

To identify and to measure thirst and its discomfort are the first steps to broaden the conscience of the health team aiming to use safe and efficient measures to decrease thirst of patients in the clinical practice.

As a result of this review, we identified that thirst dimensions – intensity, frequency, and discomfort – were identified by Analogic Visual Scale, Verbal Numeric Scale and Face's Scale, extensively used to validate the pain symptom, and by the Thirst Inventory, Xerostomia Inventory and Thirst Discomfort Scale. It was evident that besides not including all the thirst dimensions, the existing assessment instruments are directed to specific populations, as hemodialysis patients and those in ICU, and with the primary focus the measurement of intensity.

Thus, the multifactorial cause is not yet valued and also the repercussions for the individual experiencing thirst, once existing instruments aim to identify isolated components of this complex symptom. Within the study limitations, there are the different methods used in by included studies, once not all described instruments were validated, impeding comparison of results.

New studies should be conducted to create and validate instruments comprehending thirst assessment and its multi-factors and, overall, subjectivity, as well as, the repercussions for the individual who experiences it.

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