

Validation process of voice self-assessment instruments in Brazil

Processo de validação de instrumentos de autoavaliação da voz no Brasil

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ABSTRACT

Objective: to characterize and reflect on the process of cultural equivalence and/or validation of vocal self-assessment instruments translated and adapted to the Brazilian Portuguese, used in clinical practice and scientific research. **Research strategy:** The search of articles was carried out in the following databases: SciELO, LILACS, PubMed and “The Cochrane Library”. **Selection criteria:** The studies were selected regarding the presence of the descriptors cited in their title, abstract or in the list of descriptors; validation articles of a self-assessment instrument in voice or with the objective of performing cultural equivalence; to be directed to the Brazilian population; original studies with a sample of human beings; regardless of the age of the life cycle, type of dysphonia or vocal symptoms. **Results:** Nine articles were selected. Quality of life in voice and vocal handicap were the most addressed constructs. Most validations occurred in the Southeast region of Brazil. The scores of the instruments is calculated by a simple sum of the answers given by the participants in the items; cutoff points are not always presented. The domains of the instruments, as well as the items that compose them, were maintained as presented in the instrument in its original. The most common statistic for instrument analysis was Cronbach’s Alpha coefficient. **Conclusion:** The constructs most addressed in the selected articles were quality of life in voice and vocal handicap index. The instruments were considered valid and sensitive for vocal self-assessment, even not considering the international proposals for validation of health instruments.

Keywords: Validation Studies; Inventories and Questionnaires; Self-assessment; Dysphonia; Voice Disorders

RESUMO

Purpose: caracterizar e refletir sobre o processo de equivalência cultural e/ou validação de instrumentos de autoavaliação vocal traduzidos e adaptados para o português brasileiro, utilizados na prática clínica e em pesquisas científicas. **Estratégia de pesquisa:** Buscas realizadas nas bases de dados: SciELO, LILACS, PubMed e The Cochrane Library. **Crterios de seleço:** estudos selecionados quanto à presença dos descritores citados em seu título, resumo ou lista de descritores; artigos de validação de instrumento de autoavaliação em voz, ou com o objetivo de realizar equivalência cultural; direcionados à população brasileira; estudos originais com amostra de seres humanos, independentemente da idade do ciclo vital, tipo de disfonia ou sintomas vocais. **Resultados:** nove artigos selecionados. Qualidade de vida em voz e desvantagem vocal foram os construtos mais abordados. A maioria das validações ocorreu na Região Sudeste do Brasil. A maior parte dos escores dos instrumentos foi calculada por somatório simples das respostas dos participantes nos itens; pontos de corte nem sempre foram apresentados. Os domínios dos instrumentos, bem como os itens que os compunham, foram mantidos conforme apresentado no instrumento em sua língua original. A estatística mais comum para análise dos instrumentos foi o coeficiente Alfa de Cronbach. **Conclusão:** os construtos mais abordados nos artigos selecionados foram qualidade de vida em voz e índice de desvantagem vocal. Os instrumentos foram considerados válidos e sensíveis para autoavaliação vocal, mesmo quando não consideradas as etapas propostas internacionalmente para validação de instrumentos em saúde.

Descritores: Estudos de validação; Inventários e questionários; Autoavaliação; Disfonia; Distúrbios da voz

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INTRODUCTION

Voice evaluation should be interdisciplinary, multidimensional and holistic⁽¹⁻³⁾, since voice production is a complex phenomenon and involves biopsychosocial issues^(1,2). Thus, any vocal measurement that uses only one parameter can be considered, at least, reductionist⁽⁴⁾, since studies⁽⁴⁻⁷⁾ suggest the inclusion of aspects such as: laryngeal examination, auditory perceptual analyses of vocal and acoustic quality of various component parameters of sound, voice aerodynamics, basic body examination, expressiveness assessment, exposure to risk factors and self-assessment of the impact of the voice problem from the patient's perspective⁽⁵⁻⁷⁾.

The individual's perspective has been valued in the last three decades and composes the concept of health of the World Health Organization – WHO⁽⁸⁾, whose positioning has had a great impact on the area of clinical voice, in such a way that, currently, a voice evaluation is not considered complete if not including the patient's self-perceived voice and the damage related to the voice problem⁽⁸⁻¹²⁾.

The self-assessment of any aspect related to voice contributes to the reflection on the vocal phenomenon, increases the perception of the problem and allows a better understanding of the communication in general and vocal behavior of the individual, which is often not observable or reported spontaneously in the clinical environment, besides bringing information that is not obtained by any other evaluative dimension⁽⁹⁻¹¹⁾. The correlation between clinical speech-language pathology evaluation and patient self-assessment, although positive, is very weak^(12,13), not allowing the inference of the patient's perception.

There are several instruments⁽¹⁴⁻¹⁸⁾ and constructs used to verify the self-assessment of the person who presents a vocal complaint/problem, which have been more frequent in the clinic and in research. They approach aspects such as: impaired voice quality of life, symptoms related to problems in the larynx and/or voice, perception of disadvantage due to some vocal alteration and type of coping in dysphonia, therapy adherence, among others^(7,9-11), and are usually presented as questionnaires with closed questions, which represent a rapid, noninvasive and easy-to-manage strategy to obtain essential information in the decision of vocal diagnosis^(19,20). Many allow the quantification of the impact caused by dysphonia, evaluation of patient evolution and support of therapeutic decisions^(11,19,20).

These protocols were generally constructed and validated in American English⁽¹⁴⁻¹⁸⁾ and are configured as measurement instruments, composed of a set of items, whose answers are usually categories ordered on a Likert scale⁽²¹⁾, a widely used psychometric strategy that allows knowing the level of agreement of the respondent, in addition to nominal, dichotomous or ordinal, interval and proportional scales. These answer keys are used in the calculation of questionnaire scores, which are able to estimate the characteristics/variables related to the investigated aspect, also called latent trait⁽²²⁾.

Brazilian researchers quickly^(9,14-18) understood the relevance of using such instruments and committed themselves to culturally adapt, translate and validate for the Brazilian Portuguese some of those questionnaires that propose to measure vocal aspects to contribute to the determination of the presence of a voice problem.

These validation processes are generally based on the steps of the Scientific Advisory Committee (SAC), the Medical

Outcomes Trust⁽²³⁾, which are the most used in Health and in Brazil, namely: conceptual and measurement model; reliability; validity; sensitivity; interpretability; administration and response demand; alternative modes of application; linguistic and cultural adaptation.

Thus, with the growth of validation studies of voice self-assessment instruments in Brazil, their application and use in clinical practice and scientific research, it is important to observe and describe their methodological processes and steps followed. Thus, this study sought to answer the following guiding question: How is the validation process performed for the Brazilian Portuguese of the voice self-assessment instruments proposed in the literature, in relation to their development, analysis and psychometric properties?

OBJECTIVE

The objective of this systematic review was to characterize and reflect on the process of cultural equivalence and/or validation of voice self-assessment instruments translated and adapted to the Brazilian Portuguese, used in clinical practice and scientific research.

SEARCH STRATEGY

This is a systematic literature review that addressed the “validation of voice self-assessment instruments” and was performed through the search for articles related to the theme at the databases: SciELO, LILACS, PubMed and “The Cochrane Library”, developed in November 2019, following the recommendation PRISMA (Reporting Items for Systematic Reviews and Meta-Analyses)⁽²⁴⁾.

The Health Sciences descriptors (HSD) in portuguese and their english correspondents were used to search for: *Distúrbios da voz/* Voice Disorders and *Disfonia/* Dysphonia associated with the boolean operator “and” a *Estudos de Validação/* Validation Studies, and *Inquéritos e Questionários/* Surveys and Questionnaires. Thus, the following combinations were formed: “Voice Disorders” and “Validation Studies”, “Voice Disorders” and “Surveys and Questionnaires”, Dysphonia and “Validation Studies” and Dysphonia and “Surveys and Questionnaires”.

SELECTION CRITERIA

Figure 1 describes the method for selecting the articles. Titles, abstracts and complete articles were read, which were selected according to the following eligibility criteria: a) presence of the descriptors cited in their title, abstract or key words; b) article of validation of a voice self-assessment questionnaire or whose objective was to perform cultural equivalence; c) directed to the Brazilian population; c) original studies with a sample of humans; d) encompassing any age of the life cycle and type of dysphonia or symptoms of vocal problems.

The research was not restrictive regarding language and year of publication. Articles in more than one database and/or keyword search were considered only once.

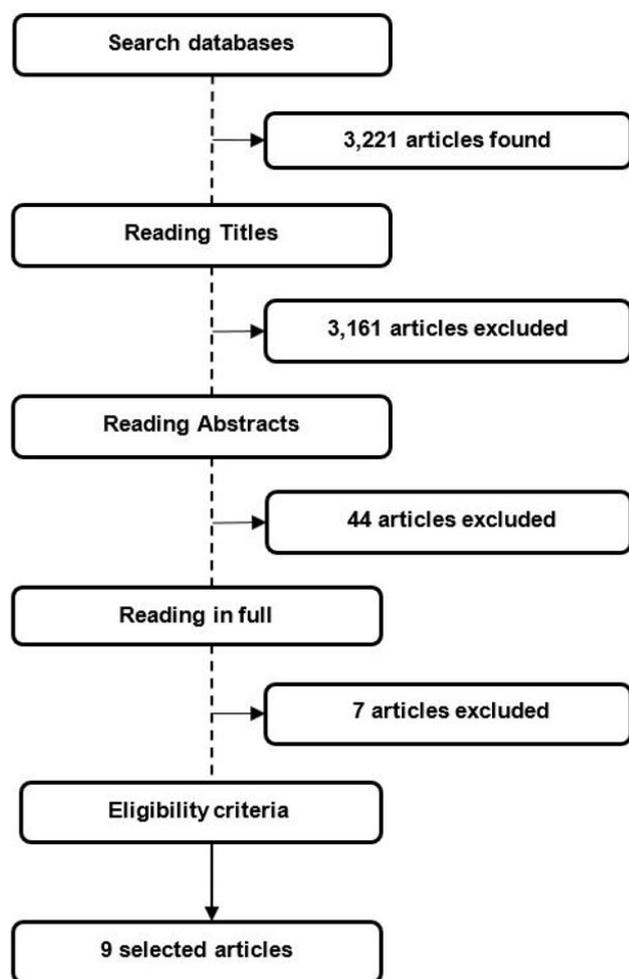


Figure 1. Strategies to select the studies for the systematic review

DATA ANALYSIS

The research at the databases was carried out by two reviewers independently, which occurred initially from the reading and evaluation of the titles and abstracts of the articles found according to the descriptors, in which the relationship with the proposed theme and framing in the selection criteria was observed. Then, the studies were forwarded for evaluation of the full text. The divergences between the evaluators were re-examined by a third evaluator in order to resolve the divergence and thus include or exclude the article in question. Manuscripts that met the eligibility criteria were selected for data analysis and categorization based on the following aspects: a) objectives; b) year of publication; c) place of validation; d) name of the instrument; e) construct; f) target population (pathology, sex and age); g) sample size; h) acquisition of the scores; i) statistical tests; j) whether there was pre, during and post-therapy application; and l) conclusions.

The data were systematically presented, following the chronological order of publication of the article and highlighting the pre-established aspects.

RESULTS

The initial search returned 3,221 articles from the pre-established databases. After reading the titles, 3,161 articles were excluded, leaving 60 studies; with the reading of the abstracts, 44 articles were excluded, leaving 16, and when with the full reading, seven were excluded, leaving nine articles, which presented all eligibility criteria, composing the final sample of this study (Figure 1).

Tables 1 and 2 present general methodological characteristics of the nine articles selected for the review and of the validation processes of voice self-assessment instruments. No study eliminated or added items when compared to the originals, validated internationally.

The participants were 1,390 individuals in both validation and cultural adaptation studies, with an average of 154.44 (± 82.40) per article, and 7 (77.8%) studies had one group of patients with voice complaints and another group without complaint (control) (Table 1).

Most articles ($n=6$; 66.7%) included the cultural and linguistic adaptation of the instruments, to suit the Brazilian Portuguese, and all mentioned that it was a phase of the validation process, carried out according to the standards proposed by the Scientific Advisory Committee (SAC), of the Medical Outcomes Trust (Committee of the Scientific Council of the Association of Medical Outcomes)²⁴. Voice quality of life and voice handicap were the constructs most addressed in the validated protocols (Table 1).

In relation to the target population, only the Brazilian Pediatric Voice-Related Quality-of-Life survey (VR-QOL-P) is intended for children and adolescents. The other instruments were structured to cover mainly adults and the elderly. All were intended for individuals of both sexes, sensitive to evaluating people with dysphonia or vocal symptoms. It was also noticed that most of the instruments ($n=6$; 66.7%) was adapted and validated in the Southeast region of Brazil, mainly in the State of São Paulo (Table 1).

The instruments were composed of a number between 10 and 32 items, all with response options according to the Likert or Likert-type scale, with five or more response possibilities. In addition, the majority ($n=7$; 77.8%) has domains related to the construct (Table 2).

In relation to obtaining the scores, in order to quantify the latent trait evaluated, the way of calculating is based on the simple sum of the answers given by the participants in each item, except for the URICA-V scale and the Brazilian Version of the Voice-Related Quality of Life (V-RQOL), whose calculations are differentiated, which have mathematical formulas, and consider the items and their domains (Table 2). The V-RQOL uses the classic formula of quality of life assessment protocols. Only the Vocal Performance Questionnaire (VPQ), the Voice Symptom Scale (VoiSS) and the URICA-V present cutoff points in their validation studies, and the latter used the values referring to the original protocol (Table 2). The cutoff points of the other instruments were defined in a later study^(17,28), but not in the first publication of the scale in Portuguese, which were the ones selected in this study.

The domains of the instruments, as well as the items that compose them, were defined according to the protocols in the original language, that is, no additional factor analysis was performed in Portuguese to confirm the existence of the same

Table 1. General characteristics of the studies selected for the systematic review and the validation process of voice self-assessment instruments

Author/Year	Instrument	Construct	Objectives	Target Population	Local da coleta	Tamanho da Amostra
Gasparini and Behlau ⁽¹⁴⁾ (2009)	Brazilian Version of the Voice-Related Quality of Life (V-RQOL)	Voice quality of life	<ul style="list-style-type: none"> · Cultural Adaptation: Brazil · Instrument Validation 	<ul style="list-style-type: none"> · Individuals with different types of dysphonia · Both sexes 	São Paulo – SP	<ul style="list-style-type: none"> · Cultural Adaptation – UNINFORMED · Validation – 234 individuals; 114 with voice complaint; 120 without voice complaint
Behlau et al. ⁽⁶⁾ (2011)	Voice Handicap Index (VHI)	Voice Handicap	<ul style="list-style-type: none"> · Cultural Adaptation: Brazil · Instrument Validation 	<ul style="list-style-type: none"> · Adult and elderly people (18 - 79 years) · Individuals with different types of dysphonia · Both sexes 	São Paulo – SP	<ul style="list-style-type: none"> · Cultural Adaptation – 10 individuals · Validation – 116 individuals; 52 with voice complaint; 64 without voice complaint
Paulinelli et al. ⁽²⁵⁾ (2012)	Vocal Performance Questionnaire (VPQ)	Changes in Vocal Deviation and voice quality of life	<ul style="list-style-type: none"> · Cultural Adaptation: Brazil · Instrument Validation 	<ul style="list-style-type: none"> · Adult and elderly people (18 - 79 years) · Individuals with different types of dysphonia · Both sexes 	Belo Horizonte – MG	<ul style="list-style-type: none"> · Cultural Adaptation – 17 individuals · Validation – 325 individuals; 160 with voice complaint; 165 without voice complaint
Costa et al. ⁽¹¹⁾ (2013)	Voice Handicap Index (VHI -10)	Voice Handicap	<ul style="list-style-type: none"> · Instrument Validation 	<ul style="list-style-type: none"> · Adolescents, Adult and Elderly people (13 - 80 years) · Individuals with different types of dysphonia · Both sexes 	Santo Amaro/São Paulo – SP	<ul style="list-style-type: none"> · Cultural Adaptation – 15 individuals · Validation – 110 individuals; 60 with voice complaint; 50 without voice complaint
Teixeira et al. ⁽¹⁶⁾ (2013)	URICA – V	Voice treatment adherence	<ul style="list-style-type: none"> · Voice scale adaptation · Instrument Validation 	<ul style="list-style-type: none"> · Adult and elderly people (18 - 87 years) · Individuals with different types of dysphonia · Both sexes 	Minas Gerais	<ul style="list-style-type: none"> · Cultural Adaptation – 10 individuals · Validation – 66 individuals with voice complaint

Table 1. Continued...

Author/Year	Instrument	Construct	Objectives	Target Population	Local da coleta	Tamanho da Amostra
Ricarte et al. ⁽²⁶⁾ (2013)	Voice Activity and Participation Profile (VAPP)	Quality of life, participation in voice activities	· Cultural Adaptation: Brazil · Instrument Validation	· Individuals with different types of dysphonia · Both sexes	São Paulo – SP	· Cultural Adaptation – 10 individuals · Validation – 50 individuals; 25 with voice complaint; 25 without voice complaint
Ribeiro et al. ⁽¹⁰⁾ (2014)	Brazilian Pediatric Voice-Related Quality-of-Life survey (VR-QOL-P)	Voice quality of life	· Instrument Validation · Relationship between vocal assessment performed by parents and VR-QOL-P score	· Adult and elderly people (18 - 65 years) · Parents or guardians of children and adolescents with dysphonia · Both sexes	Uninformed	· Cultural Adaptation – 16 individuals · Validation – 246 individuals; 112 parents of children with voice complaint; 118 parents of children without voice complaint
Moreti et al. ⁽¹⁵⁾ (2014)	Voice Symptom Scale (VoiSS)	Voice Symptoms	· Cultural Adaptation: Brazil · Instrument Validation	· Children and adolescents with dysphonia (2 - 18 years) · Individuals with different types of dysphonia · Both sexes	São Paulo – SP	· Cultural Adaptation – 15 individuals · Validation – 300 individuals; 160 with voice complaint; 140 without voice complaint
Oliveira et al. ⁽²⁷⁾ (2016)	Voice Disability Coping Questionnaire (VDCQ) - 15	Dysphonia coping	· Cultural Adaptation: Brazil · Instrument Validation	· Adolescents, Adults and Elderly people · Individuals with different types of dysphonia · Both sexes · Adults (20 - 54 years)	São Paulo – SP	· Cultural Adaptation – 14 individuals · Validation – 178 individuals; 87 with voice complaint; 91 without voice complaint

subscales or domains of the questionnaires. Only the Voice Disability Coping Questionnaire (VDCQ VDCQ-15) performed Confirmatory Factor Analysis to verify if there was a change in relation to items and domains after cultural adaptation to the Brazilian Portuguese.

The most common statistic for instrument analysis was Cronbach's Alpha coefficient, which aims to evaluate its reliability. Only the article on the URICA-V scale did not use this test (Table 3).

Wilcoxon and t-Student tests were mainly used to monitor the sensitivity of questionnaires (scores) before and after therapy moments, also used in the case and control intergroup comparison. The ANOVA and Kruskal Wallis tests were used when comparing three or more population groups. To test the sensitivity of the items individually, one of the tests used was the Wilcoxon Signed-Rank Tests (Table 3).

Pearson or Spearman's correlation tests were cited (Table 3) as evidence of data validity, because the scores extracted from the instruments were correlated with voice self-assessment, as

Table 2. Characteristics for obtaining the scores and structure of voice self-assessment instruments validated for Brazilian Portuguese

Author/Year	Instrument	Number of Items	Type of scale	Score Acquisition	Domains	Cutoff point
Gasparini and Behlau ⁽¹⁴⁾ (2009)	Brazilian Version of the Voice-Related Quality of Life (V-RQOL)	10 items	Likert-type scale	Standard algorithm	Physical-Social, Social-Emotional, Total	Uninformed
Behlau et al. ⁽⁶⁾ (2011)	Voice Handicap Index (VHI)	30 items	Likert-type scale	Simple sum	Functional; Organic; Emotional and Total	Uninformed
Paulinelli et al. ⁽²⁵⁾ (2012)	Vocal Performance Questionnaire (VPQ)	12 items	Likert-type scale	Simple sum of item responses Total score ranging from 12 to 60, proportional to vocal impact	Uninformed	Above 12 points indicates drop in vocal performance
Costa et al. ⁽¹¹⁾ (2013)	Voice Handicap Index (VHI -10)	10 items	Likert-type scale	Simple sum of item responses. Total score, ranging from 0 to 40 points, proportional to the vocal handicap	Uninformed	Uninformed
Teixeira et al. ⁽¹⁶⁾ (2013)	URICA – V	28 Items	Likert-type scale	Sum of the average responses of the items corresponding to each stage of change excluding the items: 4,9,20,1 and 31 referring to pre-contemplation	Pre-Contemplation, Contemplation, Action, Maintenance	8 or less - pre-contemplation phase; 8-11 - contemplation phase; 11-14 - action phase
Ricarte et al. ⁽²⁶⁾ (2013)	Voice Activity and Participation Profile (VAPP)	32 Items	Likert-type scale	Participation Restriction Score (PRS)	Total, Activity Limitation Score (ALS)	Uninformed
Ribeiro et al. ⁽¹⁰⁾ (2014)	Brazilian Pediatric Voice-Related Quality-of-Life survey (VR-QOL-P)	10 items	Likert-type scale	Uninformed	Physicist; Socio-emotional and General	Uninformed
Moretti et al. ⁽¹⁵⁾ (2014)	Voice Symptom Scale (VoiSS)	30 Items	Likert-type scale	Simple sum of item responses, reaching up to 120 points. Score proportional to the perception of vocal symptoms.	Emotional; Limitation; Physical and Total	16 or more points determines vocal alteration
Oliveira et al. ⁽²⁷⁾ (2016)	Voice Disability Coping Questionnaire (VDCQ) - 15	15 items	Likert-type scale	Simple sum of item responses	Looking for help; Search for solution; Minimization; Acceptance	Uninformed

well as with the auditory perceptual analysis of the participants' voice, and, as this correlation was positive, the information of the instruments was considered valid.

The validation studies of the Protocols VR-QOL-Pand VoiSS used auditory perceptual analysis of the voice to make correlation with their scores, The V-RQOL, VPQ, VHI-10, VHI-30 and Voice Activity and Participation Profile (VAPP) VAPP considered vocal self-assessment and the VDCQ-15 used both auditory perceptual and self-assessment of voice quality (between excellent, very good, good, reasonable or poor) to correlate with protocol scores and verify its validity.

The Instruments V-RQOL, URICA-V and VDCQ-15 did not present reapplication tests after treatment and were indicated

only for evaluation. The others were tested and classified as sensitive to application during evaluation, monitoring and reassessment after voice rehabilitation.

The authors of the selected studies concluded that the proposed protocols are valid and sensitive, so that they provide reliable self-assessment data (Table 3). Half of the instruments of voice self-assessment (n=5, 55.6%) followed all the proposed stages for validation, according to the standards proposed by the Scientific Advisory Committee of the Medical Outcomes Trust⁽²³⁾ for the instrument validation process. In general, the validation stage least addressed in the studies was sensitivity (Table 4).

Table 3. Characteristics of the voice self-assessment instruments validation process

Author/Year	Instrument	Statistical Analysis	Tested Application	Conclusion
Gasparini and Behlau ⁽¹⁴⁾ (2009)	Brazilian Version of the Voice-Related Quality of Life (V-RQOL)	Kruskal-Wallis test; Cronbach's Alpha correlation; Wilcoxon test	Treatment assessment and monitoring (16 participants)	V-RQOL specifically evaluates patients with voice problems. It is valid, reliable and responsive to change. The Brazilian version can be proposed as an assessment of the quality of life of dysphonic patients and treatment. The VHI is valid, reliable and responsive to measures of assessment of change related to self-perceived voice handicap. It can be used to assess dysphonic patients and for treatment results.
Behlau et al. ⁽⁶⁾ (2011)	Voice Handicap Index (VHI)	Kruskal Wallis test; Wilcoxon test; Cronbach's Alpha correlation	Treatment assessment and monitoring (10 participants)	The VPQ proved to be valid, reliable, reproductive and sensitive to treatment, and it can be considered another option to relate quality of life with a voice problem.
Paulinelli et al. ⁽²⁵⁾ (2012)	Vocal Performance Questionnaire (VPQ)	Mann-Whitney test; Spearman's correlation; Wilcoxon test; Cronbach's Alpha	Treatment assessment and monitoring (39 participants)	The VHI-10 validated for Brazilian Portuguese, with validated psychometric properties, reliability and sensitivity for use in individuals with voice problems.
Costa et al. ⁽¹¹⁾ (2013)	Voice Handicap Index (VHI -10)	Spearman's correlation; Test of Wilcoxon signed stations; Cronbach's Alpha correlation	Treatment assessment and monitoring (21 participants)	The use of the URICA-V scale revealed that most patients with dysphonia being treated are in the contemplation stage, which may restrict the results of therapy. There was no relationship between demographic variables and adherence stages of the instrument.
Teixeira et al. ⁽¹⁶⁾ (2013)	URICA – V	Spearman's correlation; Test Stations Wilcoxon signage; Cronbach's Alpha	Assessment	The Brazilian version of the protocol (VAPP) is valid, reliable and sensitive specifically for assessing the quality of life of individuals with vocal disorders and the results of treatments.
Ricarte et al. ⁽²⁶⁾ (2013)	Voice Activity and Participation Profile (VAPP)	Chi-square; Analysis of Variance - ANOVA	Treatment assessment and monitoring (50 participants)	The Brazilian version of the protocol (VAPP) is valid, reliable and sensitive specifically for assessing the quality of life of individuals with vocal disorders and the results of treatments.
Ribeiro et al. ⁽¹⁰⁾ (2014)	Voice Activity and Participation Profile (VAPP)	Chi-square; Analysis of Variance - ANOVA	Treatment assessment and monitoring (50 participants)	

Subtitle: V-RQOL = Brazilian Version of the Voice-Related Quality of Life; VR-QOL-P = Brazilian Pediatric Voice-Related Quality-of-Life survey; VHI = Voice Handicap Index; IDV - 10 = Voice Handicap index: 10; VDCQ - 15 = Voice Disability Coping Questionnaire: 15; VoiSS = Voice Symptom Scale; VPQ = Vocal Performance Questionnaire; VAPP = Voice Activity and Participation Profile

Table 3. Continued...

Author/Year	Instrument	Statistical Analysis	Tested Application	Conclusion
		Chi-square test; Mann- test		The VR-QOL-P is validated for Brazilian Portuguese, with cultural equivalence and psychometric measures of validity, reliability and sensitivity, which have been satisfactorily tested.
	Brazilian Pediatric Voice-Related Quality-of-Life survey (VR-QOL-P)	Whitney; McNemar test; Wilcoxon Signed-Rank Test; Spearman's correlation; Likelihood Ratio; Cronbach's Alpha	Treatment assessment and monitoring (16 participants)	VoiSS is a valid, reliable instrument for assessing voice and vocal symptoms.
Moretti et al. ⁽¹⁵⁾ (2014)	Voice Symptom Scale (VoiSS)	T-Student test; Cronbach's Alpha correlation	Screening, treatment assessment and monitoring (86 participants)	It differs healthy individuals from dysphonic voices, confirming the use of this instrument in screening in high-risk populations.
Oliveira et al. ⁽²⁷⁾ (2016)	Voice Disability Coping Questionnaire (VDCQ) - 15/Coping with dysphonia	Confirmatory Factor Analysis; Analysis of Variance - ANOVA; Pearson's correlation; Bartlett's sphericity test; Kaiser-Meyer-Olkin index; Cronbach's alpha correlation	Assessment	The VDCQ-15 has undergone cultural adaptation and validation in an effective way and is a specific instrument for assessing patients with voice problems.

Subtitle: V-RQOL = Brazilian Version of the Voice-Related Quality of Life; VR-QOL-P = Brazilian Pediatric Voice-Related Quality-of-Life survey; VHI = Voice Handicap Index; IDV - 10 = Voice Handicap index: 10; VDCQ - 15 = Voice Disability Coping Questionnaire: 15; VoiSS = Voice Symptom Scale; VPQ = Vocal Performance Questionnaire; VAPP = Voice Activity and Participation Profile

Table 4. Instruments validated according to the requirements of the Scientific Advisory Committee (SAC), of the Medical Outcomes Trust

Author/Year	Instrument/ Construct	Committee steps							
		Step 1 (Conceptual and measurement model)	Step 2 (Reliability)	Step 3 (Validity)	Step 4 (Sensitivity)	Step 5 (Interpretability)	Step 6 (Form of administration and response)	Step 7 (Application mode)	Step 8 (Cultural and linguistic adaptation)
Gasparini and Behlau ⁽¹⁴⁾ (2009)	Brazilian Version of the Voice- Related Quality of Life (V-RQOL)/ Voice Quality of Life	X	X	X	--	X	X	X	--
Behlau et al. ⁽⁶⁾ (2011)	Voice Handicap Index / VHI - Voice Handicap	X	X	X	X	X	--	X	X
Paulinelli et al. ⁽²⁵⁾ (2012)	Vocal Performance Questionnaire - VPQ / Changes in Vocal Deviation and voice quality of life	X	X	X	X	X	X	X	X

Subtitle: V-RQOL = Brazilian Version of the Voice-Related Quality of Life ; VR-QOL-P = Brazilian Pediatric Voice-Related Quality-of-Life survey; VHI = Voice Handicap Index; VHI - 10 = Voice Handicap index: 10; VDCQ - 15 = Voice Disability Coping Questionnaire: 15; VoiSS = Voice Symptom Scale; VPQ = Vocal Performance Questionnaire; VAPP = Voice Activity and Participation Profile

Table 4. Continued...

Author/Year	Instrument/ Construct	Committee steps							
		Step 1 (Conceptual and measurement model)	Step 2 (Reliability)	Step 3 (Validity)	Step 4 (Sensitivity)	Step 5 (Interpretability)	Step 6 (Form of administration and response)	Step 7 (Application mode)	Step 8 (Cultural and linguistic adaptation)
Costa et al. ⁽¹¹⁾ (2013)	Voice handicap index - VHI- 10 / Voice Handicap	X	X	X	X	X	X	X	X
Texeira et al. ⁽¹⁶⁾ (2013)	URICA - V / Adherence to vocal treatment	X	-	X	--	X	X	X	--
Ricarte et al. ⁽²⁶⁾ (2013)	Voice Activity and Participation Profile (VAPP) / Quality of life, participation in voice activities	X	X	X	X	X	X	X	X
Ribeiro et al. ⁽¹⁰⁾ (2014)	Brazilian Pediatric Voice- Related Quality-of- Life survey (VR-QOL-P)/ Voice Quality of Life	X	X	X	X	X	X	X	X
Moreti et al. ⁽¹⁵⁾ (2014)	Voice Symptom Scale - VoiSS/ Voice Symptoms	X	X	X	X	X	X	X	X
Oliveira et al. ⁽²⁷⁾ (2016)	Voice Disability Coping Questionnaire - VDCQ - 15/ Dysphonia coping	X	X	X	--	X	X	X	X

Subtitle: V-RQOL = Brazilian Version of the Voice-Related Quality of Life ; VR-QOL-P = Brazilian Pediatric Voice-Related Quality-of-Life survey; VHI = Voice Handicap Index; VHI - 10 = Voice Handicap index: 10; VDCQ - 15 = Voice Disability Coping Questionnaire: 15; VoiSS = Voice Symptom Scale; VPQ = Vocal Performance Questionnaire; VAPP = Voice Activity and Participation Profile

DISCUSSION

The present review gathered studies that aimed to culturally adapt and validate the self-assessment protocols in Brazil thus far, which are used in clinical practice and research, such as: Brazilian Version of the Voice-Related Quality of Life (V-RQOL)⁽¹⁴⁾, to measure a negative impact on quality of life due to dysphonia; Voice Handicap Index – VHI⁽⁶⁾, to measure the perception of disadvantage resulting from the manifestation of dysphonia; Vocal Performance Questionnaire – VPQ⁽²⁶⁾ and Voice Activity and Participation Profile (VAPP)⁽²⁵⁾, in order to observe the individual's communication; URICA – V⁽¹⁶⁾, adapted to evaluate the stage of treatment of patients with

dysphonia; Brazilian Pediatric Voice-Related Quality-of-Life survey (VR-QOL-P)⁽¹⁰⁾, Voice Symptom Scale – VoiSS⁽¹⁵⁾, to investigate the occurrence of laryngeal, vocal symptoms and the perception of limitations due to dysphonia; Voice Disability Coping Questionnaire – VDCQ-15⁽²⁷⁾, with the objective of evaluating how the individual is dealing with dysphonia.

Each validation process was analyzed, since the guarantee of the reliability of an instrument should be based on the planning and observance of all procedures⁽²⁹⁾ and that many protocols related to voice self-assessment considered this planning in their validation.

The articles of validation of health instruments tend to be planned according to the main stages of validation of the

Scientific Advisory Committee (SAC), of the Medical Outcomes Trust⁽²³⁾, the most used in Brazil today, despite not being the only recommendation. Six steps are foreseen: (1) conceptual and measurement model, (2) reliability, (4) validity, (5) sensitivity, (5) interpretability, (6) demand for administration and response, (7) alternative modes of application and (8) linguistic and cultural adaptation.

Thus, the first (1) stage is related to the conceptual and measurement model, which makes the instrument more rational, including data from the target population and information from specialists, characterizing the development of the instrument, allowing its adaptation to another language and culture. The second (2) and the third (3) steps are related to reliability, which measures the acquisition of reliable data, through the analysis of internal consistency with the use of Cronbach's alpha, and reproducibility, application of the test-retest, in addition to the search for evidence of validity, which certify whether the instrument measures what is proposed to be measured, respectively⁽²³⁾.

The fourth (4) step measures the sensitivity of the test in detecting longitudinal changes, comparing groups before and after therapy moments, for example. This stage is followed by interpretability (5), a measure that allows offering a qualitative meaning to the score obtained in the scores, which is complementary to the sixth (6) rule related to the alternative forms of response and administration of the questionnaire, such as: application time, reading level, comprehension, energy and other requirements related to the population in relation to the instrument⁽²³⁾.

The seventh (7) step corresponds to alternative modes of application, including instruments applicable by the evaluator, self-applicable, or applied through the computer, for example. The last stage (8) corresponds to linguistic and cultural adaptation, which is the most performed in the articles reviewed in the present study, in which the translation and adaptation of the instruments of voice self-assessment for the Brazilian Portuguese is made.

Usually in the description of the eighth stage, the studies report that it was performed by bilingual speech therapists and a professional translator, not involved in the previous stages⁽²³⁾. Subsequently, the translated versions were analyzed and modified by consensus by other speech therapists who are experts in voice and fluent in English. The translated instrument is also applied to a group of individuals belonging to the target population, in order to identify the level of clarity and understanding of each item. If necessary, changes are made until reaching the final instrument^(6,10,14,16,25-27,30).

For the elaboration of an instrument of measures, it is necessary to define what should be measured and how this measurement should be performed, from the determination of its validity. Validity refers to the ability that the methods used in a research provide to the reliable achievement of its objectives and consequently to the characteristic if in fact a test is measuring some real attributes that it is supposedly measuring. Validity is the true measure that consists of how useful the test is^(31,32).

Validity, therefore, is not a unitary concept, and there are several ways to evaluate it, each with greater relevance due to the objective and contexts in which the evaluation instrument is intended. It can be estimated by the following methods: content validity, validity related to a criterion and validity of the construct⁽³¹⁾.

The protocols of the Voice area were validated for the Brazilian Portuguese, published in the journals, and later

used in observational and interventional research, whose purpose was to produce scientific evidence on the studied vocal aspect (construct), in the most diverse populations and regions of the country. This fact should be considered during cultural adaptation, considering that Brazil is a country with vast territory and diversified population, with differentiated cultural and sociodemographic characteristics. It is emphasized, then, the importance of adapting a self-assessment instrument involving individuals from different regions of the country, in order to have a greater cultural scope, and consequently better application and acceptance among professionals and people with vocal problems.

Moreover, protocols developed in a given culture apply specifically to that reality and, if they need to be used in different situations, another validation process should be carried out^(25-27,29), considering not only the language, but the population and cultural characteristics of the country. In this process, the instrument should be applied with the target individuals for further analysis of the responses and obtaining the calculations of the scores so that the psychometric measurements can be inferred for other samples with similar characterization.

The type of statistical modeling used in the analysis of the psychometric measurements of the selected voice self-assessment instruments was the Classical Test Theory (CTT), which is more traditional and commonly used in validation studies. In this model, the level of the attribute/score is given as the sum of the answers in each of the items, as observed in the calculations suggested in the studies that validated questionnaires in the voice area.

However, this method suffers from limitations, because its parameters are generalist, considering standard values of the response scale of the items, besides relying directly on the sample of individuals studied, so that the results for the same test may vary according to the sample^(33,34), which reinforces the idea that it is not recommended to perform inferences from test scores performed in different populations.

Although CTT has great importance and usefulness, due to its limitations, some authors have proposed the application of more modern theories, such as the Item Response Theory (IRT), which is highlighted in relation to CTT^(35,36). The IRT allows working with the classification of the individual in relation to the latent trait; and analyzes each item of the instrument, which provides greater use of the information contained in each one, by giving them different weights according to their importance, in such a way that it improves sensitivity in the measurement of the latent trait^(22,34,37).

The most validated voice questionnaire adapted for several languages/cultures is the Vocal Handicap Index (VHI). A systematic review carried out with the objective of investigating the validation of different versions of the VHI-30 in relation to its validity, reliability and translation process found this protocol translated into 11 languages. This was considered reliable, with good internal consistency, but with moderate construction validity with regard to its domains⁽³⁸⁾.

The article published in 2007⁽³³⁾ already scored the limitations related to classical modeling of calculations (CTT), such as the validity and reliability being dependent on the sample, in addition to the question of determining the factors of the VHI, which presents three domains in the original Version in American English, but other studies found two⁽³⁹⁾ and up to four domains when confirmatory factor analysis⁽⁴⁰⁾ was performed in different populations. The study mentioned applied the IRT, based on

the RASCH model in the VHI-30, and concluded that the item-to-item analysis made the protocol more appropriate not only in the initial evaluation of the patient, but also to evaluate the efficacy of the therapy.

In addition to this article, other studies highlight the advantages of the IRT and suggest that this new proposal be applied in the validations of voice self-assessment questionnaires^(30,36,39). Therefore, this new proposal of calculations should be considered not only in the new validations, but also applied in the preexisting protocols, as described in this review⁽³³⁾.

Only in the validation of the VDCQ⁽²⁷⁾, confirmatory factor analysis was performed, in which the items corresponded to four factors/domains: search for help, search for solution, minimization and acceptance; differently from the domains indicated in the original study, whose instrument considers only two domains: focus on the problem and focus on emotion⁽²⁷⁾. Nevertheless, in the adaptation of the VDCQ to Portuguese Brazilian, the two domains of the questionnaire inherited from the English version were considered. The other studies use the factors of the original protocols. The URICA-V scale⁽¹⁶⁾ also uses the cutoff points of the original scale, that is, nonspecific for the voice area and for the Brazilian population.

It is interesting to reinforce the importance of exploratory factor analysis (EFA) and confirmatory analysis (CFA), in order to verify whether, in the Brazilian population, or in a specific population, the number of factors is similar to that of the instrument validated in another context, or if the items have the same relationship with the predetermined domains⁽⁴¹⁾.

Thus, the instruments initially directed to individuals with specific age groups and evaluating specific moments of treatment may become more comprehensive from the factor analysis and application of the IRT, considering that the individual's aptitude in relation to the vocal aspect investigated will be considered.

Another standardized step is validation itself, whose objective is to make the translated instrument compatible with the original, in relation to linguistic, conceptual and psychometric equivalence and reliability and sensitivity measures, for example, as well as that it measures what is proposed to measure⁽²⁹⁾.

As validation measures, the studies commonly presented correlations (Pearson and Spearman) between the scores of the questionnaires and the self-perceived voice^(10,15,25-27), which has been more valued, and/or clinical auditory perceptual evaluation⁽⁴²⁾, which is the reference standard most used in the area in Speech Therapy to prove its sensitivity. These measures also allow evaluating the sensitivity and specificity of the questionnaires. The measure of reliability is also a step in the validation process, and it is the ability of the test/item to reproduce a consistent result despite its analysis by different evaluators or moments, measured using Cronbach's Alpha coefficient⁽²⁹⁾.

Sensitivity is the ability of the test to identify differences in scores between groups of patients with different types of dysphonia, which was measured by the t-Student and Wilcoxon tests for two independent samples, Kruskal Wallis and ANOVA for more than two independent samples, in the cases described in this study. Another important measure in the validation process is responsiveness, which verifies whether the instrument detects changes in patients' conditions in relation to the latent trait, as occurs in pre- and post-therapy application, performed through paired tests in some of the selected studies^(29,43). These measures, important in the validation process, should be made in future studies, using those protocols.

URICA-V and VDCQ-15 did not present responsiveness data and, therefore, are indicated only in the initial evaluation. It would be interesting to verify the sensitivity of these three instruments to the rehabilitation process, especially to verify whether there was displacement from the stage of the change cycle to at least action or preferably maintenance on the URICA-V scale⁽⁴⁴⁾, whether there was the development of more functional coping strategies to deal with a possible recurrence of the problem in the VDCQ-15.

Although the URICA-V scale is not indicated for monitoring in the validation article⁽¹⁶⁾, studies^(45,46) used it to observe a change in the state of readiness before and after group and individual therapy. No significant results were found in relation to the sensitivity and responsiveness of the protocol, since no differences were observed in readiness between the moments of therapy in any of the therapeutic modalities (individual and group therapy), even though the individuals improved in other aspects^(45,46).

Moreover, a study⁽⁴⁷⁾ investigated the accuracy of existing domains on the URICA-V scale by means of confirmatory factor analysis. Some items of the questionnaire did not present a significant correlation regarding the domain of origin itself. These results allowed proposing an adjustment in the URICA-V scale to refine the skill of the instrument at the time of evaluation.

In view of the above, the selected studies sought to follow the validation standards, but, despite this, most validation processes have some gap to be better observed and solved, especially in relation to psychometric measures. This observation corroborates the findings in a systematic review conducted in 2010⁽³⁶⁾, which analyzed self-assessment protocols related to dysphonia based on the standards of the Scientific Advisory Committee (SAC) of the Medical Outcome Trust⁽²³⁾, and was able to conclude that there were problems related to development and deficits in the psychometric properties of the original instruments.

In general, the questionnaires validated in the articles selected in this review obtained good results in the statistical tests proposed for each stage, especially those that effectively followed most of the steps, and most concluded that the proposed protocols are valid, sensitive and provide reliable self-assessment data. Nevertheless, there was no evolution in relation to the analysis of the instruments, but a standardization of the methods, generally using the same statistical models. Therefore, studies should be conducted with the objective of applying contemporary methods, such as IRT in these instruments^(36,47), in order to improve its psychometric measures of discrimination, sensitivity, reliability and responsiveness, in addition to obtaining parameters related to the items and their real contribution to understanding the installation, maintenance and rehabilitation of dysphonia.

It is worth noting that there are other instruments of voice self-assessment, usually elaborated in English and translated/validated for the Brazilian Portuguese, in addition to those discussed in this article. They were not included in this review because they were not located in the research based on the search strategy, especially concerning the combination of the descriptors used, or because they do not meet the eligibility criteria, but are no less important for this. Some examples are: Vocal Tract Discomfort Scale (VTDS)⁽⁴⁸⁾, Voice Disability Coping Questionnaire (VDCQ-27)⁽¹⁸⁾, Brazilian Portuguese version of the Transgender Voice Questionnaire for male-to-female transsexuals (TVQ:MtF)⁽⁴⁹⁾, among others. These have validation characteristics similar to those of the protocols

described, and therefore, the suggestions discussed in the present study may extend to the other vocal self-assessment protocols.

Thus, the advance of computational, statistical and psychometric sciences, as well as in the voice area, has allowed the improvement of methods and made them naturally accessible, directing a new look at self-assessment questionnaires, from their elaboration to the review of their psychometric measurements^(36,47). The deepening of the stages to be fulfilled and on the contemporary methods of analysis should be considered from the first moment of the elaboration, or cultural adaptation, of an instrument of voice self-assessment, as well as in the standardization of pre-existing instruments, such as those presented in the present study. The reflections presented here can help researchers guide these processes.

CONCLUSION

This review found nine articles referring to self-assessment protocols for a voice problem validated for the Brazilian population. The validation of the studies sought to follow the internationally proposed standards. The constructs most approached by the instruments were quality of life in voice and vocal handicap index. The protocols covered all age groups of the life cycle, especially adults and the elderly, both sexes and were intended for individuals with dysphonia/vocal complaints.

In most cases, the questionnaires were validated in the Southeast region of Brazil, their calculations occur through the simple sum of the answers given by the participants in each item, do not present a cutoff point, and the domains of the instruments were defined according to the protocols in the original language. The most performed test was Cronbach's Alpha, which measures reliability. The URICA-V and VDCQ-15 instruments are indicated for evaluation only. The studies point out that the proposed protocols are considered valid and sensitive for vocal self-assessment, although some have not gone through all the stages for validation of health instruments.

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