INSTRUMENTS USED IN THE EVALUATION OF TEACHERS' VOICE: LITERATURE REVIEW

Instrumentos aplicados en la evaluación de la voz en profesores: estudio bibliográfico

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ABSTRACT

The purpose of this study is to conduct a literature review focused on the instruments used to assess an objective and qualitative voice of teachers. A bibliographic review of the publications listed in PubMed and Scielo over the past 5 years, was performed which were connected with the evaluation of voice teachers. The instruments used in the 15 articles found show that 80% of the studies involved questionnaires, 40% performed auditory perceptual assessments of the voice, 40% used telelaringoscopía or videostroboscopy, 33% did speech therapist or speech therapy evaluation, 27% performed sound analysis of the voice, laryngeal evaluation accounted for 27%, 27% use protocol characterization of the sample, 13% used a VHI scale, 13% evaluated the aerodynamic parameters, and only 7% used auto-co-hetero, a GRABSI scale, evaluation of articulation and posture, orofacial motricity assessment and dental evaluation. Several assessment tools were found that account for the diversity of both the instruments and the procedures used to evaluate the voice used especially in regard to questionnaires, and subjective evaluation protocols. Medical devices have a standard application protocol that allows you to replicate the procedure in the same way in different parts of the world; but in Speech Therapy all the procedures depend on the availability of instruments and the professional experience of the therapists.

KEYWORDS: Phonation; Voice Quality; Voice Disorders; Dysphonia

INTRODUCTION

The evaluation of the voice in the otorhinolaryngology services has had an heterogeneous application evidenced in the instruments used, because there aren't the same opportunities for exploration and evaluation of the voice parameters in all the medical centers that have this service. Furthermore, the different variables involved in the etiology of voice disorders make vocal pathology have different approaches and different results[1].

Generally, in capital cities state of the art instrumentation exists, but in provinces these possibilities are not available. This implies that the assessment instruments used depend on who is responsible for the voice evaluation. For teachers, if the referral occurs due to a voice disorder associated with their practice, the evaluation must be applied by a multidisciplinary team that identifies any triggering factors and indicates the procedures to follow, according to the altered parameters. The team of professionals is based on the Otorhinolaryngology and Speech Therapy assessment[2]; however, some studies have found articulation and posture patterns that are favoring the emergence of vocal disorders in teachers[2]. Emotional, psychosocial and life style aspects have also been considered in the studies found[3]. The tools described in the literature depend on the

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type of evaluation you want to perform or feasibility of having the studies proposed by the Basic Protocol of the Phoniatrics committee of the European Laryngological Society: videostroboscopy, perceptual analysis, aerodynamics and efficiency, acoustic analysis and subjective assessment by the patient. Objective methods point towards observing the anatomophysiology of the organs used in phonation, mainly the vocal cord, and seeing if the data from the instruments are within normal parameters. The usual clinical examination consists of an otorhinolaringology and speech therapy or phoniatric assessment: the first aims at an anatomophysiological observation of the vocal organs, and the second, to evaluate the quality of voice, technique, proper speech and articulation, activation of the resonator and the presence of nasalización[4]. The authors that favor the realization of a visual-perceptual evaluation of voice, mention Voice Handicap Index (VHI) as an instrument evidencing voice problems from multiple aspects of the patient's life: emotional, physical, functional, economic and others[5]. This index has been a subject of study to see if it is reliable to evaluate the voice when the objective assessment instruments are not available; some authors show that there is a relationship between the functional and emotional subscales of the VHI, and disruption of acoustic parameters[6], while others state that there is a large discrepancy between the two evaluations[7]. Another instrument that assesses the voice from a personal perception is the GRBAS scale with the degree of hoarseness, raspy voice, aerial voice, weak voice and forced voice[8], but they're still conducting studies to correlate the results of the GRBAS scale and the acoustic parameters. Señaris (2006) indicates as the basic exploring protocol: laryngostroboscopy, perceptual analysis of the severity of the dysphonia with the GRBAS scale, acoustic voice analysis, analysis of aerodynamic efficiency with maximum phonation time and perception from the patient with VHI scale. This protocol coincides with the method presented by the committee on Phoniatrics of the European Laryngological Society and the protocol used by Niebudek – Bogusz (2008). However, it is recognized that traditional voice evaluation medical protocols underestimate social and mental states[5], which is why you cannot do without functional assessment obtained by speech evaluation and auditory perceptual assessment. This work aims at performing a literature study focused on the instruments used to assess objectively and qualitatively the voice of teachers, as this group of professionals has the greatest risk factor associated with their profession and is the third cause of absence from work in Chile[9].

METHOD

To identify the instruments used in the evaluation of the voice, there was a survey of publications listed in PubMed and SCIELO. The first stage involved the search of the descriptors in Health Sciences – DECS – BIREME. The keywords were phonation, voice quality and voice training and Portuguese and English versions were also sought. The total number of articles analyzed were located through the following inclusion criteria: full papers published in the period 2006-2010, in Spanish, English or Portuguese where at least one assessment tool is considered to assess vocal performance in teachers. In the exclusion criteria articles that were not in Spanish, Portuguese or English were discarded and ones that were not centered on evaluating teacher vocal pathology such as voice assessment in elderly, hearing impaired, patients with aspiration, among others. Of the 1280 articles found, only 15 met the inclusion criteria, which were found both in the Scielo library and in Pubmed. According to this, the most commonly used instruments in voice evaluation in teachers were established and grouped into 3 tables: the first shows the items found specifying title, author, source, year, the second shows the percentage of the most widely used assessment instruments and the third, the questionnaires that were used in the studies found.

LITERATURE REVIEW

In the articles found evaluative procedures are observed using both subjective self-assessment instruments, as well as sophisticated electronic systems that observe full vocal cord vibration. Table 1 summarizes the instruments used in the literature found, indicating the title, year of publication and the assessments used. It was verified that 80 % of the studies deal with questionnaires, 40 % performed auditory perceptual evaluation of voice, 40 % use videostroboscopy or telelaringoscopía, 33 % do phoniatric or speech therapy evaluation, 27 % performed acoustic voice analysis, 27 % laryngeal evaluation, 27 % use characterization of the sample protocol, 13 % use VHI scale, 13 % evaluate the aerodynamic parameters and only 7 % use self- co – hetero evaluation, GRBASI scale, articulation and posture assessment, evaluation of orofacial mobility and dental evaluation. These results are shown in Table 2.

The types of questionnaires used are in Table 3, which shows that 80 % use self-administered questionnaire with general information on socio-demographic characteristics, lifestyle habits,

Table 1 – Published Articles that include instruments used to evaluate voice in teachers

	Tittle	Year	Assessment instruments found
1	Correlation between acoustic parameters and Voice Handicap Index in dysphonic teachers Niebudek et al, Folia Phoniatr Logop	2010	Scale VHI, ev. Laryngological, videolaringostroboscopy, analysis acoustic voice, perceptual evaluation of aerodinamic parameters.
2	Estilo de vida e agravos á saúde e voz em professores Servilha, Bueno. Disturbios da comunicação.	2010	Questionnaire: Vocal production conditions-teacher.
3	Adoecimiento vocal em professores Mestre, Merlin, Anais XVI Encontro de iniciação Científica da PUC.	2009	Questionnaire working conditions.
4	Prevalence of occupational voice disorders teachers. Angelillo et al. Jprev Med HyG.	2009	Questionnaire,characterization protocol the snapshot.
5	Tipificação de sintomas relacionados à voz e sua produção em professores identificados com ausência de alteração vocal na avaliação fonoaudiológica. Janeiro, Merlin. Anais do XVI Encontro de iniciação Cientifica da PUC	2009	Questionnaire vocal alteration, perceptual evaluation speech therapy.
6	Voz e disfunção temporomandibular em professores Machado et al, Rev. CEFAC	2009	Questionnaire, protocol, ev. Laryngological, videofibrolaringoscopy, Ev. Perceptual-hearing, ev. Orofacial motor, ev. Dental.
7	Voice disorders and mental health in teachers: a cross-sectional. Nerriérre et al, BCM Public Health.	2009	Questionnaire, International Diagnostic Interview short form.
8	Ações em saúde vocal: proposta de melhoria do perfil vocal de Professores. Alves et al, Pro-fono revista de Atualização Científica	2008	Questionnaire, ev. telelaringológica, ev. Perceptaul-hearing, scala GRBASI, Nordic Questionnaire.
9	Fatores associados a alterações vocais em professoras Araujo et al, CAd. Saúde Pública.	2008	Questionnaire, Questionnaire Job Content, protocol.
10	The effectiveness of voice therapy for teachers with dysphonia. Niebudek et al, Folia Phoniatr Logop	2008	Questionnaire, protocol, speech evaluation, ev. Laringeal, videostroboscopy, voice acoustic analysis.
11	Evaluation of voice acoustic parameters related to the vocal-loading test in professionally active teachers with dysphonia. Niebudek et al, International Journal of Occupational Medicine and Enviromental health.	2007	Questionnaire, ev. Foniatric, ev. Laringeal, videostroboscopy, Scala VHI
12	La evaluación fonopedagógica: un proceso bidimensional. Riquelme, Xandre. Avances de Investigación	2007	Questionnaire, speech evaluation, MDVP, interdisciplinary perceptual evaluation, self-assessment, peer assessment, and hetero.
13	Índice de incapacidad Vocal: Factores predictivos Señaris et al, Acta otorrinolaringológica del Hospital Universitario Central de Asturias	2006	EV. Laringostroboscopy, perceptual loudness analysis of hoarseness, voice analysis acoustic, aerodynamic efficiency analysis and perception of the patient.
14	Professores em contexto profissional e não profissional: análise objetiva e subjetiva dos aspectos da articulação e da postura. Reis et al, Disturbios da comunicação.	2006	Protocol simple characterization, ev. Speech therapy , joint registration and posture.
15	Sintomas osteomusculares em professores do Ensino Fundamental. Carvalho, Alexander. Ver. Bras. Fisioter.	2006	Nordic Questionnaire

characteristics of teaching job and vocal hygiene. A 13 % use the Nordic questionnaire that provides information on musculoskeletal symptoms. The same percentage is found for the questionnaire working conditions (Job Content) and production conditions or vocal alteration. Only 7 % use International Diagnostic interview short form referred to assessing mental health conditions at work.

Table 2 – Percentage of most used instruments to evaluate vocal function in teachers

Assessment Instrument	F	%
Questionnaire	12	80
Auditory –perceptual ev.	6	40
Videoestroboscopy- telelarhingostroboscopy	6	40
Speech therapu Ev.	5	33
Voice Acoustic Analysis or MDVP	4	27
Larynx Ev.	4	27
Characterization of sample Protocol	4	27
VHI Scale	2	13
Aerodynamic parameters Ev.	2	13
Self, co and heteroevaluation	1	7
GRBASI Scale	1	7
Articulation and posture Ev.	1	7
Orofacial Mobility Ev.	1	7
Dental Ev.	1	7

The instruments employed to assess vocal function in teachers depend on instrumental possibilities of the evaluators and vocal parameters wished to be studied. Although matches were found in the general aspects of the evaluation procedures, there are some differences that account for the heterogeneity of these. In the sample characterization protocol : some authors address identification data of teachers, level they teach, teaching time and workload[2,4,10,11], while Machado (2009), in the item Protocol assesses vocal quality achieved through the emission of the vowel /a/ in an ascending and descending scale[12].

Table 3 – Types of questionnaires used on the evaluation of the teachers' vocal function

Questionnaires	F	%
General Questionnaire	12	80
Nordic Questionnaire	2	13
Questionnaire Job content, work conditions	2	13
Questionnaire Conditions of vocal production or vocal alteration	2	13
International Diagnostic interview short form	1	7

In the questionnaires focused on discovering vocal symptoms, vocal habits[12] and samples for testing auditory perception[4,10,13-15], Machado (2009) adds the complaints associated with symptoms of temporomandibular disorders and Carvalho (2006) determines the musculoskeletal symptoms in teachers through the Nordic Questionnaire. Meanwhile, Riquelme (2008) adds the peer assessment and hetero evaluation, by involving the teacher in his own evaluación[16].

Phoniatric assessment is presented as a synonym for speech therapy evaluation, in Spain, and speech therapy, in Latin America, this focuses on assessing the quality of the voice, vocal technique, nasalization, muscle tension, maximum phonation time, vocal extension and fundamental frequency4. Whereas for Reis et al (2006), the voice speech evaluation seeks to find the Maximum phonation time. It also does video recordings in professional and nonprofessional context to assess the articulation through vertical amplitude of mandibular movement and horizontal perioral extension when issuing syllables with phonemes / p / + / a / and / s / + / i /. The posture is analyzed from cervical and body axis, noting whether there are asymmetries between neck, shoulder and waist.

In some studies usual laryngological assessment consists in an indirect laryngoscopy looking to find vocal disorders associated symptoms[4,12,17], in other cases, the search is centered on historical data related to voice complaint, vocal habits, laryngeal symptoms and disphony frequency[2], while Nerrière (2009) obtains historical data through questionnaires that characterize overall health. Moreover, in most cases direct examination of the larynx is by otorhinolaryngolist through videonasolaringoscopía[12], telelaringoestroboscopía[17] or videoestroboscopía[4]. To Niebudek (2010), the VHI scale can give guidance on the ENT examination required to use if you have a score that acknowledges severe voice disorders[18]. The VHI questionnaire contains three subscales measuring: physical, emotional, and voice functional aspects, these are valued[1-4], according to the complaints in phonation. The highest score will be between 91 to 120 points and corresponds to a serious voice disability; of 61-90 corresponds to a severe disability, 31 to 60 is a moderate disability and less than 31 is a mild voice disability[5]. On the other hand, Nerrière (2009) studies the relationship between voice disorders and mental health in teachers using a general vocal health questionnaire focused on the history of vocal health, while to assess the mental health aspect, it uses the questionnaire "Composite International Diagnostic Interview Short Form" 13. For its part, Araujo (2008) evaluates using sample characterization protocol, questionnaires focused on discovering vocal symptoms, vocal habits, vocal history and adds Job Content Questionnaire to characterize the psychological situation of each teacher and his social network[19].

Vocal performance has also been associated with vocal hygiene, where this factor has been evaluated through the Vocal Production Conditions of the teacher questionnaire, which seeks information on the functional status of the voice, general health issues, lifestyle habits, vocal history, family history and performance environment[3]. The basic information of the questionnaire seeks to characterize the functional aspects that are altered by lifestyle, and approaches in general, the items proposed in the self administered evaluations. Although progress has been made in validating self-assessment tools such as the VHI, there is still a lack of systematization in the qualitative assessments. It is necessary to standardize assessment instruments and validate procedures that can be used with equal effectiveness in all Health Services evaluating voice. The results of this study justify the importance of analyzing a sample with validated and accessible instruments for further diagnosis and treatment of voice disorders in teachers. From the search conducted only one article was found that focused their study on obtaining information on the resources used to evaluate and treat dysphonia in Otorhinolaryngologic services of 66 hospitals in Spain. It was found that there is no uniformity in the processes used; the most common type of exploration is the laryngoscopy (93 %), followed by laryngostroboscopy (62%) with 10% in the aerodynamic exploration[1]. This differs from the data found in this research, where the most widely used assessment instrument is the questionnaire (80%), followed by assessment of auditory perception (40%) and videostroboscopy (40%). It is noteworthy that in both cases the aerodynamic assessment is not widely used, despite being a procedure with high diagnostic value and easy to reproduce, in our case it was only used by 7%.

CONCLUSION

The aim of this study was to perform a literature review focused on the instruments used to assess voice in teachers in an objective and qualitative way. Various assessment tools were found, accounting for the heterogeneity of the resources used, especially in the application of questionnaires, protocols and subjective evaluation. However, the questionnaire is the most widely used followed by auditory perceptual assessment. Medical procedures used are videostroboscopy and laryngeal evaluation, while speech therapy procedures tend to diversify more, focusing on the application of questionnaires, self-perceptive and perceptual-auditory evaluation, speech evaluation, acoustic analysis, characterization of the sample, orofacial mobility and aerodynamic parameters. Thus, it follows that the range of tools available make vocal evaluation a process that is still heterogeneous and difficult to reproduce and compare.

RESUMEN

El objetivo de este trabajo es realizar un estudio bibliográfico focalizado en los instrumentos que se utilizan para evaluar de forma objetiva y cualitativa la voz en profesores. Se realizó un levantamiento bibliográfico de las publicaciones catalogadas en Pubmed y Scielo durante los últimos 5 años, que tuvieran relación con la evaluación de la voz en profesores. Los instrumentos utilizados en los 15 artículos encontrados muestran que un 80% de los estudios ocupan cuestionarios, 40% realiza evaluación perceptivo-auditiva de la voz, 40% utiliza videoestroboscopía o telelaringoscopía, 33% realiza evaluación foniátrica o fonoaudiológica, 27% realiza análisis acústico de la voz, 27% hace evaluación laríngea, 27% utiliza protocolo de caracterización de la muestra, 13% utiliza escala VHI, 13% evalúa los parámetros aerodinámicos y solo un 7% utiliza auto-co-heteroevaluación, escala GRBAS, evaluación de articulación y postura, evaluación de la motricidad orofacial y evaluación odontológica. Se encontraron diversos instrumentos de evaluación que dan cuenta de la heterogeneidad de los recursos para evaluar la voz, tanto de los instrumentos utilizados, como de los procedimientos, sobre todo en lo que respecta a cuestionarios, protocolos y evaluación subjetiva. Los instrumentos médicos tienen un protocolo de aplicación estandarizado que permite replicar el procedimiento de la misma forma en distintos lugares del mundo; en cambio, en fonoaudiología, los procedimientos parecen depender de la experiencia del profesional, y los instrumentos que estén disponibles.

DESCRIPTORES: Fonación; Calidad de la Voz; Trastornos de la Voz; Disfonía

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