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**Keywords**

Quality of life  
Dysphonia  
Validation studies  
Child  
Adolescent

**Descritores**

Qualidade de vida  
Disfonia  
Estudos de validação  
Criança  
Adolescente

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Received: 08/09/2012

Accepted: 04/11/2013

# Voice-related quality of life in the pediatric population: validation of the Brazilian version of the Pediatric Voice-Related Quality-of-Life survey

## *Qualidade de Vida em Voz na População Pediátrica: validação da versão brasileira do Protocolo Qualidade de Vida em Voz Pediátrico*

**ABSTRACT**

**Purpose:** To measure the voice-related quality of life in children/adolescents with vocal complaints through the validation of the Brazilian Pediatric Voice-Related Quality-of-Life survey – PVRQoL (*Qualidade de Vida em Voz Pediátrico* – QVV-P), to verify whether the presence of vocal complaints interferes with the quality of life of children/adolescents, and to determine the relationship between the vocal assessment carried out by parents and the QVV-P scores. **Methods:** The participants included 246 parents of children/adolescents of both sexes, aged between 2 years and 18 years (divided into preschoolers, schoolers and adolescents), with and without vocal complaints. All participants signed the informed consent form. Translation, linguistic and cultural adaptation, assessment of cultural equivalence, implementation of the protocol in its final version, voice assessment by parents, demographic and clinical descriptive statistical analysis of the population, individual analysis of the items, verification of psychometric measures of validation, reliability, reproducibility and responsiveness of the instrument to treatment, were carried out. **Results:** Low scores, especially in the physical domain, were found in subjects with vocal complaints. Among those, adolescents suffered the greatest impact. The social-emotional domain was not sensitive in preschoolers. There was a correlation among the overall, social-emotional and physical scores, and the vocal assessment performed by parents. The QVV-P was reliable, reproducible and responsive to voice problems. **Conclusion:** Voice change interferes with the quality of life of children/adolescents, and there is a relationship between the assessment of voice quality and QVV-P scores — the older the individual, the worse the quality of life in aspects related to voice, especially in the physical domain, and the better the vocal quality, as perceived by the parents.

**RESUMO**

**Objetivo:** Mensurar a qualidade de vida relacionada à voz de crianças/adolescentes com queixa vocal por meio da validação brasileira do Pediatric Voice-Related Quality-of-Life Survey – PVRQoL (*Qualidade de Vida em Voz Pediátrico* – QVV-P), verificando se a presença de uma queixa vocal interfere na qualidade de vida de crianças/adolescentes e se há relação entre a avaliação vocal realizada por pais e os escores do QVV-P. **Métodos:** Participaram 246 pais de crianças/adolescentes com e sem queixa vocal, de ambos os sexos, com idade entre 2 e 18 anos (divididos em: pré-escolar, escolar e adolescente). Todos assinaram o Termo de Consentimento. Realizou-se a Tradução e adaptação linguística e cultural, avaliação da equivalência cultural, aplicação do protocolo na sua versão final, avaliação vocal pelos pais/responsáveis, análise estatística descritiva demográfica e clínica da população, análise individual das questões, verificação das medidas psicométricas de validade, confiabilidade e sensibilidade do instrumento. **Resultados:** Indivíduos com queixa vocal, especialmente os adolescentes, apresentaram escores do QVV-P reduzidos, sobretudo, no domínio físico. O domínio Socioemocional não foi sensível nos pré-escolares. Houve correlação entre todos os escores do protocolo e a percepção dos pais sobre a qualidade vocal de seus filhos. O QVV-P mostrou-se válido, confiável e sensível aos problemas de voz. **Conclusão:** A alteração vocal interfere na qualidade de vida de crianças/adolescentes, havendo relação entre a avaliação da qualidade vocal realizada pelos pais/responsáveis e os escores do QVV-P; quanto maior a idade, pior a qualidade de vida nos aspectos relacionados à voz, principalmente no domínio Físico, melhor a avaliação da qualidade vocal pelos pais.

Study carried out at the Universidade Federal do Espírito Santo – UFES – Vitória (ES), Brazil.

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**Conflict of interests:** nothing to declare.

## INTRODUCTION

Throughout local development, factors extrinsic and intrinsic to the child and the adolescent may lead to vocal changes<sup>(1,2)</sup>. The etiology of vocal changes is connected to congenital issues, inadequate vocal habits, phonotrauma, environmental factors, physical factors, psychological factors, behavioral factors and organic factors, which should be properly identified to provide a better therapeutic approach<sup>(3)</sup>. The habit of speaking loudly (with strong intensity) is common in childhood, but it is a particularity seen in dysphonic children<sup>(4)</sup> in all activities, their main vocal marker being moderate to intense roughness and breathiness<sup>(5)</sup>.

There are several reports in literature concerning the prevalence of vocal issues in children and adolescents, ranging from 3.9 to 23.4%<sup>(6,7)</sup>, according to the studied group and the screening criteria used. In the pediatric population, it is estimated that most vocal problems occur in the age group of children between 5 years and 10 years<sup>(1)</sup>. These statistics are worrisome since vocal problems are among the several factors that affect quality of life<sup>(2,4,8)</sup>, defined as the perception of the subjects about their position in society, in relation to the cultural context and the value systems in which they are inserted, considering their objectives, expectations, standards and interests, and favoring their complete physical, mental and social well-being<sup>(9)</sup>.

The voice problem may be underestimated in the life of a child<sup>(8)</sup>, once there are no broader symptoms involving other systems<sup>(10)</sup>, thus delaying the search for intervention. This will consequently lead to chronic voice changes with the potential to limit school life, as well as social and professional opportunities<sup>(8,11)</sup>.

In the pediatric speech therapy clinic, it is not common to ask the patients or their parents to perform a voice-related quality of life assessment. The evidence is that even in the English language there are only three instruments of parental assessment related to voice<sup>(4)</sup>, which are: Pediatric Voice Outcome Survey (PVOS), Pediatric Voice Related Quality-of-Life survey (PVRQoL) and Pediatric Voice Handicap Index (PVHI).

Instruments that measure quality of life addressed to children and adolescents usually approach physical, social and cognitive development aspects, as well as the school context and playing with friends<sup>(12)</sup>. These instruments can be applied with the following clinical objectives: functional assessment at the presence of chronic diseases, analysis of the sensitivity of patients to therapeutic approaches, and evaluation of significant changes in the general health condition and in the specific disease<sup>(13)</sup>, besides as being used for screening purpose.

Parents of children and adolescents can measure the impact of vocal changes on the quality of life of their children by means of the PVRQoL survey<sup>(14)</sup>, a valid American instrument that is sensitive to the identification of the impact of a vocal change. It is comprised of ten questions and two domains: social-emotional and physical<sup>(4)</sup>. American

studies demonstrated that children without voice-related changes presented scores close to 100<sup>(15)</sup>, not revealing an impact on their quality of life, while children with vocal fold nodules, vocal fold paralysis and paradoxical vocal fold motion presented reduced scores for all the domains, when compared to children without laryngeal and vocal changes, thus demonstrating that voice-related changes interfere with the quality of life<sup>(16)</sup>.

The usage of instruments applied to children and adolescents is important because those in charge have the ability to understand the context of the problem. So, starting from that perception, children arrive to the experts' clinics<sup>(14,17)</sup>. Besides, it has been observed that data obtained from this type of assessment can help to verify the damage of a vocal change in the various social contexts of the subject, which can also lead to a more personalized treatment<sup>(18)</sup>.

This study aimed at:

1. performing the validation of the Brazilian version of the PVRQoL protocol<sup>(14)</sup>, called *Qualidade de Vida em Voz Pediátrico* (QVV-P) (Appendix 1), by means of translation and cultural adaptation of the instrument and by obtaining psychometric measures of validity, reliability and sensitivity;
2. verifying if the presence of a vocal complaint interferes in the quality of life of children and adolescents;
3. verifying if the PVRQoL scores and the evaluation of vocal quality are different in relation to the gender of participants;
4. checking if there is a relationship between the vocal quality assessment performed by the parents/those in charge and the three scores of the protocol (general, social-emotional and physical).

## METHODS

After the approval of the ethics committee of the institution of origin (027/11), the parents/people in charge signed the informed consent form, and the children/adolescents signed the assent term to participate in the research. The validation of the PVRQoL protocol was executed in ten stages, performed in the Brazilian validation of the adult version of the protocol QVV<sup>(18)</sup> and according to the guidelines proposed by the Scientific Advisory Committee of the Medical Outcomes Trust<sup>(19)</sup>. In summary, the actions performed were as follows:

1. translation and linguistic and cultural adaptation with bilingual speech therapists and other professionals who performed translation and back-translation;
2. cultural equivalence assessment with the application of the translated version on a group of participants with vocal changes;
3. application of the protocol in its final version with the definitive questions of the instrument on participants with and without vocal complaints;
4. vocal assessment conducted by the parents/people in charge of subjects with or without vocal complaints by means of five categories of analysis, which were: excellent, very good, good, reasonable and bad voice;
5. demographic and clinic descriptive statistical analysis of the population, considering gender, age and presence/absence of vocal complaints;

6. individual analysis of the questions in the protocol identifying the general, social-emotional and physical scores;
7. psychometric measures of validity;
8. reliability;
9. reproducibility;
10. sensitivity to treatment.

The PVRQoL questionnaire was initially translated to Portuguese by two speech language pathologists who were aware of the objectives of the study, fluent in English and with Brazilian Portuguese as their mother tongue. They compared the translated versions together with the researchers of the study. The comparison with the original document occurred with a back-translation conducted by a teacher of English, whose mother tongue was Brazilian Portuguese and who had not participated in any stage of the study. No differences were found between the original and the back-translated versions of the instrument.

A multiple choice question was added to the QVV-P so that parents/those in charge could assess the voice of their children/adolescents according to five categories (excellent, very good, good, reasonable and bad) in order to meet the requirements of the Scientific Advisory Committee of the Medical Outcomes Trust<sup>(19)</sup> as to the application of an external evaluation measure to validate the mentioned instrument. Parental assessment was chosen to determine the validity of the QVV-P since there were very young children in this study (from 2 years old on), who would not have the cognitive skills to perform a vocal self-assessment test. Considering that previous studies<sup>(20,21)</sup> with lay adults, concerning vocal assessment, demonstrated a negative correlation between the indicators of general quality of life and those related to voice or those that categorize vocal quality (very good or very bad voice, for instance), we thought it was adequate that parents/those in charge could measure the presence or absence of a voice problem and the vocal quality (excellent to bad) of their children, thus allowing us to verify the correlation coefficient of the variables in order to establish if the QVV-P can really measure what it proposes to do.

In this study, 246 parents/people in charge of children/adolescents with and without vocal complaints aged from 2 years to 18 years, participated. Collection took place in two schools (private and public), otolaryngology clinics and at a school clinic with specialized speech therapy care in the field of voice. This sample was divided into five groups called G1, G2, G3, G4 and G5.

G1 was comprised of 16 parents/people in charge of children/adolescents with vocal complaints who participated in the cultural equivalence step of the instrument. This group included ten male and six female participants, aged between 2 years and 18 years with a mean age of 10.52 years.

In G2, there were 230 parents/people in charge of children/adolescents with and without vocal complaints who answered the final version of the protocol. This group included 112 parents/people in charge of participants with

vocal complaints consisting of 50 female and 62 male participants, and 118 parents/people in charge of participants without vocal complaints consisting of 62 female and 56 male participants. The age for both groups ranged from 2 years to 18 years (age group approached by the instrument), with a mean age of 9.97 years for the group with vocal complaints and 9.89 years for the group without vocal complaints.

G3 was created to test the reliability of the QVV-P; 95 parents/people in charge participated and were randomly selected among the 112 parents/people in charge of subjects with vocal complaints in G2 with 51 male and 44 female participants, with a mean age of 9.87 years. These parents/people in charge answered the instrument again 14 days after its initial application.

G4 was structured with the objective of verifying the sensitivity of the instrument during the treatment and was submitted to speech therapy evaluation. This group was comprised of 16 children/adolescents, out of the total group with vocal complaints, comprising of nine male and seven female participants, aged between 6 years and 18 years (mean age of 9.62 years). All the participants were submitted to the auditory perception test performed by the first authors with the GRBAS (grade, roughness, breathiness, asthenia, strain) scale and to laryngological evaluation, performed by an otolaryngologist by means of a video laryngostroboscope with a 10 mm and 70° rigid videolaryngoscope and a light source (Endo-Stoboscope L-Atmos). Data analyzed during the treatments were used as a diary to register statements and reports concerning the execution of vocal exercises, as well as the obtained benefits.

The main vocal and laryngeal characteristics of the G4 were as follows: general vocal changes that ranged from moderate to intense, and the most observed parameters were roughness, tension and breathiness in vocal quality; laryngological evaluation showed cases of vocal nodules (4) vocal fold edema with nodular thickening (3) vocal folds with parallel fissure (3) mid-posterior triangular fissure (3) cyst (1) fold (1) and vascular dysgenesis (1).

G5 involved the parents/people in charge of 16 children/adolescents who were submitted to an eight-session program of speech therapy care. They took the retest, answering the questions of QVV-P again at the end of the speech therapy treatment with the researcher, in order to measure the sensitivity of the instrument.

The following criteria were used to include participants: age equivalent to the age group approached by the PVRQoL (2–18 years old) and vocal complaints (aiming to compound the two groups, one with and one without vocal changes). The exclusion criteria were as follows: subjects with current or prior complaints of human communication disorders except for complaints related to vocal changes, presence of an acute infection in the upper airways, and previous vocal treatment or previously diagnosed neurological or psychiatric diseases. The respect for the inclusion and exclusion criteria was assured by the application of a brief questionnaire to identify and characterize the sample, elaborated by the researcher

for this study, considering the variables that could lead to bias, for instance, hoarseness caused by a flu or neurological impairment and not by an isolated and specific voice problem.

For data analysis, participants were divided by age group (preschoolers – 2 years to 5 years and 11 months, schoolers – 6 years to 11 years and 11 months, and adolescents – 12 years to 18 years), gender and presence/absence of vocal complaint. Additionally, the five categories to assess vocal quality were grouped into excellent (corresponding to the answers excellent and very good), good and bad (corresponding to the answers reasonable and bad). The following statistical tests were used: chi-squared test (to compare the gender of the participants), Mann-Whitney's (to compare age, and groups with and without vocal complaints), Cronbach's alpha (to determine the reliability of QVV-P), McNemar's (reproducibility of the instrument), the Wilcoxon signed rank test (individual analysis of QVV-P questions, and reliability and sensitivity of the instrument), Mann-Whitney's (clinical and demographic characterization and calculation of mean scores of QVV-P), Spearman's correlation analysis (crossing vocal quality  $\times$  QVV-P scores), and the likelihood ratio test (difference between genders as to the vocal quality assessment). The adopted statistical significance level was 5% (0.05).

## RESULTS

By analyzing the clinical and demographic characteristics of the participants, it was observed that 48.7% of them presented vocal complaints. For this group, mean age was 9.97 years and 55.4% were male participants; as for the groups without vocal complaints, mean age was 9.89 years and the groups were dominated by the female gender (55.5% of the participants).

There was an effective relationship between the vocal quality assessment conducted by the parents/people in charge and the QVV-P scores (Table 1). When the parents noticed the presence of a voice problem and damage in the vocal quality of their children, they also identified a lower voice-related quality of life. For the group with vocal complaints, the parents assessed the voices of their children as being bad and for the group without vocal complaints, they judged them as being excellent or very good, regardless of gender (likelihood ratio test compatible with  $p=0.653$  for the group with vocal complaint and  $p=0.264$  for the group without vocal complaint).

Therefore, the data of the correlation coefficient demonstrated that the QVV-P is valid in Brazilian Portuguese, once it meets the objective of measuring the impact of a voice problem on the quality of life of children and adolescents, according to the parental perception, in the general and physical scores for the whole age group it analyzes (2 years to 18 years of age), and in the social-emotional score only for schoolers (6 years to 11 years of age) and adolescents (12 years to 18 years of age) (Table 1).

All the ten questions of the QVV-P presented different scores for groups with and without vocal complaints (Mann-Whitney's test with  $p \leq 0.002$ ), with higher scores for the group with vocal problems, especially in questions one and nine.

The analysis of the three QVV-P scores demonstrated differences for both tested groups (with and without vocal complaints). A reduction in all QVV-P scores was observed for the total group with vocal complaint, demonstrating that this group has worse quality of life due to the voice problem and that the physical domain is mostly compromised in the perception of the parents/people in charge, and, consequently, consists of the main factor responsible for the reduction of the total score (Table 2). So, the QVV-P is an instrument sensitive to vocal problems in the pediatric population.

The group of preschoolers (2 years to 5 years and 11 months of age), even if different in relation to general and physical scores, did not present differences in the social-emotional domain, which shows that this domain is not sensitive to this age group. However, the physical scores revealed differences between children with and without vocal complaints (Table 2).

The group of schoolers (6 years to 11 years and 11 months of age) presented differences in the three scores, when comparing participants with and without vocal complaints. This group also presented worse quality of life concerning the voice, in relation to the preschooler. In this age group, the social-emotional domain already demonstrated sensitivity to vocal problems, and the physical score was still the main domain responsible for the reduced quality of life in the group with vocal complaints (Table 2).

All scores of the instrument distinguished participants with and without vocal complaints in the group of adolescents (12 years to 18 years and eleven months of age), which presented worse voice-related quality of life in relation to the group of schoolers (Table 2).

**Table 1.** Correlation between the mean general, social-emotional and physical scores of the Qualidade de Vida em Voz Pediátrico protocol and the vocal evaluation for the participants with and without vocal complaints, considering the groups of preschoolers, schoolers and adolescents

Variable	Statistics	Vocal Quality Evaluation			
		All	Preschoolers	Schoolers	Adolescents
Total score	Correlation coefficient (r)	0.843	0.797	0.848	0.859
	p-value	<0.001*	<0.001*	<0.001*	<0.001*
Social-emotional score	Correlation coefficient (r)	0.618	0.250	0.633	0.720
	p-value	<0.001*	0.130	<0.001*	<0.001*
Physical score	Correlation coefficient (r)	0.814	0.787	0.820	0.818
	p-value	<0.001*	<0.001*	<0.001*	<0.001*

\*Significant values ( $p \leq 0.05$ ) – Spearman's correlation analysis



**Table 2.** Mean general, social-emotional and physical scores of the Qualidade de Vida em Voz Pediátrico protocol for participants with and without vocal complaint

Variable	Group	n	Mean	Standard deviation	p-value
<b>TG</b>					
Total score	With complaint	112	78.65	15.63	<0.001*
	Without complaint	118	99.05	2.09	
Social-emotional score	With complaint	112	85.37	19.33	<0.001*
	Without complaint	118	99.89	0.81	
Physical score	With complaint	112	73.78	16.52	<0.001*
	Without complaint	118	98.47	3.40	
<b>PG</b>					
Total score	With complaint	19	87.50	7.31	<0.001*
	Without complaint	19	98.42	2.66	
Social-emotional score	With complaint	19	98.68	3.35	0.075
	Without complaint	19	100.00	0.00	
Physical score	With complaint	19	80.04	12.07	<0.001*
	Without complaint	19	97.37	4.44	
<b>SG</b>					
Total score	With complaint	52	78.51	16.68	<0.001*
	Without complaint	56	98.88	2.07	
Social-emotional score	With complaint	52	84.61	20.78	<0.001*
	Without complaint	56	99.78	1.17	
Physical score	With complaint	52	73.79	17.65	<0.001*
	Without complaint	56	98.27	3.27	
<b>AG</b>					
Total score	With complaint	41	75.00	15.89	<0.001*
	Without complaint	43	99.53	1.75	
Social-emotional score	With complaint	41	80.24	19.50	<0.001*
	Without complaint	43	100.00	0.00	
Physical score	With complaint	41	71.24	16.48	<0.001*
	Without complaint	43	99.22	2.91	
<b>Gender – TG with complaint</b>					
Total score	F	50	80.20	14.58	0.284
	M	62	77.41	16.44	
Social-emotional score	F	50	88.13	19.12	0.016*
	M	62	83.15	19.38	
Physical score	F	50	75.00	14.87	0.527
	M	62	72.79	17.81	

\*Significant values ( $p \leq 0.05$ ) – Mann-Whitney's test

**Capiton:** AG = adolescent group; F = female; M = male; PG = preschooler group; SG = schooler group; TG = total group

**Table 3.** Reliability of the Qualidade de Vida em Voz Pediátrico protocol: individual questions and physical, social-emotional and total scores

Aspect	n	Cronbach's alpha coefficient	p-value
Question 01	95	0.999	<0.001*
Question 02	95	0.995	<0.001*
Question 03	95	>0.999	<0.001*
Question 04	95	0.998	<0.001*
Question 05	95	>0.999	<0.001*
Question 06	95	0.994	<0.001*
Question 07	95	>0.999	<0.001*
Question 08	95	>0.999	<0.001*
Question 09	95	0.995	<0.001*
Question 10	95	>0.999	<0.001*
Total score	95	0.998	<0.001*
Social-emotional score	95	>0.999	<0.001*
Physical score	95	0.998	<0.001*

\*Significant values ( $p \leq 0.05$ ) – Cronbach's alpha coefficient

The group with vocal complaints presented differences regarding gender in the social-emotional score; the male participants demonstrated more disadvantages concerning quality of life in relation to female participants (Table 2). No differences were identified for the group without vocal complaints.

QVV-P was reliable for clinical and scientific use because the values estimated by the Cronbach's alpha test were high, thus revealing high internal consistency of the general, social-emotional and physical scores (Table 3). The level of reproducibility of the QVV-P instrument was acceptable for presenting satisfactory results, which can be used in other analyses (Table 4).

QVV-P was sensitive to speech therapy due to the vocal rehabilitation of 16 participants, which was proven by the reduction of three scores after two months of speech therapy, thus reflecting the improved voice-related quality of life (Table 5).

**Table 4.** Reproducibility of scores of the Qualidade de Vida em Voz Pediátrico protocol (n=95)

Pair of variables	Mean	Standard deviation	p-value
Total score	77.65	16.58	0.121
r Total score	77.44	16.54	
Social-emotional score	83.47	20.25	0.317
r Social-emotional score	83.41	20.23	
Physical score	73.25	17.34	0.172
r Physical score	72.99	17.45	

\*Non significant values ( $p>0.05$ ) – Wilcoxon signed rank test

**Caption:** SD = standard deviation

## DISCUSSION

Vocal maturation is parallel to the organic and social development of the subject<sup>(3)</sup>. According to the age group of the speaker, there is an expected voice that is adapted to the anatomophysiological features of the larynx<sup>(5)</sup>. There is a vocal change between childhood and adolescence, especially in fundamental frequency, vocal extension, and control of intensity and vocal attack<sup>(3)</sup>. It is usually during the second childhood that most vocal problems occur<sup>(1)</sup>, especially for male subjects<sup>(1,2)</sup>, which justifies the mean age of approximately 10 years old for the participants with vocal complaints and the greater number of boys in the mentioned group. At the presence of dysphonia, the main vocal markers of children are roughness and breathiness, from moderate to intense<sup>(5)</sup>, which may trigger impacts on the quality of life of the speaker<sup>(8,11,12,15,22)</sup>.

The vocal evaluation and the assessment of the health condition of the patient must not only include objective data but also measures of self-perception and/or parental perception of the vocal problem<sup>(22)</sup>. There is increasing consensus that these measures are useful to assess quality of life<sup>(4,17,23)</sup>. However, its use is still restricted, especially when it comes to the pediatric population<sup>(15)</sup>, even though it would enable greater adherence to treatment due to the better orientation of actions and definition of goals<sup>(4)</sup>. The parents/people in charge of participants with vocal complaints who noticed changes in the vocal quality of the children/adolescents obtained, reduced QVV-P scores (Table 1), which is a similar correlation to that obtained in the adult version of QVV<sup>(18)</sup>.

Even in English, there is only one instrument that measures the voice-related quality of life in the pediatric population<sup>(4)</sup>, which reinforces the relevance of this research wherein a prevalence of male participants in the group with vocal complaints was observed (55.4%) — this has already been reported in other studies on dysphonia during childhood<sup>(1,6)</sup> along with data suggesting a mean age of 9.9 years old — and is compatible with literature<sup>(1)</sup>, pointing out to the greater occurrence of vocal changes in the age group of 5 years to 10 years.

Instruments that measure quality of life should be able to assess physical, social and emotional issues and are hence constituted by several domains<sup>(13,23)</sup>. QVV-P not only provides a total score but is also characterized for approaching the physical and social-emotional dimensions when considering that voice is essential for interpersonal relationships and

**Table 5.** Sensitivity of the Qualidade de Vida em Voz Pediátrico protocol (n=16)

Variables	Mean	Standard deviation	p-value
Total score			
Pre-therapy	62.50	17.44	<0.001*
Post-therapy	90.78	9.21	
Escore Socioemocional			
Pre-therapy	65.63	16.46	<0.001*
Post-therapy	92.06	9.26	
Escore Físico			
Pre-therapy	60.41	22.26	0.001*
Post-therapy	89.97	9.78	

\*Significant values ( $p\leq 0.05$ ) – Wilcoxon signed rank test

**Caption:** SD = standard deviation

good oral communication, and that changes in its production or quality may trigger organic, social, emotional and even academic disadvantages.

Since every society lives with specific culture, beliefs, habits, attitudes and behaviors, which influence the perception of vocal changes<sup>(4,18)</sup> and the search for diagnosis and treatment<sup>(23)</sup>, the instruments cannot be simply translated and used in other cultures. Their psychometric measures should be tested, demonstrating clinical and scientific relevance<sup>(13,24)</sup>, according to the already obtained and described advances.

Therefore, this research performed the translation and the back-translation of the PVRQoL to verify if the participants had difficulties in understanding any item of the instrument, to check for questions that were not applicable to the Brazilian context, and for the presence of any conceptual incompatibility. The translated version was then applied in a group of 16 participants, enabling the option “non-applicable” to all the items to detect questions that were not viable to our tested new cultural context. Only after obtaining equivalence concerning culture and vocal quality correlation  $\times$  QVV-P scores, the instrument was applied in a broader sample (n=230).

Since the QVV-P has ten self-explanatory questions, whose scores are calculated by a standard formula, the interpretation is objective and easily understood: the lower the total score, the worse the quality of life of the person, and the domain that presents the lowest score is the main domain responsible for the reduced voice-related quality of life. Therefore, QVV-P was considered as a practical and brief instrument, which is easy to handle, calculate and interpret, thus fulfilling the requirements for clinical application<sup>(18)</sup>.

Besides enabling satisfactory answers for the information parameters of the item (clarity and objectivity of the questions), versatility, practicality, reproducibility, validity and sensitivity, and similarly to the findings of the adult version<sup>(13,18)</sup>, the QVV-P has proven to be a specific questionnaire for vocal changes, as it was observed that children and adolescents with vocal problems presented inferior scores in relation to children and adolescents without vocal changes (Table 2). The application of this instrument in voice treatment will become a facilitator for rehabilitation since it measures the impact of dysphonia on the quality of life of the pediatric population under the point of view of the parents/people in charge. It also allows us to verify how efficient the treatment is, by comparing the pre and post speech therapy

changes<sup>(25)</sup> — which were observed by the changes in QVV-P scores after the vocal rehabilitation of 16 participants, thus revealing the sensitivity of the instrument, as presented in Table 5. In this sense, the already mentioned benefits from the use of QVV in adults, as to the greater awareness of the patient and adhesion to therapy<sup>(26)</sup>, can also be seen in the pediatric population.

Even though it is not clear if emotional, physical and functional measures are similar between adults and children with voice problems<sup>(17)</sup>, a comparison between QVV-P scores obtained in this research and the adult QVV scores<sup>(18)</sup> demonstrated that dysphonic adults suffered greater impact on quality of life than the pediatric population, with a mean difference of 12.86 points in the scores of both investigations (adult: general – 65.9, social-emotional – 70.6 and physical – 62.7; pediatric: general – 78.65, social-emotional – 85.37 and physical – 73.78). The results of adult and pediatric participants without vocal complaints were similar for all scores (close to 100).

Both the pediatric and the adult population presented the physical score as the one with more impact on the quality of life. It is possible that the prevalence of disadvantages in the physical domain may be connected to the fact that by reflecting organic and functional aspects, it is easier to be understood and identified by the parents or those in charge, while emotional issues are more subjective, being also possibly hidden in the family and social routine, thus making it difficult to be perceived in children aged from 2 years to 4 years<sup>(8)</sup>. The proof is that only because of the speech therapy sessions, many parents in the intervention group realized, from the first session on, that their children had become sadder, more frustrated and upset with the vocal changes than they had imagined.

In the preschooler group, no indicators of anxiety, depression or frustration were observed in QVV-P because of voice problems. No disadvantages were seen in the social environment, in this age group, caused by vocal problems, and that is why the mean score in the social-emotional domain of the group with vocal complaints was similar to that of the group without vocal complaints (close to 100). Maybe, if QVV-P was constituted by specific items for different stages of development, differences could have occurred in the social-emotional field since a static set of items for all ages cannot properly reflect the changes in attitudes related to voice for each age group<sup>(8)</sup>. Therefore, even though QVV is practical, brief, easy to handle, calculate and interpret<sup>(27)</sup>, its pediatric version includes three age groups (preschoolers, schoolers and adolescents), which present important peculiarities as to vocal, cognitive and affective-emotional development, and demonstrates scores that range according to the age group for those with vocal changes.

Besides, such facts can be related to the limited experience of social exposure of the voice, once the communication skills are developed with age, together with the improvement of the social skills learned in a family environment, guided by educational practices and parental social repertoire, which directly interfere in behaviors and social competence<sup>(28)</sup>. In other words, throughout the developmental phase, children will be socially more active because of direct instruction, the development of

cognitive skills and the opportunity to practice their behavior in different situations. These items are reinforced when we analyze the data from the group of schoolers and adolescents, in which disadvantages have been identified in all the QVV-P domains among the participants with vocal complaints. So, the relationship between QVV-P scores and age demonstrated that unlike what was observed in PVOS<sup>(17)</sup>, there is no reduction of internal consistency when the instrument is used with schoolers and adolescents.

The absent correlation between vocal quality × social-emotional score in preschoolers with vocal problems is due to the fact that parents do not realize an impact on this domain, even though they can identify a voice change, which can result from the difficulty to recognize and measure the social and emotional disadvantages created by the vocal problem in this age group. Regarding the physical domain, there was correlation for all the tested age groups, indicating that every time there is a voice problem or changes in vocal quality, parents recognize that the voice-related quality of life is damaged (Table 1).

The parental assessment expected by the QVV-P protocol is able to identify and measure general, physical and social-emotional disadvantages triggered by a vocal change in the life of their children, in cases where the parents can recognize the presence of a voice problem and damaged vocal quality (category: bad voice). So, the negative correlation between quality of life and vocal self-perception, which has been identified for the adult population<sup>(20,21)</sup>, also takes place in the pediatric population as a result of parental assessment.

Data analysis obtained by means of the diary, elaborated from medical records, allowed the evaluation of several reports by parents of children at school age concerning how the students suffer for not being able to conclude an out loud reading in the classroom, not because of a language issue, but due to the loss of quality of life and speaking fatigue; many children even say “I try to read, but my voice fades out”, which proves that a voice problem can compromise the communication and the social life of a child<sup>(4,22)</sup>.

The parents of adolescents reported bullying cases, loss of friends, isolation and low social skills as a consequence of the voice problem, which strengthens their perception about the impact of vocal changes in the social-emotional component of quality of life in this age group. These findings corroborate the results of an international study<sup>(8)</sup> in which parents noticed a greater functional than emotional impact on the quality of life of their children. So, it is observed that the cultural factor directly interferes in the way the voice problem is noticed, as well as in the level of limitation and restriction that vocal changes create in the life of a person<sup>(23)</sup>.

Adolescence is a development stage filled with major physical and emotional changes, when there is the desire to be like our peers in order to be accepted by the group<sup>(29)</sup>. Since voice is essential for interpersonal relationships and to build the identity of the speaker, a vocal change at this point can trigger psychoemotional problems<sup>(3)</sup>. Participants with dysphonia due to vocal mutation, for instance, felt distressed for being judged as people without sexual definition, submissive, weak

and immature, which are characteristic markers of this vocal reality<sup>(3)</sup>. So, a vocal change, especially due to vocal mutations, can lead to jokes and pejorative terms, and this compromises the self-esteem and the socialization of the adolescent<sup>(30)</sup>.

The comparison between QVV-P scores and gender showed major disadvantages in the quality of life concerning the social-emotional domain for boys, which can be due to the fact that they tend to speak more and louder<sup>(1,2)</sup>, and because their attitude is marked by movements and conflicts, so vocal mutation is stronger<sup>(3)</sup>. So, it is possible to understand that when vocal changes create sound interruptions, breathiness and difficulties to speak strongly, the parents notice more easily how an impact is generated in the lives of their children<sup>(3)</sup>.

Even though the proposal is that the vocal evaluation of children aged more than 6 years should count on the combination of statements by parents and children<sup>(4)</sup>, which would also enable the comparison of answers<sup>(8)</sup>, the QVV-P, which exclusively uses the parental version to measure quality of life in all ages, presented high reliability for clinical and scientific use, as well as satisfactory reproducibility, which is extremely important, since this is the first clinical voice protocol addressed to the pediatric population adapted to Brazilian Portuguese.

## CONCLUSION

The Brazilian version of the PVRQoL survey, called QVV-P, validated in Brazilian Portuguese, presenting cultural equivalence and psychometric measures of validity, reliability and sensitivity, tested satisfactorily. The presence of vocal complaints interferes in the quality of life of the pediatric population, with more disadvantages for subjects aged older than 6 years. The social-emotional domain showed more impact on boys with vocal complaints. There are no differences in gender in relation to the vocal quality assessment performed by the parents/people in charge, but there is a relationship of this assessment with the scores in two QVV-P domains (physical and social-emotional); the greater the damage in QVV-P scores, the greater the impact on quality of life and the worse the vocal quality of children and adolescents, according to their parents' perception.

*\*LLR was in charge of the project, data collection, tabulation of results, data analysis and writing the manuscript; KMPP collaborated with data analysis and elaboration of the manuscript; MB was responsible for the study design and general orientation of the stages of execution and elaboration of the manuscript, and also collaborated with data analysis.*

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#### Appendix 1. Protocolo Qualidade de Vida em Voz Pediátrico

Estamos procurando compreender melhor como um problema de voz pode interferir nas atividades de vida diária de seu/sua filho(a). Apresentamos uma lista de possíveis problemas relacionados à voz. Por favor, responda a todas as questões baseadas em como a voz de seu/sua filho(a) tem estado nas DUAS ÚLTIMAS SEMANAS. Não existem respostas certas ou erradas. Para responder ao questionário, considere tanto a gravidade do problema, como sua frequência de aparecimento, avaliando cada item abaixo de acordo com o tamanho do problema que ele/ela tem. A escala que você irá utilizar é a seguinte:

- 1 = não é um problema  
 2 = é um problema pequeno  
 3 = é um problema médio  
 4 = é um problema grande  
 5 = é um problema muito grande

1. Meu/minha filho(a) tem dificuldades em falar forte (alto) ou ser ouvido(a) em lugares ou situações barulhentos.	1	2	3	4	5
2. Quando fala ele/ela fica sem ar e precisa respirar muitas vezes.	1	2	3	4	5
3. Às vezes, quando começa a falar, ele/ela não sabe como a voz vai sair.	1	2	3	4	5
4. Às vezes, meu/minha filho(a) fica ansioso(a) ou frustrado(a) por causa da sua voz.	1	2	3	4	5
5. Às vezes, meu/minha filho(a) fica deprimido(a) por causa da sua voz.	1	2	3	4	5
6. Meu/minha filho(a) tem dificuldades em falar ao telefone ou conversar pessoalmente com seus/suas amigos(as).	1	2	3	4	5
7. Meu/minha filho(a) tem problemas na escola por causa da sua voz.	1	2	3	4	5
8. Meu/minha filho(a) evita sair socialmente por causa da sua voz.	1	2	3	4	5
9. Meu/minha filho(a) tem que repetir o que fala para ser entendido(a).	1	2	3	4	5
10. Meu/minha filho(a) ficou menos expansivo(a) por causa da sua voz.	1	2	3	4	5