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Cross-cultural Adaptation and Validation of the Hong Kong-Chinese version of Children's Voice Handicap Index-10 for Parents (CVHI-10-P(HK))

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Declaration of interest

None

Abstract

Objectives. The purpose of this study was to cross-culturally adapt and validate the Hong Kong Chinese version of the Children's Voice Handicap Index-10 for Parents (CVHI-10-P(HK)), a parent-proxied quality of life (QOL) questionnaire that pairs with the Children's Voice Handicap Index-10 (CVHI-10(HK)).

Method. The English version of the Children's Voice Handicap Index-10 for Parents underwent forward-backward translation and pretesting. Content validity was computed from an expert panel rating on relevance and test-retest reliability was obtained from parents and/or guardians of six dysphonic and five vocally-healthy children. Other validity and reliability measures were analyzed from CVHI-10-P(HK) completed by parents and/or guardians of 28 dysphonic and 35 vocally-healthy children who had completed CVHI-10(HK).

Results. The CVHI-10-P(HK) demonstrated excellent internal consistency (α = 0.091), excellent content validity (item- and scale-level content validity indices = 1.00), good construct validity (between group difference in total CVHI-10-P(HK) score: $t(30.904) = -6.449$, $p < 0.001$, Cohen's $d = 1.709$) and excellent test-retest reliability ($r = 0.966$, $p < 0.001$). Criterion validity analysis showed a moderate correlation between the total CVHI-10-P(HK) score and auditory-perceptual ratings on overall severity ($r = 0.515$, $p < 0.001$). Area under the curve of the receiver operating characteristic plot was found to be 0.855. The CVHI-10-P(HK) has excellent intrinsic accuracy. A cutoff of score of 4 may be adopted for the optimal sensitivity and specificity match. A moderate correlation was found between the total scores of CVHI-10-P(HK) and CVHI-10(HK) ($r = 0.684$, $p < 0.001$).

Conclusion. The CVHI-10-P(HK) is a valid tool that measures QOL of dysphonic children from the parents' perspective. It is recommended to be used in parallel to the CVHI-10(HK) as part of a comprehensive voice assessment for children in Hong Kong.

Keywords

Voice disorders

Pediatric dysphonia

Children's quality of life

Voice Handicap Index (VHI)

Children's Voice Handicap Index-10 for Parents (CVHI-10-P)

1. Introduction

Prevalence of pediatric dysphonia was found to be highly variable across studies. It was reported to range from 2% to 23.9% in the United states [1-3] and could go as high as 53.2% in an Iranian population [4]. In Hong Kong, the prevalence of dysphonia in school-age children was reported to be 5.4% [5]. Dysphonia in children will not only affect their voice production; but also negatively impact their communication efficiency, social and emotional development, and academic performance [6-8]. It is, therefore, evident that pediatric dysphonia warrants proper management.

Pediatric dysphonia is a multifaceted problem that needs to be approached multidimensionally [9]. Evaluation of such should take into account both the clinician's and the child's perspectives. The perspective and involvement of parents and/or caregivers are indeed crucial to therapeutic success in pediatric dysphonia and should not be overlooked [10, 11]. A number of tools had been developed and validated to assess how the child's quality of life is affected by his/her dysphonia. A majority of these questionnaires are derived from their adult versions and are parent-proxied in nature (e.g. the pediatric Voice Handicap Index (pVHI) [12], the pediatric Voice Outcome Survey (pVOS) [13], and the pediatric Voice-Related Quality-Of-Life survey (pVRQOL) [14]). The Children's Voice Handicap Index (CVHI-10), on the other hand, is a self-reported assessment tool for pediatric dysphonia [15]. It is a ten-item questionnaire designed to be completed independently by children who age between eight to fourteen and to pair with its parent version, the Children's Voice Handicap Index-10 for Parents (CVHI-10-P) [16]. It is believed that completion of both CVHI-10 and CVHI-10-P would bring about complementary information on the child's quality of life, and thus, result in a more holistic evaluation of the his/her dysphonia.

Recently, the Hong Kong Chinese version of the CVHI-10 (i.e. the CVHI-10(HK)) has been validated and made available to the pediatric population in Hong Kong [17]. The purpose of the present study was to cross-culturally adapt the CVHI-10-P to a Hong Kong Chinese version, the CVHI-10-P(HK), and validate it through examining its psychometric properties. Further, the relationship between the CVHI-10-P(HK) and its child counterpart was investigated.

2. Method

2.1 Participants

Informed consent was obtained from all participants prior to their enrolment (Ref. HSEARS20181230001, Human Subjects Ethics Sub-committee, the Hong Kong Polytechnic University). Parents and/or guardians of three dysphonic and six vocally healthy children participated in the pre-testing process at the adaptation phase. Twenty-eight parents and/or guardians of dysphonic children (the Dysphonic group) and 35 parents and/or guardians of vocally healthy children (the Control group) participated in the validation process. Additional parents and/or guardians of six dysphonic and five vocally healthy children were recruited for the analyses of test-retest reliability. All child participants were between the ages of eight and 14 years with no history of neurological and/or hearing impairments. In addition, all parent participants were native Cantonese speakers and were able to read and comprehend written Chinese sentences. Demographics of the children whose parents participated in the validation phase can be found in the study by Kwong [17].

2.2 Materials and equipment

Voice samples of the child participants were recorded using an AKG D5 condenser microphone connected to a Focusrite Scarlett 2i2 sound interface that was installed in a Lenovo ideapad y700-15TSK computer. All recordings were done with a sampling rate of 44100Hz. The

recorded voice samples were later auditory-perceptually rated using an Audio Technica M40x head phone connected to a Lenovo thinkpad T470 computer.

2.3 Procedures

2.3.1 The adaptation phase

The English version of the CVHI-10-P [16] had undergone forward-backward translations to Hong Kong Chinese by two independent Chinese/English bilingual qualified translators. A final year Master of Speech Therapy student and the author, who is a speech therapist who had over 15 years of experience in managing voice disorders, reviewed the two translations and synthesized a version that was ready to be pre-tested.

Pre-testing of the synthesized CVHI-10-P(HK) was conducted on nine parent participants. The parents and/or guardians completed the questionnaire before they were interviewed for their comments. Based on their comments, minor adjustments were made to produce the final version of the CVHI-10-P(HK) used in this study. The Appendix compares the forward translation, backward translation and final version of the questionnaire.

2.3.2 The validation phase

An expert panel was formed to review the final version of the CVHI-10-P(HK). Three English/Chinese bilingual speech therapists, each of them had over 15 years of experience in managing voice disorders, took part as panel members. Each panel member rated the questionnaire components; namely, the title, instruction, rating descriptors and questionnaire items; as 1) not relevant, 2) quite relevant, 3) very relevant or 4) absolutely relevant. Content validity indices (CVIs) were computed based on these relevance ratings.

Parent participants of the Dysphonic group and Control group of this study completed the CVHI-10-P(HK), whereas their children completed the CVHI-10(HK) [17]. Additional parent participants were recruited to complete the CVHI-10-P(HK) twice to obtain test-retest reliability. The two completions were 14 days apart from each other in order to minimize bias due to memory. Voice samples of the child participants were recorded in a sound-treated room. The children were instructed to produce a Cantonese standard sentence (/pa1 pa1 ta2 kɔ1 kɔ1/), using his/her habitual pitch and loudness and at a microphone-to-mouth distance of 30cm. Readers may refer to the study by Kwong [17] for the detailed procedures of data extraction and auditory-perceptual analysis on these voice samples. In short, the voice samples were rated by three speech therapists who are experienced in managing paediatric voice disorders for overall severity using a six-point equal appearing interval scale (0 = normal, 5 = most severe). None of these judges were involved in the expert panel that provided relevance ratings on the questionnaire components.

2.3.3 Statistical analyses

All statistical analyses were conducted using the IBM SPSS Statistics 25 software. Internal consistency and test-retest reliability were analyzed with Cronbach's alpha coefficient and Pearson's moment correlation coefficient respectively. The total CVHI-10-P(HK) scores of the Dysphonic and Control groups were compared using independent *t*-tests for construct validity. Correlation between the total CVHI-10-P(HK) score and the overall severity ratings of the children's voice samples were analyzed by obtaining the Pearson's moment correlation coefficient for criterion validity. The receiver operating characteristic (ROC) curve was plotted for the CVHI-10-P(HK) for sensitivity and specificity estimation. The total CVHI-10-P(HK) scores obtained from the parent participants and the total CVHI-10(HK) scores obtained from

their corresponding children were compared using Pearson's correlation statistics. The items scores obtained from the two parties were compared by obtaining Spearman's rhos, given the ordinal nature of the data. Alpha levels were set at 0.05 for all statistical tests.

3. Results

3.1 Internal consistency

The Cronbach's alpha coefficient obtained for the CVHI-1-P(HK) equaled to 0.901. Table 1 lists the Cronbach's alpha if the corresponding item is deleted from the ten-item questionnaire.

Table 1 Summary of Cronbach's alpha coefficients if one of the CVHI-10-P(HK) items is deleted from the questionnaire

CVHI-10-P(HK) item	Cronbach's alpha if item is deleted
Item 01	0.893
Item 02	0.893
Item 03	0.886
Item 04	0.896
Item 05	0.881
Item 06	0.891
Item 07	0.889
Item 08	0.892
Item 09	0.894
Item 10	0.891

3.2 Content validity

Three CVIs were calculated using the formulas suggested by Yusoff [18]. Questionnaire components rated as *very relevant* or *absolutely relevant* by members of the expert panel were

regarded as "agreed components". Item-level CVIs (I-CVIs) obtained from all the questionnaire components (i.e. the instruction, rating descriptors and the ten questionnaire items) were 1.00. The scale-level content validity index based on the average method (S-CVI/Ave) and scale-level content validity index based on the universal agreement method (S-CVI/UA) also achieved 1.00.

3.3 Construct validity

The Dysphonic group (mean = 8.96, *SD* = 5.903) showed higher total CVHI-10-P(HK) score than the Control group (mean = 1.51, *SD* = 1.772). Leven's test results suggested the assumption of equal variance was violated ($F = 37.750$, $p < 0.001$). After adjustment of degree of freedom, the two groups showed significant difference in the total CVHI-10-P(HK) scores ($t(30.904) = -6.449$, $p < 0.001$, Cohen's $d = 1.709$).

3.4 Criterion validity

Inter-judge reliability (mean-rating (k = 3), absolute agreement, 2-way mixed-effects) of the auditory-perceptual analyses of the children's voice samples was good (ICC = 0.806, $p < 0.01$) and intra-judge reliabilities (single measure, absolute agreement, 2-way mixed-effects) ranged from moderate to good (ICCs = 0.861, 0.677, 0.759, $p < 0.01$). A moderate correlation between the total CVHI-10-P(HK) scores and auditory-perceptual ratings on overall severity was obtained ($r = 0.515$, $p < 0.001$).

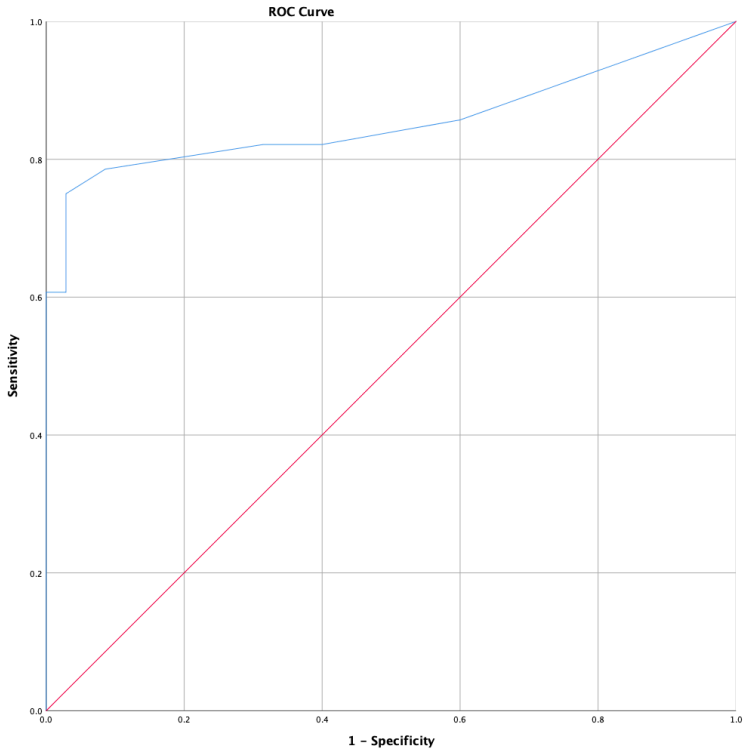
3.5 Test-retest reliability

The test-retest reliability of the CVHI-10-P(HK) was found to be excellent (Pearson's $r = 0.966$, $p < 0.001$).

3.6 Sensitivity and specificity

The ROC curve was located at the top left corner of the plot and the area under the curve (AUC) was 0.855 (see Figure 1). From the coordinates of the ROC curve, a cutoff score of 3.5 or above would give the maximum sensitivity and specificity of 0.786 and 0.914 respectively.

Figure 1 Receiver operating characteristic (ROC) plot of CVHI-10-P(HK)



3.7 Correlation between CVHI-10-P(HK) and CVHI-10(HK)

The descriptive and correlation analyses data are summarized in Table 2. The mean total score and the mean scores of most items of CVHI-10-P(HK) were higher than the corresponding counterparts of the CVHI-10(HK), except for Item 02 (mean score in CVHI-10-P(HK) = 0.63, *SD* = 0.768; mean score in CVHI-10-P(HK) = 0.62, *SD* = 0.728) and Item 06 (mean score in CVHI-10-P(HK) = 0.57, *SD* = 0.928; mean score in CVHI-10-P(HK) = 0.57, *SD* = 0.946).

A significant, positive and moderate correlation was found between the total scores of CVHI-10-P(HK) and CVHI-10(HK) ($r = 0.684$, $p < 0.001$). Significant and positive correlations were revealed in most of the item scores between the two questionnaires, with the exceptions of Item 02 ($\rho = 0.161$, $p = 0.208$), Item 04 ($\rho = 0.194$, $p = 0.128$) and Item 05 ($\rho = 0.082$, $p = 0.522$). The levels of correlation of these items were considered either very low (i.e. Items 02 and 04) or negligible (i.e. Item 05). Correlation levels of the remaining items between the two questionnaires ranged from low (i.e. Items 01, 03, 08 and 09) to moderate (i.e. Items 06, 07 and 10).

Table 2 Correlation of the item scores and total scores between CVHI-10(HK) and CVHI-10-P(HK)

	CVHI-10(HK)		CVHI-10-P(HK)			
	Mean	*SD*	Mean	*SD*	Correlation Coefficient	*p*
Item						
01	0.46	0.643	0.48	0.644	[a]0.322	0.010*
02	0.63	0.768	0.62	0.728	[a]0.161	0.208
03	0.10	0.346	0.33	0.648	[a]0.367	0.003**
04	0.13	0.381	0.27	0.545	[a]0.194	0.128
05	0.10	0.346	0.35	0.676	[a]0.082	0.522
06	0.57	0.946	0.57	0.928	[a]0.582	<0.001**
07	0.87	0.889	0.95	1.142	[a]0.500	<0.001**
08	0.11	0.542	0.35	0.676	[a]0.390	0.002**
09	0.14	0.535	0.21	0.484	[a]0.316	0.012*
10	0.30	0.638	0.56	0.876	[a]0.596	<0.001**
Total Score	3.41	3.731	4.83	5.552	[b]0.684	<0.001**

Note: *SD* = Standard deviation, [a] = Spearman's rho, [b] = Pearson's moment correlation coefficient, * = significant at 0.05 level, ** = significant at 0.01 level.

4. Discussion

The present study aimed to cross-culturally adapt and validate the Hong Kong Chinese version of the CVHI-10-P. The CVHI-10-P(HK) was developed through a stringent process that consisted of forward-backward translations and pre-testing. Psychometric properties of the questionnaire will be discussed below.

The Cronbach's alpha coefficient of the CVHI-10-P(HK) (α = 0.91) suggested excellent internal consistency [19], and deletion of any of the items would only alter the internal consistency to a limited extent. The items are considered to be representative of the impact of voice disorder on a child from the parent's perspective [15]. Cronbach's alpha coefficient

higher than 0.90 may be regarded as excessive and suggest redundancies in items [20]. Reducing the number of items in the questionnaire is, nevertheless, not indicated as the questionnaire only consist of a reasonable number of items (i.e. ten) and the items were designed to pair with the child version of the questionnaire.

Excellent item-level and scale-level CVIs obtained from the CVHI-10-P(HK) suggest excellent content validity. The questionnaire components and the questionnaire itself are considered extremely relevant to the intended construct, that is, the impact of dysphonia on a child's well-being from the parents' perspective. Further, an excellent test-retest reliability was obtained. The CVHI-10-P(HK) is, therefore, considered to be a stable questionnaire with high reproducibility [21].

The total CVHI-10-P(HK) score was significantly higher in the Dysphonic group than in the Control group. The good construct validity and excellent intrinsic discrimination accuracy indicated by the AUC of ROC data make the assessment tool clinically valuable in discriminating the dysphonic and vocally-healthy children. A cutoff score of four would give the optimal sensitivity and specificity combination. When compared to the child version of the questionnaire, which has a cutoff score of three [17], the parent-version has a slightly higher cutoff score. This is in line with the differences in direction and magnitude between the mean total CVHI-10(HK) and mean total CVHI-10-P(HK) scores (See table 2).

From the measurement of criterion validity, a positive relationship was found between the total CVHI-10-P(HK) score and auditory-perceptually overall severity rating. Despite the statistical significance, the correlation was only considered moderate in magnitude. The two measures

assess pediatric dysphonia from the perspectives of two different parties, namely, the clinician and the parent. They also measure different levels of functioning and disability resulting from dysphonia [22]. The significant correlation suggests that the questionnaire may shed light on the severity of the voice problem; whereas the moderate correlation suggests the two measures are not replaceable by, but complementary to each other. A different finding was obtained from the validation study of the original CVHI-10-P; where non-significant and weak correlations were found between the CVHI-10-P total score and the grade (G), roughness (R) and breathiness (B) ratings [16]. Such difference may be attributed to the differences in parents' perception towards their children's voice problem in different cultures. Parents in Hong Kong may take into account the "severity" of the dysphonia to a greater extent when viewing its impact on their children's well-being.

The total and item scores between CVHI-10(HK) and CVHI-10-P(HK) were compared. Unlike the original CVHI-10-P where non-significant correlations were found a majority of the items scores [16], significant correlations were found in the total and most item scores, indicating the complementary relationship between the two questionnaires. It is noteworthy that, the correlation in the total score was only moderate in magnitude and the correlations in the items scores were negligible to moderate in magnitude. The moderate and less-than-moderate correlations may be explained by the differences between the children's and parents' perspectives toward impacts of voice problems. The two questionnaires, therefore, should not be considered replaceable of each other. The mean total and a majority of item scores of the two questionnaires suggested that parents perceived the impact of dysphonia on their children's well-being as "more severe" than their children, where as an opposite pattern was found in the comparisons between the original CVHI-10 and CVHI-10-P [16]. The cultural difference between Hong Kong and Italy may, again, account for such difference.

4.1 Clinical implications

Findings of the present study suggest good psychometric properties of the CVHI-10-P(HK) and thus confirm the application of the questionnaire to the assessment for the impact of dysphonia on children from the parents' perspective. The CVHI-10-P(HK) and CVHI-10(HK) were designed in accordance with each other. They may be used complementarily to measure impact of dysphonia on a child's well-being from both the parents' and child's perspectives. The two questionnaires may also be used together with other assessment tools that target at vocal structures and vocal functions to result in a holistic and comprehensive voice assessment. Further, the good construct and criterion validities, excellent AUC of ROC and the cutoff score obtained from the present study suggest that the CVHI-10-P(HK) may be used as a stand-alone clinical tool, for instance, a screening tool to identify children with and/or those who are at risk of dysphonia and an assessment tool that provides insights on QOL in dysphonic children who are not literate enough to complete the CVHI-10(HK) independently.

5. Conclusion

The psychometric properties of the CVHI-10-P(HK) confirms its validity as an assessment tool that measures the impact of pediatric dysphonia on children from the parents' and/or caregivers' perspectives. When completed in parallel to the CVHI-10(HK), a comprehensive assessment on a child's voice problem may be achieved. This would undoubtedly enhance treatment planning, and thus, result in better therapeutic outcome. Even if not completed alongside with the child version, the CVHI-10-P(HK) may still be used as a screening tool by comparing its score against the cutoff score determined in the present study.

6. Declaration of interest

None

7. Vitae – Elaine Kwong

Elaine Kwong, PhD. is currently an Assistant Professor in the Department of Chinese and Bilingual Studies, Hong Kong Polytechnic University. She is also an experienced speech-language pathologist (SLP) who specializes in managing both adult and pediatric voice disorders. Dr Kwong had delivered courses on clinical management for voice disorders to student SLPs from various institutes in Hong Kong. She also regularly supervises student SLPs in voice clinics. Her research interests include, but not limit to, complementary and alternative medicines for voice disorders, physiology of voice production and vocal fatigue, and prevention of voice disorders in occupational voice users etc.

Appendix – The original, forward translation, backward translation and final version of the Children Voice Handicap Index-10 for Parents (Hong Kong Chinese Version) (CVHI-10-P(HK))

	Original	Forward Translation	Backward Translation	Final Version
Title	Children's Voice Handicap Index-10-Parents	兒童聲線障礙測量表-10-家長版	Children's Voice Handicap Index – 10 – Parents' Version	兒童聲線障礙測量表-10-家長版
Instruction	Instructions: The following sentences are used by many children do describe their voices, and how their voices affect their daily lives. Please circle to indicate how often your child have similar experiences as those children.	以下句子為很多兒童慣常使用來形容他的聲線以及其聲線對他日常生活的影響。請你以圓圈填選尺度，以表達你的孩子有多常擁有相同的經歷。	Instructions: The following sentences are commonly used by many children to describe their voice and the impact of their voice on their daily life. Please fill in the scales with a circle to show how often your child has the same experience.	指引：很多兒童慣常使用以下句子來形容他們的聲線及其聲線對他們日常生活的影響。請你評分並圈出分數，以表示你的孩子多常經歷類似情況。

Rating descriptors	Never / Sometimes / Many Times / Always	從不 / 間中 / 多次 / 總是	Never / Sometimes / Many Times / Always	從不 / 間中 / 多次 / 經常
Item 01	People have difficulty hearing my child because of his voice.	因為我孩子的聲線，別人難以聽到我孩子說的話。	It is difficult for others to understand what my child says under a noisy environment.	因為我孩子的聲線，別人難以聽到我孩子說的話。
Item 02	People have difficulty understanding my child in a noisy room.	在嘈雜的環境中，別人難以明白我孩子說的話。	It is difficult for others to understand what my child says under a noisy environment.	在嘈雜的環境中，別人難以明白我孩子說的話。
Item 03	The voice difficulties of my child prevent him to stay with people.	聲線問題阻礙了我孩子與其他人相處。	The voice issue hindered my child from getting along with others.	聲線問題阻礙了我孩子與人們相處。

Item 04	My child feels left out of conversations because of his voice.	我孩子因為聲線問題在交談中被冷落。	My child was desolated in the conversation due to the voice issue.	我孩子因為聲線問題在交談中被冷落。
Item 05	The voice difficulties of my child reduce his school outcome.	聲線問題影響了我孩子的學校表現。	The voice issue affects the school performance of my child.	聲線問題影響了我孩子的學習成果。
Item 06	My child feels he has to strain to produce voice.	我孩子覺得需要很用力才能發出聲音。	My child feels it takes a lot of effort to make a sound.	我孩子覺得需要很用力才能發出聲音。
Item 07	The voice of my child is not light.	我孩子的聲線不算柔弱。	My child's voice is not weak.	我孩子的聲線不算輕柔 (輕聲不用力) 。

Item 08	The voice problem of my child upsets him.	我孩子因聲線問題感到苦惱。	My child is distressed by the voice problem.	我孩子因聲線問題感到苦惱。
Item 09	The voice of my child makes him feel inferior to other children or other boys.	我孩子的聲線讓他覺得自己不如其他孩子。	My child feels inferior to other children due to his voice.	我孩子的聲線讓他覺得自己不如其他孩子。
Item 10	People ask me ‘‘what’s wrong with the voice of your child?’’	別人問我“你孩子的聲線出了什麼問題？”	People will ask "what's wrong with your child's voice?"	別人問我“你孩子的聲線出了什麼問題？”

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Reference

1. R.E. Deal, B. McClain, J.F. Sudderth, Identification, evaluation, therapy, and follow-up for children with vocal nodules in a public school setting, Journal of speech and hearing disorders 41 (1976) 390-397. https://doi.org/10.1044/jshd.4103.390.

2. E-M. Silverman, C.H. Zimmer, Incidence of chronic hoarseness among school-age children, Journal of Speech and Hearing Disorders 40 (1975) 211-215. https://doi.org/10.1044/jshd.4002.211.

3. M. Powell, M.D. Filter, B. Williams, A longitudinal study of the prevalence of voice disorders in children from a rural school division, Journal of Communication Disorders 22 (1989) 375-382. https://doi.org/10.1016/0021-9924(89)90012-9.

4. A. Mohammadzadeh, N. Sandoughdar, Prevalence of voice disorders in Iranian primary school students, Journal of Voice 31 (2017) 263.e213-263.e218. https://doi.org/10.1016/j.jvoice.2016.04.004.

5. W-H Lau, Prevalence and risk factors for voice problems in school-age children, (unpublished result) http://hdl.handle.net/10722/173713.

6. S.R. Schwartz, S.M. Cohen, S.H. Dailey, et al., Clinical practice guideline: hoarseness

(dysphonia), Otolaryngology–Head and Neck Surgery 141 (2009) 1-31. https://doi.org/10.1016/j.otohns.2009.06.744.

7. N.P. Connor, S.B. Cohen, S.M. Theis, S.L. Thibeault, D.G. Heatley, D.M. Bless, Attitudes of children with dysphonia, Journal of Voice 22 (2008) 197-209. https://doi.org/10.1016/j.jvoice.2006.09.005.

8. V. Reynolds, A. Buckland, J. Bailey, et al., Objective assessment of pediatric voice disorders with the acoustic voice quality index. Journal of Voice 26 (2012) 672.e671-672.e677. https://doi.org/10.1016/j.jvoice.2012.02.002.

9. P.H. Dejonckere, Assessment of voice and respiratory function, in: M. Remacle, H. Eckel (eds.), Surgery of Larynx and Trachea, Springer, Berlin, 2009, pp. 11-26. https://doi.org/10.1007/978-3-540-79136-2_2.

10. J. Kollbrunner, E. Seifert, Functional hoarseness in children: short-term play therapy with family dynamic counseling as therapy of choice, Journal of voice 27 (2013) 579-588. https://doi.org/10.1016/j.jvoice.2013.01.010.

11. R. Hersan, M. Behlau, Behavioral management of pediatric dysphonia, Otolaryngologic Clinics of North America 33 (2000) 1097-1110. https://doi.org/10.1016/s0030-6665(05)70268-1.

12. K.B. Zur, S. Cotton, L. Kelchner, S. Baker, B. Weinrich, L. Lee, Pediatric Voice Handicap Index (pVHI): a new tool for evaluating pediatric dysphonia, International journal of pediatric otorhinolaryngology 71 (2007) 77-82. https://doi.org/10.1016/j.ijporl.2006.09.004.

13. C.J. Hartnick, Validation of a pediatric voice quality-of-life instrument: the pediatric

voice outcome survey, Archives of Otolaryngology–Head & Neck Surgery 128 (2002) 919-922

. https://doi.org/10.1001/archotol.128.8.919.

14. M.E. Boseley, M.J. Cunningham, M.S. Volk, C.J. Hartnick, Validation of the pediatric voice-related quality-of-life survey, Archives of Otolaryngology–Head & Neck Surgery 132 (2006) 717-720. https://doi.org/10.1001/archotol.132.7.717.

15. A. Ricci-Maccarini,V. De Maio, T. Murry, A. Schindler, Development and validation of the children's voice handicap index-10 (CVHI-10), Journal of Voice 27 (2013) 258.e223-258.e228. https://doi.org/10.1016/j.jvoice.2012.10.006.

16. A. Ricci-Maccarini, V. De Maio, T. Murry, A. Schindler, Development and validation of the children's voice handicap index-10 for parents, Journal of Voice 30 (2016) 120-126. https://doi.org/10.1016/j.jvoice.2014.10.004.

17. E. Kwong, Cross-Cultural Adaptation and Validation of the Hong Kong-Chinese Version of Children's Voice Handicap Index, Journal of Voice (in press). https://doi.org/10.1016/j.jvoice.2020.07.001.

18. M.S.B. Yusoff, ABC of content validation and content validity index calculation, Education in Medicine Journal 11 issue 2 (2019) 49-54. https://doi.org/10.21315/eimj2019.11.2.6.

19. D. George, P. Mallery, SPSS for Windows Step by Step: A Simple Guide and Reference, 11.0 Update, Allyn and Bacon, Boston, 2003.

20. M. Tavakol, R. Dennick, Making sense of Cronbach's alpha, International Journal of Medical Education 2 (2011) 53-55. https://doi.org/10.5116%2Fijme.4dfb.8dfd.

21. O.A. Bolarinwa, Principles and methods of validity and reliability testing of questionnaires used in social and health science researches, Nigerian Postgraduate Medical Journal 22 (2015) 195-201. https://doi.org/10.4103/1117-1936.173959.

22. World Health Organization, International Classification of Functioning, Disability, and Health: Children & Youth Version, World Health Organization, 2007.