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Turkish Adaptation of the Pediatric Voice Related Quality of Life Survey: A validity and reliability study

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ABSTRACT

Objectives: Childhood voice disorders have increased in recent years reduce not only communication of the child, but also; the quality of life by affecting the socio-emotional state.
Methods: In the study, it is aimed to test validity and reliability of Pediatric Voice Related Quality of Life Survey (PVRQOL)'s Turkish adaptation. A total of 223 individuals aged between 2 years and 18 years, with and without voice problems were involved in this study.
Results: Statistically significant differences were found between study and control groups for total score and sub domain scores for PVRQOL ($p < 0,001$). Total score of quality of life was higher in the control group. Cronbach alpha coefficient for overall PVRQOL was 0,922; dimension of physical function was 0,894 and socio-emotional domain was 0,804. In the test-retest reliability test, overall PVRQOL was found to be 0,732; physical functional sub domain was 0,734; socio-emotional sub domain was 0,721. The validity of the questionnaire was determined by factor analysis.
Conclusion: The results suggest that the Turkish version of the PVRQOL has reliability and validity, and may play a crucial role in evaluating children with voice disorders.

1. Introduction

Voice disorders are among the most common communication disorders in children and adults [1]. Voice disorders in children can occur due to environmental, behavioral, psychological and organic causes. The most common of these is the habit of speaking loudly, which is among behavioral causes [1,2]. The prevalence of voice disorders in children ranges from 1% to 23% due to differences in the assessment methods used [3]. It was found that voice disorders are higher in males (7.5%) compared to females (4.6%) [4,5]. Childhood voice disorders which have increased in the recent years reduce not only the communication of the child, but also the quality of life by affecting the socio-emotional state. Because of this, it has become increasingly important to assess the effects of voice disorders on children's quality of life [11]. Evaluating the quality of life helps in determining the place and importance of voice disorders in the child's life, greatly contributes to the treatment process and the clinician in terms of guiding their choices and changes the point of view of the clinician. There are different questionnaires developed to evaluate the quality of life in children and these need to be filled with the help of their parents [6].

Pediatric Voice Outcome Survey (PVOS), Pediatric Voice Related Quality of Life Survey (PVRQOL) and Pediatric Voice Handicap Index (Pediatric Voice) are used to determine the effect of voice disorders on the quality of life in children Among these surveys, only the PVHI's Turkish validity and reliability study was carried out. Insufficient number of questionnaires adapted to Turkish limits the studies to be carried out The purpose of this study is to determine the effect of voice disorders on children's quality of life and prepare the Turkish Adaptation of *Pediatric Voice- Quality of Life Survey* which will guide the treatment process.

1.1. Pediatric voice- Quality of Life Survey

Pediatric Voice Related Quality of Life Survey (PVRQOL) was developed in 2006 by Boseley, Cunningham, Volk and Hartnick (see Appendix A). It is a questionnaire populated by parents of children between 2 and 18 years of age with voice disorders. It consists of 10 questions. There are two domains: physical-functional and social-emotional. Social emotional sub-domain consist of four questions and the physical function sub-area consist of six questions. Each question

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has an answer option up to 6 from 1. The total score is 100. As the score goes higher, quality of life gets higher. Answer options and scoring are as follow [3].

Answer options	Scores
1 = None, not a problem	10
2 = A small amount	7,5
3 = A moderate amount	5
4 = A lot	2,5
5 = Problem is “as bad as it can be”	0
6 = Not applicable	0

2. Materials and methods

2.1. The development of PVRQOL's Turkish version

Study was approved by Gazi University, Clinical Research Ethic Board. For the adaptation of the PVRQOL to Turkish, the items of the original version were first translated to Turkish by three speech language pathologists and translated back to English by an assistant professor from the Gazi University, English Language and Literature Department. Finally, the evaluation committee consisting of three speech language pathologists gave the final form to the translated survey. The final survey was pilot tested with parents of dysphonic/non dysphonic twenty children. Items 3 and 9 in the survey were rearranged because they were not understood by the majority. The sixth answer option “not applicable” has been translated into Turkish as “a problem that is not a solution”, but it has been removed because it was not understood by the parents and the survey has been finalized. Finally, PSİYKA were obtained by translating into Turkish without distorting the original meaning of the PVRQOL (see Appendix A).

2.2. Participants

All participants were examined by the ENT physician. A total of 223 voluntary individuals (97 female and 126 male) aged between 2 years and 18 years, with and without voice problems were involved in this study. Children with physical, mental and psychological disorders and children under the age of 2 and older than 18 were not included in the study. The study group consisted of individuals with voice problems and the control group consisted of individuals without voice problems. A total of 97 female and 126 male individuals from the study and control groups participated in the study.

2.3. Statistical method

The PSİYKA data of 223 individuals was transmitted to the electronic environment. The data was evaluated with *IBM SPSS Statistics 21* (Chicago, Illinois, ABD). Firstly, in the descriptive statistics, the mean and standard deviation was calculated for the quantitative (age, score) summed up data and then the observation number (b) and percentages (%) were calculated for the qualitative (gender, age groups, diagnosis) summed up data. Within this scope, the sample created to evaluate the PSİYKA score which consists of the data of 223 individuals was analyzed. In order to test whether the variances of the groups to be compared were homogenous or not, Levene's variance equality test was applied. For the homogenous variances, the independent two samples *t*-test under the homogenous variance and for variances which were not homogenous the independent two samples *t*-test were applied. On addition, in order to compare the age group and quality of life scores, the one-way analysis of variance (One Way ANOVA) test which is used in more than two group comparisons was used. The internal reliability of the survey was calculated with the *Cronbach alpha* coefficient. For the test-retest reliability analysis, the Pearson correlation analysis was used. Additionally, the rate of the items' compared to their total correlation coefficients were calculated and commented on. The validity of the survey which was adapted to Turkish was determined with Factor Analysis. With the purpose of testing the statistical significance of the hypothesis results, $p < 0{,}001$ has been accepted.

Table 1
Demographic characteristics.

		Average age ± SD (min; max)	Percentage	Frequency
Study Group	Female	9,4 ± 3,7 (min:3; max:18)	25,7	26
	Male	10 ± 3,3 (min:3; max:18)	74,3	75
	Total	9,9	100	101
Control Group	Female	10,4 ± 4,3 (min:3; max:18)	58,2	71
	Male	10,4 ± 3,8 (min:4; max:18)	41,8	51
	Total	10,4	100	122

3. Results

3.1. Demographics

Quantitative data of the participants is shown in Table 1. The individuals were examined in two levels in accordance with the diagnoses put on them. According to this; 92.1% of the study group consisted of vocal cord nodules and 8.9% had mutational falsetto diagnosed cases. The control group consisted of individuals without voice disorders and with natural vocal cords Individuals who participated in the study were separated into 3 age categories as pre-school, school and adolescent group. Quantitative data on these age categories are shown in Table 2.

3.2. PSİYKA values of the individuals

PSİYKA values of the individuals is shown in Table 3. There was statistically no significant difference between the female and male individuals in the study group in terms of both total and sub-domains ($p > 0.001$).

There was statistically no significant difference between the male and female individuals in the control group ($p > 0{,}001$).

When the total and sub domain scores of these two groups were compared were examined without gender differences; it was found that the control group had a high score and created a statistically significant difference compared to the study group ($p < 0{,}001$).

There was no statistically significant difference between the three age groups in terms of total and sub domain scores in the study group ($p > 0{,}001$). Similarly, no significant difference was observed in the control group ($p > 0.001$). When each of the three age groups in the study and control groups were evaluated mutually, there was a

Table 2
Distribution of the age groups.

	Age Category	Average Age ± SD	Percentage	Frequency
Study Group	Preschool (2–5 years old 11 months)	4,68 ± 0,47;	15,8	16
	School (6–11 years old 11 months)	9,05 ± 1,55	60,4	61
	Adolescent Group (12–18 years old 11 months)	14,79 ± 1,86	23,8	24
Control Group	Preschool (2–5 years old 11 months)	4,30 ± 0,47	18,9	23
	School (6–11 years old 11 months)	9,38 ± 1,67	45,1	55
	Adolescent Group (12–18 years old 11 months)	10,39 ± 4,14	36,1	44

Table 3
PSİYKA values of the individuals.

		Total Ave ± SD	Physical Ave ± SD	Social Ave ± SD
Study Group	Female	71,7 ± 19,8	39,9 ± 14,1	31,8 ± 7,8
	Male	66,0 ± 23,9	36,1 ± 15,9	29,8 ± 9,9
	Total	67,5 ± 23,03	37,1 ± 15,5	30,3 ± 9,4
Control	Female	99,1 ± 1,8;	59,3 ± 1,5	29,8 ± 9,9
Group	Male	97,5 ± 6,2	58,0 ± 5,0	39,4 ± 9,9
	Total	98,5 ± 4,3	58,8 ± 3,5	39,6 ± 1,3

statistically significant difference between the study group and the control group in terms of both the total score and the sub domain scores ($p < 0.001$). The data obtained from age groups are shown in Table 4.

3.3. Reliability

For the reliability study of the questionnaire, firstly the internal consistency test of the questionnaire should be done. Cronbach Alpha coefficient is expected to be greater than "0" [7]. The reliability analysis results of PSİYKA are shown in Table 5.

In literature, the correlation coefficient of the correction factors of the corrected items being larger than 0.50 is considered to be significant in terms of reliability [7]. Accordingly, the corrected substances/total ratios in Table 3.2 are larger than 0.50. In the last column of the above table, it is seen what the Cronbach Alpha value will be if a question is deleted. As it can be seen in the table, it is observed that whichever question is deleted, the alpha coefficients for the reliability analysis made by the remaining items are over 0,90.

The internal consistency of PSİYKA which consists of ten questions was determined as 0,922. According to this, it has been observed that the alpha coefficient was not greater than 0,922 when any of the items were ignored. Therefore, each of the 10 items needs to be in the survey. The internal consistency coefficients of PSİYKA were determined as 0,894 for the physical domain and 0,804 for the social emotional domain. These values are sufficient for internal consistency. Since these results are higher than the %70 threshold value, it has been determined that the internal consistency of the survey was quite high.

69 of the participants with voice problems took the survey again two weeks later. The test-retest reliability of the participants in question were determined as 0,732 for the total domain; 0,734 for the physical functional sub domain; 0,721 for the social emotional sub domain (Table 6).

3.4. Validity

The validity of the study which was adapted to Turkish was determined with Factor Analysis. When the factor analysis of the answers given to the 10 questions in the survey was carried out, it was seen that the questions of the survey were expressed with a total of 2 factors. The 2nd factor most contributes to the 10 t h question (contribution rate is 64%). Similarly, the factors corresponding with the other questions of the survey became the highest value when their contribution was the most. The factor analysis of the answers given to the 10 questions is given in Table 7.

Table 5
The reliability analysis results of PSİYKA.

Item	Average	St. Deviation	Corrected Item/ Total	Alpha coefficient (When the item was erased)
1	1,98	1,44	0,718	0,915
2	1,56	1,06	0,714	0,914
3	1,81	1,32	0,713	0,914
4	1,91	1,41	0,788	0,910
5	1,35	0,86	0,695	0,917
6	1,60	1,21	0,769	0,911
7	1,71	1,37	0,795	0,909
8	1,32	0,91	0,637	0,919
9	1,85	1,34	0,745	0,912
10	1,26	0,86	0,551	0,921

4. Discussion

It is important to use scales which have been especially designed for children to be able to most accurately understand the life quality of children and teenagers. Life quality scales unique to diseases are only valid in the evaluation of the diseases they are developed for. PVQOL is a survey which evaluates children between 2 and 18 years of age with voice disorders. It has been modified from the VQOL survey. In our country, the small amount of these types of evaluation scales limits the studies carried out in this area. Therefore, the Turkish adaptation of the PVRQOL survey has been done and the life quality of children with voice disorders and no voice disorders has been evaluated. There are similar studies in the literature.

In Blumin, Keppel, Braun, Kerschner and Merati's study on normative PVRQOL values unique to gender and age, the total score average for healthy children was determined as 97 over 100 and it has been stated that a score of 86 and over represents quality of life related to normal voice [8]. In Merati, Keppel, Braun, Blumin and Kerschner's study, the total PVRQOL score average was determined as 96,8 for healthy children; 70,5 for children with vocal cord paralysis; 84,8 for children with vocal nodules and 86,7 for children with paradoxical vocal cord dysfunction (PVFD). Statistically significant differences have been observed in each of the 3 illness group in social emotional and physical functional domains compared to healthy children [12]. In Ribeiro, Paula and Behlau's study, it has been found that the groups with the voice problem had a lower quality of life in the evaluation made in terms of the total quality of life score and sub domain scores of the groups with voice problems and no voice problems [10]. In our study, control group's average is higher than the study group's average according to the quality of life score ($p < 0,001$) (see Table 3).

When we take a look at the relationship between pediatric voice disorders with gender, it can be seen that voice disorders are seen more frequently in male children (%7,5) compared to females (%4,6). The reason for this has been determined as the fact that male children have more of a tendency to yell and scream and make harder glottal attacks [5,13–17] In line with literature, it has been determined in our study as well that voice disorders are seen more frequently in male children (%74,3). When the quality of life scores were evaluated in terms of gender, Blumin et al. were not able to find a difference between the genders in terms of the quality of life score in healthy children [8].

Table 4
Comparison of PSİYKA total and sub domain scores according to the age groups.

	Study Group			Control Group		
	Total Ave ± SD	Physical Ave ± SD	Social Ave ± SD	Total Ave ± SD	Physical Ave ± SD	Social Ave ± SD
Preschool	71,3 ± 19,04	38,8 ± 11,7	32,5 ± 10,23	98,6 ± 1,89	59 ± 1,71	39,6 ± 0,91
School	67 ± 24,28	37,1 ± 16,15	29,8 ± 9,68	98,1 ± 5,89	58,5 ± 4,82	39,6 ± 1,71
Adolescent	67,4 ± 21,71	36,5 ± 15,63	30,8 ± 8,98	98,8 ± 2,67	59,1 ± 2,02	39,7 ± 0,92
P	0,868	0929	0,713	0709	0,678	0904

Table 6
Average scores of PSİYKA in the test-retest evaluation.

Test Retest Test	Physical Functional average ± SD	Social Emotional average ± SD	Total Score average ± SD
1. Application	37,1 ± 15,5	30,3 ± 9,4	67,5 ± 23,0
2. Application	38,5 ± 14,4	31,5 ± 9,5	70,1 ± 21,3
R	0,734	0721	0,732

Table 7
Factor analysis of the answers given to the 10 questions.

	Component	
	1	2
s1	,789	-,157
s2	,773	-,134
s3	,760	-,051
s4	,818	,032
s5	,709	,206
s6	,784	,131
s7	,819	,098
s8	,608	,674
s9	,775	,017
s10	,517	,640

Similarly, Ribeiro et al. were not able to find a difference between the genders in terms of the quality of life scores in healthy children either. However, they have determined that male children with voice problems are more disadvantageous in comparison to female children in terms of social emotional domain scores. Similarly, a statistically significant difference was not determined between the quality of life scores of children in terms of gender in our study. A statistically significant difference has not been determined for the study group either ($p > 0{,}001$) (see Table 3).

Ribeiro et al. have separated individuals with voice problems and no voice problems into 3 groups as, preschool, school and adolescent and made a comparison in terms of the averages of the total score and the sub domain scores. When the school group with voice problems and no voice problems were compared, a statistically significant difference was found both in terms of total domain and sub domains. The same result was seen when the adolescent group with voice problems and no voice problems were compared as well. When the preschool group with voice problems and no voice problems were compared, a significant difference was found between the two groups in terms of both total score and physical functional domain score. However, a significant difference was not found in terms of the social emotional sub domain score [10]. In our study, a statistically significant difference was not observed between the three age groups in both the study and the control group in terms of total score and sub domain scores ($p > 0{,}001$). When each of the three age groups in the study and the control groups were mutually evaluated, it was seen that there was a statistically significant difference between the study and the control group in terms of both total score and the sub domains ($p < 0{,}001$) (see Table 4).

The reliability of PVRQOL, which was developed by Boseley et al. (2006), was evaluated through the calculation of the Cronbach Alpha Coefficient. This statistical evaluation was used to determine the internal consistency between the test items and was determined as, 96 (the accepted value is alpha > 0.55). The test-retest reliability was calculated through the application of PVOS and PVRQOL to 70 caregivers twice within a two week interval. The nominal κ values was determined as 0,8. The criterion validity of the survey was tested with PVOS which had previous reliability [9].

Ribeiro et al. (2014) have translated PVRQOL into Brazilian Portuguese, adapted it and determined the total internal consistency coefficient of the survey as 0,998; the social emotional domain score as > 0,999 and the physical functional domain score as 0,998 [10].

Similarly The results of our study way show that the survey is valid and reliable (see Tables 5 and 6).

5. Conclusion

The results suggest that the Turkish version of the PVRQOL has reliability and validity and may play a crucial role in evaluating children with voice disorders. We believe that this survey will play an important role in assessing children with voice disorders.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.ijporl.2018.06.008.

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