Measuring Quality of Life in the Speakers with Dysarthria: Reliability and Validity of the Persian Version of the Qol-Dys

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Abstract

 Background: In light of the significance of quality of life in clinical decision-making for patients with dysarthria and the absence of a reliable Persian questionnaire in this field, the objective of the present study was to determine the validity and reliability of the Persian version of the Quality of Life Questionnaire in those diagnosed with dysarthria (QoL-DyS questionnaire), thereby providing a clinically applicable measurement tool.

 Methods: The original research involved 70 patients diagnosed with dysarthria, comprising 26 females and 44 males, as well as 70 healthy participants matched to the patient group. After translating the Cultural and Linguistic Adaptation of the QoL-DyS questionnaire into Persian, internal consistency was calculated using Cronbach's alpha coefficient. At the same time, the reliability of the test-retest was evaluated using the intraclass correlation coefficient (ICC). Additionally, the questionnaire's content validity, clinical validity, and criterion validity were calculated.

 Results: The questionnaire and all subcategories demonstrated a Cronbach's alpha coefficient exceeding 0.70, and the reproducibility coefficient (ICC) was found to be 0.96 [95% CI, 0.94-0.98]. The content validity ratio (CVR) for all questionnaire items ranged from 0.7 to 1, while the content validity index (CVI) for all items fell between 0.8 and 1. In clinical validity, a significant difference emerged between the mean scores of the patient group and those of the healthy controls ($P < 0.000$). The criterion validity analysis revealed a satisfactory correlation (r = 0.874, $P < 0.000$) between the QoL-DyS questionnaire and the Voice Handicap Index questionnaire.

 Conclusion: The Persian adaptation of the QoL-DyS questionnaire demonstrates strong validity and reliability. This finding highlights the instrument's suitability for use by speech-language therapists in evaluating the quality of life of patients experiencing dysarthria.

 Keywords: Quality of life, Dysarthria, Psychometrics, Validity, Reliability, Persian

Introduction

Dysarthria is a condition characterized by a range of speech-motor disorders that can result from dysfunction in either the central or peripheral nervous system. Dysarthria causes disruptions in the muscle movements involved in producing the main components of speech, including res- piration, phonation, articulation, resonance, and prosody (1). Dysarthria is one of the common disorders observed in individuals who have experienced a stroke, impacting approximately 30% to 40% of this specific group (2).

Depending on the lesion's location and severity in the

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↑What is "already known" in this topic:
Impairments in language and speech skills caused by dysarthria can lead to the loss of potential physical, mental, social, and occupational abilities. Consequently, the diminished skills can significantly restrict the overall quality of life.

→What this article adds:
The present study aimed to evaluate the validity and reliability of the Persian version of the Quality-of-Life Questionnaire for patients experiencing dysarthria (QoL-DyS questionnaire), to provide a practical assessment tool. The results indicated that the Persian adaptation of the QoL-DyS questionnaire exhibits robust validity and reliability.

relevant nerves, as well as the presence of any neurological disorders, dysarthria can be classified into 7 distinct types (1): flaccid, spastic, unilateral upper motor neuron, ataxic, hypokinetic, hyperkinetic, and mixed.

In addition to stroke, dysarthria can also be caused by other neurogenic disorders such as multiple sclerosis (MS), Parkinson's disease, and amyotrophic lateral sclerosis (ALS). Furthermore, aside from dysarthria, these individuals also encounter various linguistic, cognitive, and swallowing difficulties, which can significantly diminish their overall quality of life (3-5).

The concept of quality of life involves individuals assessing their health, and this factor holds significance within the realm of healthcare (6). Numerous research studies have been conducted recently to develop tools for assessing quality of life, to evaluate the effects of specific diseases on quality of life, along with the impact of medical interventions and other treatments on quality of life (1).

Questionnaire tools can be used to assess the quality of life. Given that the existing questionnaires for evaluating and measuring the quality of life might be in other languages, there are 2 approaches to utilize this tool effectively in assessing the quality of life across diverse countries and cultures with different languages (1):

1. Creating a new questionnaire in accordance with the language and culture of the same country

2. Translating questionnaires from various languages into the target language.

The first technique involves a series of time-consuming steps in questionnaire development, including selecting options, testing each one, and making adjustments as needed. Therefore, this method may not always be suitable for use. Merely translating is insufficient in the second approach, as there are cultural differences among various countries and nations; thus, the interpretation and comprehension of terms like disease and quality of life differ significantly, making it imperative to go beyond mere translation. Consequently, it appears that translating, cross-cultural adaptation, and verifying the validity and reliability of questionnaires in other languages for the target language are viable alternatives (1).

Impairments in language and speech skills caused by dysarthria can lead to the loss of potential physical, mental, social, and occupational abilities. Consequently, the diminished abilities can significantly restrict the overall quality of life (7). Hence, to protect the quality of life of patients suffering from dysarthria, it is crucial to assess their quality of life during the initial phases. Subsequently, if required, prompt interventions should be implemented as swiftly as possible to prevent any deterioration and enhance their overall quality of life. To assess the quality of life of patients experiencing dysarthria, questionnaires tailored to this condition can be employed. Several self-assessment instruments have been developed for a range of disorders, including those affecting voice and swallowing disorders, including voice and swallowing disorders (1, 7, 8). In speech motor disorders such as dysarthria, there are also questionnaires to investigate communication impairments:

• A questionnaire to investigate the relationship between the clarity of speech and overall communication performance in different social situations in ALS patients (9).

• A questionnaire to explore the effectiveness of communication in individuals with dysarthria caused by Parkinson's (10).

• A questionnaire to investigate the level of self-understanding, self-awareness, and speech difficulties in individuals with dysarthria caused by neurological disorders (11).

• The dysarthria impact profile (DIP) was employed to assess the psychological impact of dysarthria, including its effects on self-perception, self-esteem, and self-confidence among individuals with dysarthria (12). Additionally, the reliability and validity of this assessment instrument across different languages were evaluated in individuals with dysarthria caused by Parkinson's disease (13, 14). Indeed, the primary emphasis of this survey lies in psychological issues, and conducting further studies and research is essential to ascertaining its appropriateness in measuring all types of dysarthria (12).

Although these tools can be beneficial for measuring and evaluating the communication problems of patients with dysarthria, the time required and the cognitive demands associated with their completion may limit their practicality in clinical settings (1).

Furthermore, the applicability and adequacy of some existing questionnaires to assess the quality of life of patients experiencing dysarthria have been examined only for certain diseases. These questionnaires only measure some aspects of the quality of life related to dysarthria(9, 10, 15-18), making them inapplicable to all patients with dysarthria since a comprehensive assessment of their quality of life cannot be achieved.

In 2011, Piacentini et al (6) developed a tool to evaluate the quality of life for patients experiencing dysarthria. They devised a questionnaire in Italian to assess individuals' comprehension of their speech and the obstacles they encounter in different situations. The process of constructing this questionnaire consists of 2 stages. First, it involves designing and reducing the number of questions from a 100-item questionnaire. Second, it entails checking the reliability and validity of the developed questionnaire, which was evaluated, revealing excellent internal consistency (Cronbach's α = 0.90) and high test-retest reliability (intraclass correlation coefficient [ICC] = 0.96 [95% CI, 0.94-0.98]) (6).

Unlike other comprehensive tools, this questionnaire is both time-efficient and accessible to those with lower cognitive demands. Moreover, the applicability and adequacy of this questionnaire in assessing the quality of life of patients experiencing dysarthria have been examined for several diseases with different etiologies, not just dysarthria caused by a specific disease, such as Parkinson's disease.

Due to the decrease in the number of inquiries, this survey is easier to use and more practical than its previous version. It consists of 40 questions and is divided into 4 distinct subcategories: Speech Characteristics of the Word

(SC), Situational Difficulties (SD), Compensatory Strategies (CS), and Perceived Reactions of Others (PR). Within each subcategory, 10 items are assessed using a 5-level scale ranging from 0 (never) to 4 (always). As a result, the total score can range from 0 to 160, with 0 indicating a high quality of life and 160 indicating a low quality of life. This questionnaire has been validated through psychometric testing in European Portuguese, and the findings showed that the European Portuguese version of the Persian version of the Quality of Life Questionnaire in patients diagnosed with dysarthria (QoL-DyS) is a reliable and valid instrument for assessing quality of life in these individuals. However, the heterogeneous distribution of the sample across dysarthria types precluded comparisons between dysarthria type, severity, and quality of life (12).

Given the significance of considering the quality of life in clinical decision-making for patients with dysarthria and the absence of translated Persian questionnaires in this specific area that possess both reliability and validity, the primary objective of this study was to examine the validity and reliability of the Persian version of the QoL-DyS. The ultimate goal was to utilize this questionnaire as a valuable instrument for accurately evaluating the extent of medical interventions and rehabilitation available to Persian-speaking patients with dysarthria.

Methods

This study is a descriptive-analytical epidemiological study that examines the validity and reliability of the Persian version of QoL-DyS.

The First Step: Translation, Cultural, and Linguistic Adaptation

In the original Italian questionnaire, the questionnaire items were also translated into English, and we used the English version. According to the translation and equivalence protocol of the International Quality of Life Assessment Project (IQOLA) (19). The questionnaire was translated from English into Persian by 2 proficient translators after receiving authorization from the original author. Afterward, the translated questionnaires underwent a thorough review and modification process by a panel of experts, which comprised 3 speech-language pathologists with over 10 years of clinical experience in managing dysarthria.

The panel explored a range of issues, including the importance of translation clarity (ie, using straightforward and easily comprehensible words), the preference for common and widely-used terms in Persian (ie, refraining from using jargon or figurative language), and the emphasis on conceptual equivalence (ie, maintaining the conceptual representation utilized in the original test). Moreover, the content validity of each item was measured by the panel, which was responsible for assessing the accuracy of the translations and ensuring that each item conveyed the same meaning as in the original questionnaire. During this step, the panel adjusted any word or phrase deemed irrelevant or nonsensical by unanimous agreement among the experts. Ultimately, a refined translation was produced.

As a pilot study, the Persian version was administered to a target group of 10 patients with dysarthria, comprising 5 females and 5 males. These participants, aged between 30 and 70 years, with a mean age of 50 years, were requested to participate through a face-to-face interview, after completing the form. Throughout the individual interview session, the interviewer sought clarification from the interviewees regarding any words or items in the Persian adaptation of QoL-DyS that they found challenging to understand when responding. The interviewers strived to ascertain that the participants fully comprehended the words or items as inquired in the original QoL-DyS questionnaire. The intention behind this procedure was to eliminate any potential ambiguities and misinterpretations. Before recording the interviews for future reference, informed consent forms were obtained from the participants. The pilot group found the items to be comprehensible, requiring no additional modifications (Appendix 1).

Patients

The study included 70 patients (26 females and 44 males) with a mean age of 54.48 ± 14.44 years (range, 23–83 years). Participants were selected based on availability from Golestan Hospital and the Neurology Department of Shafa Hospital in Ahvaz after meeting the inclusion criteria. It had been less than a week since the patients' disorder began, and they had not yet received any speech therapy services. The inclusion criteria for patients with dysarthria consisted of several key factors. These factors included a confirmed diagnosis of dysarthria using the Duffy protocol, having Persian as their native language, being at least 18 years of age, and exhibiting normal cognitive ability as determined by scoring a minimum of 23 points (20) on the Persian version of the Mini-Mental State Examination (MMSE). The exclusion criteria included dysarthria that does not coexist with other neurological speech and language disorders, such as aphasia, and Non-dominance of the different languages in bilingual patients.

13 patients experienced flaccid dysarthria, while 14 patients exhibited spastic dysarthria. Three patients were diagnosed with UUMN dysarthria, and 16 patients displayed ataxic dysarthria. Additionally, six patients were identified with hypokinetic dysarthria, and 18 patients were found to have mixed dysarthria. To assess clinical validity after obtaining permission and completing a written consent form, 70 healthy individuals selected to correspond with the patient group regarding age, sex, and educational level, with an average age of 14.3 ± 54.5 years (26-81 years), who met the inclusion criteria were invited to complete the relevant questionnaires. The criteria for inclusion in the study involved the absence of dysarthria disorder, speaking Farsi as their native language, a minimum age of 18 years, and a confirmed diagnosis of normal cognitive ability based on scoring at least 23 points on the Persian version of the Mini-Mental State Examination (MMSE). For individuals lacking literacy, the examiner took the time to read the questions and document their responses carefully.

The participants' demographic characteristics are pre-

Table 1. Demographic characteristics of individuals with dysarthria

Index	Variable	Patient group (n=70)	Healthy group (n=70)
	Age	54.48 ± 14.44	54.5 ± 14.3
Demographics	Male	44	44
	Female	26	26
	Illiterate	15	15
	Half-educated (under diploma)	32	32
Education	Diploma	14	14
	Associate Degree	1	1
	Bachelor's Degree	6	6
	Master's Degree	2	2
	Flaccid	13	
	Spastic	14	
Dysarthria type	UUMN	3	
	Ataxic	16	

sented in Table 1.

The Second Step: Reliability Examination
Item Analysis

The focus of this section lies in the exploration of both item discrimination and the contribution of individual items to establishing the questionnaire's reliability. As its name suggests, the discrimination coefficient represents the correlation between the overall questionnaire score and the scores of individual items. The examination of test reliability involved recalculating the internal consistency coefficient after removing each item to assess its contribution to the overall score. The appropriateness of items was evaluated based on changes in Cronbach's alpha coefficient, where an increase following item elimination signified inappropriateness, whereas a decrease indicated appropriateness.

Internal Consistency

The consistency of the items within the QoL-Dys questionnaire and the existing subscales was evaluated using Cronbach's alpha coefficient. A Cronbach's alpha coefficient of 0.70 is deemed satisfactory, while coefficients falling between 0.80 and 0.90 are considered good, and values above 0.90 are excellent (21).

Test-Retest Reliability

After 2 weeks, the dysarthria patients involved in the study were given the Persian version of the QoL-Dys questionnaire again, and the intraclass correlation coefficient (ICC) was computed to assess test-retest reliability. An ICC of 0.75 or higher is considered acceptable. ICC ≥0.90 indicates high reproducibility; ICC = 0.75-0.90 indicates good reproducibility; ICC = 0.50-0.75 indicates moderate reproducibility; and ICC ≤ 0.50 indicates poor reproducibility (22).

The Third Step: Validity Examination

The validity of a study denotes the degree to which its results accurately represent the construct it is intended to measure (23). Content validity, clinical validity, and criterion validity were used in this study.

Content Validity

The content validity of the Persian version of the QoL-DyS measurement tool was evaluated through a survey involving 10 speech and language pathologists, all of whom possessed graduate degrees. A form for evaluation was devised, incorporating questions on the appropriateness or inappropriateness of the questionnaire questions in relation to the objectives of each subset. The questionnaire questions, together with the evaluation form, were provided to the individuals. The individuals evaluated the questions as "necessary" with a score of 2, "not bad" with a score of 1, and "must not exist" with a score of 0.

Following the determination and calculation of the content validity ratio (CVR), the content validity index (CVI) was then computed. Experts evaluated the CVI by providing feedback on the three criteria of relevance or specificity, simplicity and fluency, and clarity and transparency of each questionnaire item using a 4-point Likert scale. The minimum acceptable score for content validity, as determined by a panel of 10 evaluators, is 0.62 (23, 24).

Clinical Validity

An assessment of the clinical validity of the QoL-Dys questionnaire involved comparing the total score and the score of each subset of patients with dysarthria to those of healthy subjects. The statistical analysis employed the Mann-Whitney test, with a significance level of 0.05.

Criterion Validity

Criterion validity was established by analyzing the correlation between the total scores of the Persian version of the QoL-DyS questionnaire and the total scores of the Persian version of the Voice Handicap Index (VHI) questionnaire. The VHI questionnaire is designed to evaluate the impact of voice disorders on individuals' quality of life. This questionnaire has been meticulously constructed in Persian using psychometric principles, demonstrating satisfactory validity and reliability (21).

All statistical analyses were conducted using SPSS software (Version 22), with a significance level of 0.05.

Results

This research entails a descriptive-analytical epidemiological investigation aimed at evaluating the reliability and validity of the Persian version of the Quality of Life questionnaire for Individuals with Dysarthria. The study included a total of 70 patients, comprising 26 females and

44 males, with a mean age of 54.48 ± 14.44 years (ranging from 23 to 83 years). Additionally, 70 healthy participants, fulfilling the inclusion criteria and matched to the patient group, had a mean age of 54.5 ± 14.3 (ranging from 26 to 81 years), and were included in the study. It took the participants approximately 10 to 15 minutes to provide answers to the questions, which were uncomplicated and posed no particular difficulty for them.

Item Analysis

The discrimination coefficient for each item demonstrated how that item and the total score were related to one another. Upon eliminating the item, the assessment of its role in the reliability of QoL-DyS exhibited a decrease in reliability. The Cronbach's alpha value remained unchanged when none of the items were removed, as shown in Table 2. This indicates that all items contributed to enhancing internal consistency.

Internal Consistency

The results of the calculations reveal a total Cronbach's alpha coefficient of 0.98, demonstrating the excellent internal reliability of the QoL-DyS questionnaire. The Cronbach's alpha coefficients for the QoL-DyS questionnaire are summarized in Table 3.

Test-Retest Reliability

The research findings indicate that the ICC value is 0.96 [95% CI, 0.94-0.98] ($P < 0.000$). As a result, the QoL-DyS questionnaire demonstrates high external consistency and temporal reliability. The ICC coefficients of the QoL-DyS questionnaire are summarized in Table 4.

Content Validity

The results show that the CVR score of all items in this questionnaire ranges from 0.7 to 1.

The outcomes derived from the calculations of the content validity index (CVI) for the questionnaire items reveal that the scores for the relevance criterion lie within the range of 1 to 0.9. Likewise, the content validity index for the simplicity criterion ranges from 1 to 0.8. Additionally, the content validity index for the criterion of clarity is observed to be between 0.8 and 1. As a result, the content validity of each item across all subcategories was deemed good and acceptable.

Clinical Validity

The Mann-Whitney test results indicate that the mean score for healthy subjects is 37.23, whereas the mean score for patients is 127.28. Therefore, a significant difference was observed between the scores of the two groups ($P < 0.0001$). Furthermore, the subset of spoken words characteristics (SC) demonstrated the highest mean difference (29.48) between the two groups, whereas the compensatory strategies' subset (CS) had the lowest mean difference (14.4). The Results of the Mann-Whitney Test for the calculation of the clinical validity of the QoL-DyS questionnaire are summarized in Table 5.

Criterion Validity

The Spearman test results reveal a noteworthy correlation ($r = 0.874$, $P < 0.000$) between the total scores of the QoL-DyS questionnaire and the total scores of the VHI questionnaire. These results indicate a statistically significant and acceptable correlation between the scores of these 2 questionnaires.

Table 2. Cronbach's Alpha if Item Deleted

Spoken words Characteristics		Situational Difficulties		Compensatory Strategies		Perceived Reactions of Others	
1	.748	1	.748	1	.754	1	.750
2	.748	2	.752	2	.756	2	.749
3	.753	3	.752	3	.754	3	.749
4	.747	4	.752	4	.754	4	.751
5	.748	5	.753	5	.752	5	.749
6	.748	6	.753	6	.756	6	.749
7	.750	7	.753	7	.753	7	.750
8	.747	8	.751	8	.756	8	.751
9	.751	9	.754	9	.751	9	.748
10	.751	10	.751	10	.752	10	.753

Table 3. Cronbach's alpha coefficients of the QoL-DyS questionnaire

QoL-DyS questionnaire	Cronbach's alpha coefficient
Spoken words Characteristics (SC)	0.98
Situational Difficulties (SD)	0.94
Compensatory Strategies (CS)	0.78
Perceived Reactions of others (PR)	0.99
Total Score	0.98

Table 4. ICC coefficients of QoL-DyS questionnaire

QoL-DyS questionnaire	ICC (95% CI)	P-value
Spoken words Characteristics (SC)	0.93	<0.000
Situational Difficulties (SD)	0.90	<0.000
Compensatory Strategies (CS)	0.87	<0.000
Perceived Reactions of Others (PR)	0.91	<0.000
Total Score	0.96	<0.000

Table 5. Results of Mann-Whitney Test for the calculation of clinical validity of QoL-DyS questionnaire

QoL-DyS questionnaire	Mean score of patients ± SD	Mean score of healthy individuals ± SD	The mean difference of the two groups	*P*-value
Spoken words Characteristics (SC)	32.34 ±8.2	2.76±1.5	29.58	<0.000
Situational Difficulties (SD)	36.86 ±10.8	17.91 ±7.3	18.95	<0.000
Compensatory Strategies (CS)	29.74 ±7.4	15.34 ± 7.7	14.4	<0.000
Perceived Reactions of Others (PR)	28.44 ±10.2	1.21 ±1.2	27.23	<0.000
Total score	127.28 ± 15.4	37.23±17.4	90.05	<0.000

Discussion

A thorough investigation was conducted to evaluate the psychometric properties of the Persian version of QoL-DyS, using a sample size of 70 dysarthric patients and 70 healthy individuals. The findings from the translation and content validity analysis of test items demonstrate the appropriateness of all test items. The Persian version appears to be appropriate as well. It is widely accepted that a precise translation enables a therapist to conduct a more accurate assessment of patients' conditions. As a result, an accurate evaluation has been demonstrated to be highly effective in treatment processes. Individuals with dysarthria found the QoL-DyS questionnaire easy to complete, and the results indicated favorable internal consistency across its four subscales, which is considered acceptable. In this study, the overall Cronbach's alpha for the test was 0.98, indicating excellent internal consistency. Cronbach's alpha coefficient did not rise when any of the items were eliminated. This finding is consistent with the results observed in the validation for other quality of life instruments. (1, 6, 25, 26).

Excellent test-retest reliability was observed for the QoL-DyS, indicating strong stability and consistency of scores over time. This holds significant value as it enables the implementation of the QoL-DyS in forthcoming investigations on the quality of life associated with both progressive and non-progressive dysarthria. In contrast to the control group, the individuals with dysarthria demonstrated considerably higher scores. Although significant differences were observed between the control participants and those with dysarthria, the effect size estimates indicate that these differences were comparatively smaller than those observed in the other dimensions. The widespread use of communication strategies (CS) by people without dysarthria in situations where communication is complex or hindered by environmental factors such as noise may account for this finding. It is also possible that, due to cultural differences or conceptual reasons, individuals without dysarthria may sometimes use compensatory strategies. The original authors also found similar results in their study.

The outcomes revealed an acceptable and significant correlation between the total scores of the QoL-DyS questionnaire and the VHI questionnaire, indicating that both tools effectively and in line with each other evaluated the quality of life of patients with voice-related speech impairments.

Several limitations should be noted in this study. First, owing to the small sample size, it was not possible to perform factor analysis. Second, there was heterogeneity among participants in terms of age, number, etiology, and the type and severity of dysarthria, which may affect the generalizability of the findings. Third, other potentially influential factors on quality of life, such as marital status, occupation, and place of residence, were not considered. Finally, it should be emphasized that all participants were in the acute stage of dysarthria (i.e., within one week of symptom onset); no individuals in the chronic phase were included, which may have potentially restricted the generalizability of the findings to the broader dysarthric population.

Validating the Persian version of the QoL-DyS questionnaire allows its application in future research targeting specific conditions and as an outcome measure in dysarthria interventions. We also recommend that future studies address the limitations of the present work to evaluate further and strengthen the validity of this instrument.

Conclusion

The Persian version of the Quality of Life in the Dysarthria Speaker (QoL-DyS) questionnaire demonstrates good external and internal reliability, as well as content, clinical, and criterion validity. Unlike other comprehensive tools, it is time-efficient and suitable for individuals with lower cognitive demands. In other words, this questionnaire is a reliable and culturally adapted instrument for evaluating quality of life in Persian-speaking individuals with dysarthria. At the same time, the results are promising, specific limitations exist—such as the absence of factor analysis. Therefore, further multicenter or large-scale studies using particular methodologies (e.g., exploratory factor analysis [EFA], confirmatory factor analysis [CFA], or longitudinal designs) are recommended. Overall, the questionnaire is well-suited for clinical use; for example, it is valuable and practical for rehabilitation planning, as well as for pre- and post-treatment assessment, and offers valuable support for future research into the quality of life in individuals with dysarthria.

Authors' Contributions

Concepts and Design: Golnoosh Abaeian, Majid Soltani, Negin Moradi; Data acquisition: Golnoosh Abaeian, Majid Soltani, Parvaneh Rahimifar; Methodology and Data analysis: Saeed Hesam, Golnoosh Abaeian, Negin Moradi; Writing – Original Draft: Golnoosh

Abaeian; Writing – Review & Editing: Golnoosh Abaeian, Majid Soltani, Negin Moradi; and Supervision: Golnoosh Abaeian, Majid Soltani, Negin Moradi, Parvaneh Rahimifar.

Conflict of Interests

The authors declare that they have no competing interests.

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Appendix 1. The Quality of Life in the Dysarthric Speakers (QoL-DyS)

These are statements that many people used to describe their speech and the effects of their speech on their lives. Circle the response that indicate how frequently you have the same experience. 0 = never; 1 = almost never; 2 = sometimes; 3 = almost always; 4 = always.

Speech Characteristic of the Word (SC) Caratteristiche della Parola (CP) ویژگی کلمات گفتاری	Score (0-4)				
1 My speech is difficult for strangers to understand 1 Il mio modo di parlare è difficile da comprendere per gli estranei ۱- غریبه ها گفتار من را به سختی متوجه می شوند .	0	1	2	3	4
2 My speech is slow 2 Il mio modo di parlare è lento ۲- (سرعت) گفتار من کند است.	0	1	2	3	4
3 My speech is sometimes too loud or too soft 3 Il volume della mia voce è a volte o troppo debole o troppo forte ۳- گفتار من گاهی اوقات بسیار بلند و (گاهی اوقات) بسیار آهسته است.	0	1	2	3	4
4 My speech sounds unnatural 4 Il mio modo di parlare sembra innaturale ۴- گفتار من غیر طبیعی به نظر می رسد.	0	1	2	3	4
5 My speech problem is so severe that it is difficult for my family to understand 5 La mia famiglia fa fatica a comprendermi a causa dei miei problemi di parola ۵- مشکل گفتاری من به قدری شدید است که خانواده ام گفتارم را به سختی متوجه می شوند.	0	1	2	3	4
6 I have significant difficulty speaking when I am in a hurry 6 Ho grandi difficoltà a parlare quando sono di fretta ۶- زمانی که عجله دارم به طور قابل توجهی در صحبت کردن دچار مشکل می شوم.	0	1	2	3	4
7 My speech is worse in the evening 7 Il mio modo di parlare è peggiore al termine della giornata ۷- عصر ها گفتار من بدتر است.	0	1	2	3	4
8 I use a great deal of effort to speak 8 Faccio molto sforzo per parlare ۸- من برای صحبت کردن تقلای زیادی می کنم.	0	1	2	3	4
9 My speech has a nasal quality 9 Il mio modo di parlare ha una qualità nasale ۹- گفتار من کیفیت تو دماغی دارد.	0	1	2	3	4
10 I run out of air when I talk 10 Finisco l'aria mentre parlo ۱۰- حین صحبت کردن خروج هوا دارم.	0	1	2	3	4
Situational Difficulty (SD) Situazioni Difficoltose (SD) دشواری موقعیتی You feel in a difficult situation if: Per Lei è una situazione difficoltosa آیا در موقعیت های زیر احساس دشواری می کنید؟					
1 You are attempting to convey important information over the telephone in an emergency 1 Tentare di dare informazioni importanti al telefono durante un'emergenza ۱- شما برای انتقال اطلاعات مهم در یک موقعیت اورژانسی با استفاده از تلفن دچار مشکل می شوید (به زحمت می افتید).	0	1	2	3	4
2 You are talking to a family member while you are watching TV or listening to the radio 2 Parlare con qualcuno mentre sto guardando la TV o sto ascoltando la radio ۲- شما به هنگام تماشای تلویزیون یا گوش دادن به رادیو ، با یکی از اعضای خانواده صحبت می کنید.	0	1	2	3	4
3 You are asking for information in a group or class 3 Chiedere informazioni ad un gruppo di persone ۳- شما در گروه یا کلاس در رابطه با اطلاعات مطرح شده، سوال می پرسید.	0	1	2	3	4
4 You are at a dinner and you have a conversation with several other people 4 Durante una cena conversare con alcune persone ۴- شما به هنگام صرف شام با سایر افراد گفت و گو می کنید.	0	1	2	3	4
5 You are speaking with someone who is obviously in a hurry 5 Farsi capire da qualcuno che ha poco tempo ۵- شما با افرادی که عجله دارند صحبت می کنید.	0	1	2	3	4

Speech Characteristic of the Word (SC) Caratteristiche della Parola (CP) ویژگی کلمات گفتاری	Score (0-4)				
6 You are talking to someone that is in another room 6 Parlare con qualcuno che è in un'altra stanza ۶- شما با افرادی که در اتاق دیگری حضور دارند صحبت می کنید.	0	1	2	3	4
7 You are upset and trying to get point across 7 Essere turbato e cercare di far comprendere un messaggio ۷- شما ناراحت هستید و سعی می کنید منظورتان را برسانید.	0	1	2	3	4
8 You are trying to resolve a conflict with someone 8 Cercare di risolvere una discussione con qualcuno ۸- شما سعی می کنید بحثی را با کسی حل کنید.	0	1	2	3	4
9 You are making a difficult request of someone 9 Porre una richiesta lunga ed articolata a qualcuno ۹- شما تلاش می کنید از فردی درخواست مهمی داشته باشید.	0	1	2	3	4
10 You are explaining to a friend that something exciting has happened 10 Raccontare ad un amico qualcosa di eccitante che mi è successo ۱۰- شما اتفاق هیجان انگیزی را برای یک دوست توضیح می دهید.	0	1	2	3	4
Compensatory Strategies (CS) Strategie di Compenso (SC) راهکارهای جبرانی آیا در صورت توانایی، جهت برقراری و تسهیل ارتباط از راهکار های زیر استفاده می کنید؟					
1 I don't change topics without letting my listener know 1 Non cambio l'argomento della conversazione senza prima farlo sapere al mio interlocutore ۱- من بدون اطلاع شنونده ام موضوع صحبت را عوض نمی کنم.	0	1	2	3	4
2 I make sure that people face me when I am speaking to them 2 Mi assicuro che quando parlo le persone siano di fronte a me ۲- من حین مکالمه با دیگران، حواسم هست که صورت شان رو به رویم باشد.	0	1	2	3	4
3 I ask people to repeat what I have said to them so that I know they have understood 3 Chiedo alle persone di ripetere quello che ho detto, così sono sicuro che abbiano capito bene ۳- من از افراد می خواهم آنچه را که به آنها گفته ام تکرار کنند تا بفهمم که آنها (حرف را) متوجه شده اند.	0	1	2	3	4
4 I get people's attention before trying to communicate with them 4 Attiro l'attenzione delle persone prima di cercare di comunicare con loro ۴- من پیش از برقراری ارتباط با افراد، توجه آنها را به خود جلب می کنم.	0	1	2	3	4
5 Even when the conversation regards me, I prefer to listen rather than participate actively 5 Anche nei discorsi che mi riguardano preferisco ascoltare piuttosto che intervenire attivamente ۵- حتی وقتی موضوع بحث به من مربوط می‌شود ترجیح می‌دهم به جای مشارکت فعال در گفت و گو، شنونده باشم.	0	1	2	3	4
6 In difficult speaking situation, I try to position myself so that I can be seen when I am talking 6 Nelle situazioni difficili cerco di posizionarmi di fronte alle persone con cui parlo ۶- در موقعیت‌های گفتاری دشوار، سعی می‌کنم جایی قرار بگیرم که موقع صحبت کردن دیده شوم.	0	1	2	3	4
7 If someone has misunderstood me, I use different wording when I repeat the message 7 Se qualcuno non mi capisce subito uso parole diverse per farmi capire ۷- اگر فردی صحبتم را متوجه نشود، هنگام تکرار صحبت هایم از کلمات متفاوتی استفاده می کنم.	0	1	2	3	4
8 If people are not watching me as I speak, I move so that they can see me 8 Se le persone non mi stanno guardando quando parlo, mi sposto in modo tale che possano vedermi ۸- اگر موقعی که حرف می زنم دیگران نگاهم نکنند، به گونه ای حرکت می کنم تا مرا ببینند.	0	1	2	3	4

Speech Characteristic of the Word (SC) Caratteristiche della Parola (CP) ویژگی کلمات گفتاری	Score (0-4)				
9 I avoid trying to talk with someone at a distance or someone in the next room 9 Evito di parlare con qualcuno a distanza o in un'altra stanza ۹- سعی می‌کنم از صحبت کردن با کسی که در فاصله‌ای دور از من قرار دارد یا در اتاق کناری‌ست اجتناب کنم.	0	1	2	3	4
10 If someone seems irritated when they cannot understand me, I give up 10 Se qualcuno sembra perdere la pazienza quando non mi capisce, sono meno motivato a ripetere ۱۰- وقتی کسی برای فهمیدن صحبت‌هایم به زحمت می افتد، ادامه نمی‌دهم.	0	1	2	3	4
Perceived Reactions of Others (PR) Percezione delle Reazioni Altrui (PR) واکنش های دریافتی از دیگران					
1 Because of my speech problem, people treat me as if I am not very bright 1 A causa dei miei problemi di parola, le persone mi trattano come se avessi difficoltà a capire ۱ - به خاطر مشکل گفتاری ام، دیگران با من جوری برخورد می‌کنند انگار فرد باهوشی نیستم.	0	1	2	3	4
2 Others get irritated with my speech 2 Gli altri perdono la pazienza a causa del mio modo di parlare ۲- گفتار من دیگران را اذیت می کند.	0	1	2	3	4
3 Others ignore me if they do not understand what I am saying 3 Gli altri mi ignorano se non hanno capito cosa ho detto ۳- اگر دیگران متوجه‌ی آنچه که من می‌گویم نشوند من را نادیده می گیرند.	0	1	2	3	4
4 Others treat me like a child when it comes to communication 4 Gli altri mi trattano come un bambino quando si deve comunicare ۴- هنگام برقراری ارتباط با دیگران، آنها مثل یک کودک با من رفتار می کنند.	0	1	2	3	4
5 People tend to get impatient because I speak slowly 5 Le persone sembrano diventare impazienti perchè parlo piano ۵- چون به آهستگی صحبت می‌کنم دیگران بی حوصله می شوند.	0	1	2	3	4
6 People fill in words for me before I have a chance to complete my thought 6 Le persone correggono le mie parole prima che io termini la frase ۶- قبل از اینکه به طورکامل افکارم را به زبان آورم دیگران به جای من کلمات را بیان می کنند.	0	1	2	3	4
7 People leave me out of conversation 7 Le persone mi escludono dalla conversazione ۷- مردم من را از گفت و گو کنار می گذارند.	0	1	2	3	4
8 People speak louder when talking to me because they think I have a hearing problem 8 Le persone mi parlano più forte perchè credono che io abbia problemi di udito ۸- مردم هنگامی که با من صحبت می کنند بلند تر حرف می زنند چون فکر می کنند مشکل شنوایی دارم.	0	1	2	3	4
9 Others have taken over my responsibilities because of my speech problem 9 Gli altri si sono presi le mie responsabilità a causa dei miei problemi ۹- دیگران به دلیل مشکل گفتاری ام، مسئولیت های من را به عهده می گیرند.	0	1	2	3	4
10 When I talk people pretend to understand me 10 Quando parlo le persone fanno finta di capirmi ۱۰- زمانی که با مردم حرف می زنم وانمود می کنند صحبت من را متوجه می شوند.	0	1	2	3	4

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