■ *Research paper*

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Metric Characteristics of the Slovenian Translation of the SWAL-QOL Questionnaire

Abstract. Only a few tests and assessment scales from the field of swallowing disorders have been translated into Slovenian, while the need for such scales has been increasing. The purpose of our study was to translate the SWAL-QOL questionnaire, which is aimed at assessing quality of life in swallowing disorders, into Slovenian and validate the translation. A random sample of 144 people without neurological disorders filled in the Slovenian version of the questionnaire (SWAL-QOL-SI), either the printed or the electronic version. On average, the participants scored 88 points out of 100 across the scales that the questionnaire comprises. The Cronbach alpha coefficient for the entire questionnaire was 0.95, indicating a high level of internal-consistency reliability. Content validity was verified by four experts. Construct validity was verified by means of exploratory factor analysis, which grouped the items in a meaningful way into six factors. Coefficient of variation (10 %) and Ferguson delta (0.99) indicated high discrimination power of the questionnaire. All the correlations between the subscales were positive and statistically significant. Gender and age were not statistically significantly associated with the scores. We believe that the SWAL-QOL-SI questionnaire is a reliable and valid measurement tool for the adult Slovenian-speaking population.

Merske lastnosti slovenskega prevoda vprašalnika SWAL-QOL

Povzetek. Na področju motenj požiranja je v slovenščino prevedenih le malo testov in ocenjevalnih lestvic, potrebe po njih pa vseskozi naraščajo. Namen naše raziskave je bil prevesti vprašalnik SWAL-QOL, ki je namenjen ocenjevanju kakovosti življenja pri boleznih požiranja, v slovenščino ter preveriti veljavnost prevoda. Naključno smo izbrali 144 ljudi brez nevroloških motenj, ki so izpolnili tiskano ali elektronsko verzijo prevedenega vprašalnika (SWAL-QOL-SI). V povprečju so sodelujoči na lestvicah, ki sestavljajo vprašalnik, dosegli 88 točk od 100 možnih. Cronbachov koeficient alfa je za celoten vprašalnik znašal 0,95, kar kaže na visoko zanesljivost z vidika notranje skladnosti. Vsebinsko veljavnost so potrdili štirje strokovnjaki. Veljavnost konstrukta smo preverjali z eksploratorno faktorsko analizo, ki je postavke smiselno združila v šest faktorjev. Koeficient variacije (10 %) in Fergusonov koeficient delta (0,99) sta potrdila visoko razločevalno moč vprašalnika. Vse korelacije med dosežki na lestvicah vprašalnika so bile pozitivne in statistično značilne. Spol in starost nista bila statistično značilno povezana z dosežki. Menimo, da je vprašalnik SWAL-QOL-SI zanesljivo in veljavno mersko orodje za odraslo slovensko populacijo.

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Introduction

Eating and drinking play two different roles in people's lives. The first one is ensuring food and drinks for survival, the other one considers the social aspect of an individual's life. Enjoying meals is connected to socialization with friends and other people, which generates positive feelings. Such experience is pleasant when we do not have any difficulties with swallowing.[1] When difficulties arise, emotional factors, support, preparation for non-oral feeding and postoperative dysphagia are of great importance.[2] Quality of life is questionable in terms of physical and psychological health, social relationships and the ability of independent functioning for those who suffer from swallowing disorders.[3] Frequent aspiration pneumonias and general degeneration due to insufficient eating or drinking are consequences of swallowing disorders, which can lead to low quality of life.[4]

Early diagnosis is therefore of great significance. Dysphagia in the acute phase, for example after a stroke, has a high rate of improvement or elimination. Patients with chronic dysphagia have to deal with a different situation regarding eating or drinking (oral or non-oral) on a long-term basis. The patients and their relatives naturally wish for a quick transition to oral feeding, yet this decision should be made based on professional judgement. It has been indicated that successful recovery and elimination of swallowing disorders also improve nutrition parameters and consequently improve the quality of life. A study showed that malnutrition after stroke resulted in lack of appetite and depression.[5] Lower survival rate has been observed among older people with swallowing disorders in comparison to those without such problems.[6] A study that included 360 patients with dysphagia from five European countries revealed that only 45 % of them considered eating as something pleasant, 41 % of them felt fear of eating, and 36 % of the patients avoided eating in the presence of other people.[7] Patients' self-esteem is therefore of great importance when validating their quality of life during rehabilitation after a swallowing disorder. It provides information on acceptance and experience of the disorder[3] and offers insight into the patient's experience before, during and after the rehabilitation. This is crucial for detecting the actual influence of the changes that occurred during the rehabilitation and gives feedback to the patients, as well as to the multidisciplinary team working with them.[8]

The first instrument developed for measuring the quality of life of people with dysphagia is the Quality of Life in Swallowing Disorders – SWAL-QOL questionnaire. It was validated in the USA[9] and has been translated into 14 languages. Its usage has expanded through the years, as it approaches patients with and without dysphagia, patients who are fed orally and non-orally and it also considers various patients' diets.[3] Prior to our study, it has not been translated into Slovenian.

Methods

Sample

The data were collected using anonymous printed and electronic questionnaires. The only inclusion criterion was the absence of neurological problems or disorders (stroke, head injury, Parkinson's disease, Alzheimer's disease, neck/oesophagus surgery etc.). A random sample of 144 people (110 women and 34 men, average age 43 years, range 17-90 years) participated in the study. The majority of them were married or in a relationship; on average, they had completed 14 years of education (range 0-23 years). Three participants needed help with filling-in the questionnaire (reading questions or writing the answers).

Instrument

Established international guidelines were used for translating the SWAL-QOL questionnaire into Slovenian. The translation (henceforth referred to as SWAL-QOL-SI) was verified by two speech and language therapists who work with patients with swallowing disorders, by an educational methodologist and a Slovenian language teacher, and back-translated by an English native speaker. Before application, the SWAL-QOL-SI was tested on a pilot sample of 15 people, who found all items to be clearly understandable. The question about the ethnic/racial group was left out from the SWAL-QOL-SI, as virtually all Slovenian speakers belong to only one such group. The items on marital status was changed: the "separated" category was left out (because there is no equivalent notion in Slovenian – only "divorced" is used) and the term "in a relationship" was added (because there is a high percentage of unmarried couples in a long-term relationship).

The introductory part of the questionnaire includes instructions for answering, an example of an answered question and a warning that all items refer only to difficulties with swallowing. The main part consists of 44 items, which are divided into 14 items on symptoms and 10 assessment scales with a total of 30 items (Burden, Eating Desire, Eating Duration, Symptoms, Food Selection, Communication, Fear,

Mental Health, Social Functioning, Sleep and Fatigue). Some translations consider the 14 items on symptoms of dysphagia as an independent assessment scale, and we followed that practice, but we excluded those items from the factor analysis. The items are answered on a 5-point Likert scale (1 = definitely / always, 2 = very probably / often, 3 = probably / sometimes, 4 = probably not / hardly ever, 5 = definitely not / never). This is followed by questions that relate to the way of feeding (orally, non-orally), diet and the patient's general status (age, gender, education, marital status, potential need of help with the questionnaire), and a section for comments.

Data analysis

Normality of scale-score distributions was tested using Kolmogorov-Smirnov and Shapiro-Wilk tests. Adequacy of data for factor analysis was checked using Kaiser-Meyer-Olkin (KMO) criterion and Bartlett's test of sphericity. Exploratory factor analysis was performed using the principal axis method and the Kaiser-Guttman criterion for extraction, followed by orthogonal varimax rotation. Internal-consistency reliability was assessed using Cronbach alpha. Discrimination power was assessed using coefficient of variation (CV) and Ferguson delta coefficient. Associations between scale scores were assessed using Pearson correlations. Differences in scale scores with respect to gender and age-group were tested using Mann-Whitney test and Kruskal-Wallis test, respectively. The data were analysed using IBM SPSS Statistics for Windows 23 software (IBM Corp., Armonk, NY, 2016).

Results

Score distributions

Kolmogorov-Smirnov and Shapiro-Wilk test indicated that the distributions of scale scores differed statistically significantly from the normal distribution ($p < 0.001$). The scores were therefore transformed using percentile-rank normalisation based on standard normal distribution. The mean score on the entire questionnaire was 88.2 out of the maximum 100 points. Mean scores on the majority of the scales were also above 80 points. The lowest mean score was observed on the Sleep and Fatigue scales (Table 1).

Because the participants had no swallowing disorders, none of them was fed through enteral tube. The majority had eaten food of ordinary consistency during the week before filling-in the questionnaire; only five participants ate soft food that was easy to chew. Mean rating of the general health condition was 3.7 (indicating very good average health).

Table 1 Descriptive statistics for the SWAL-QOL-SI scales and the entire questionnaire.

Scale	Mean	Min	Max	*SD*	Median
Burden	80.1	0	100	31.1	100
Eating Desire	90.2	33	100	14.6	100
Eating Duration	87.3	0	100	21.1	100
Symptoms	92.6	32	100	9.6	96
Food Selection	84.9	13	100	21.0	100
Communication	97.7	63	100	6.6	100
Fear	96.4	13	100	10.3	100
Mental Health	96.5	20	100	11.9	100
Social Functioning	96.1	20	100	12.7	100
Sleep	75.3	25	100	18.9	75
Fatigue	73.5	17	100	18.2	75
Entire questionnaire	88.2	74	98	8.8	90

Validity

Content validity was checked and confirmed by four experts. The translation was judged to be in accordance with the original content- and language-wise and therefore adequate for the use with the Slovenian-speaking population. Construct validity was checked using exploratory factor analysis, where 30 items were included (leaving out the 14 items on symptoms). Kaiser-Meyer-Olkin (KMO) criterion and Bartlett test were used to check the adequacy of data for factor analysis. The KMO value of 0.83 indicated a high proportion of common variance among the items. Bartlett test indicated that the correlation matrix was statistically significantly different from the identity matrix ($p < 0.001$). All the inter-item correlations were higher than 0.5. Six factors were extracted, which explained 73 % of the variance. The factor loading after rotation are reported in Table 2. In comparison to the ten original assessment scales of the SWAL-QOL, factor 1 covered the Social Functioning scale, factor 2 combined the Communication and Fear scales, Factor 3 the Burden and Mental Health scales, factor 4 Sleep and Fatigue scales, factor 5 the Eating Duration and Food Selection scales, and factor 6 encompassed the Eating Desire scale.

Table 2 Factor loadings after rotation and the comparison with the original SWAL-QOL scales.[10]

Item	Original scale	Factor					
		1	2	3	4	5	6
36	Social Functioning	.93					
38		.88					
37		.87					
35		.83					
34		.78					
24	Communication		.76				
27	Fear		.70				
23	Communication		.70				
28	Fear		.67				
25			.62				
26			.56				
31	Mental Health		.53				
2	Burden			.66			
1				.63			
33	Mental Health			.61			
29				.57			
32				.55			
30				.46			
43	Fatigue				.85		
41					.79		
42	Sleep				.72		
39	Fatigue				.59		
40	Sleep				.54		
6	Eating Duration					.71	
4						.59	
22	Food Selection					.57	
21						.57	
3	Eating Desire						.66
5							.64
7							.43

Internal-consistency reliability

The estimated Cronbach alpha values are reported in Table 3. The estimate for the entire questionnaire was 0.95, thus indicating excellent internal-consistency reliability.

Discrimination power

Coefficients of variation for the scales ranged from 7 % to 39 %; for the entire questionnaire, the coefficient of variation was 10 % Ferguson delta values were very high: the lowest estimate for a scale was 0.82 (for Communication) and the estimate for the entire questionnaire was 0.99. All these statistics indicate that the SWAL-QOL-SI is able to distinguish between very small differences the measured constructs.

Table 3 Values of Cronbach alpha coefficient for individual assessment scales and the entire questionnaire.

Scale	*n*	Cronbach alpha
Burden	2	0.90
Eating Desire	2	0.80
Eating Duration	3	0.61
Symptoms	14	0.89
Food Selection	2	0.89
Communication	2	0.92
Fear	4	0.89
Mental Health	5	0.92
Social Functioning	5	0.89
Sleep	2	0.50
Fatigue	3	0.86
Entire questionnaire	44	0.95

Legend: *n* – number of items.

Correlations between assessment scales

All the scale scores were statistically significantly positively correlated ($p < 0.05$). The highest correlation was between Mental Health and Fear ($r = 0.77$); the lowest correlation was between Fatigue and Sleep scale scores ($r = 0.12$).

Gender and age differences

Men scored statistically significantly higher than women on the Communication ($p = 0.005$), Sleep ($p = 0.033$) and Fatigue ($p = 0.040$) scale. There were practically no differences on the Eating Desire and Eating Duration scales. On the other scales as well as on the entire questionnaire, men scored higher on average, but the difference was not statistically significant (mean of the entire questionnaire was 90.3 for men and 88.1 for women, $p = 0.693$).

There were no statistically significant differences between age groups (up to 25 years, 26-35, 36-45, 46-55, 56 years or more) except on the Food Selection scale ($p = 0.013$).

Discussion

The aim of our study was to check the metric characteristics of the Slovene translation of the SWAL-QOL questionnaire. The average score of the sample from the healthy population on the entire questionnaire was somewhat lower than in other countries, but still very high. Content validity was confirmed by expert ratings. Construct validity was assessed by factor analysis, which identified six factors instead of original ten assessment scales, but there was high substantial overlap and other researchers also obtained similar results.[11,12] Hence, we can conclude that the SWAL-QOL-SI is a valid measurement instrument.

Internal-consistency reliability was found to be excellent for the entire questionnaire and sufficient for all the scales except Sleep (which has a small number of items). Very similar results were obtained in other countries.[11,13] Discrimination power of the entire questionnaire appeared to be excellent judging from the healthy sample, but further studies on the population of people with swallowing disorders are required to ascertain it. Correlations between individual scales were positive, which is agreement with the original SWAL-QOL development study.[9]

A comparable study in Greece reported no statistically significant differences between genders in SWAL-QOL scores.[14] We observed higher average scores of men on some scales, but the difference on the entire questionnaire was not statistically significant. There are different reports concerning the influence of age on the occurrence of swallowing disorders. Some indicate that age increases the probability of occurrence of swallowing disorders,[15,16] so older people should have worse swallowing-related quality of life. On the other hand, some authors report no statistically significant differences in SWAL-QOL scores with respect to age.[17] Our findings were in line with such view, except for the Food Selection scale, where the members of the oldest age group reported some restrictions with choosing their food. This could be attributed to neurodegenerative processes or worsened dental and medical condition.[15]

Limitations

Our sample was not balanced in terms of gender, because there were 75 % of women. In addition to men, we also lacked people older than 85 years in our sample. In that group, signs of swallowing difficulties can be expected due to neurodegenerative processes. As already mentioned, an essential aspect of validation that remains a task for the future is to compare the results of the healthy population with those of people with swallowing disorders.

Conclusion

The translation and validation of the SWAL-QOL-SI questionnaire provides speech and language therapists in Slovenia with a useful tool for assessing quality of life of people with swallowing disorders. It also opens up possibilities for further research. The questionnaire helps defining quality of life, level of dysphagia and areas that mostly affect people suffering from such disorders. The results of the assessment are useful in clinical practice for planning the treatment and adjusting it to individual needs. A study involving a sample of people with swallowing disorders in Slovenia is already under way, which will provide normative data for the SWAL-QOL-SI questionnaire.

References

1. Žemva N: Varno požiranje in hranjenje. In: Petkovšek-Gregorin, R (ed.), *Varnost in rehabilitacijska zdravstvena nega: zbornik predavanj*. Ljubljana 2010: Zbornica zdravstvene in babiške nege Slovenije - Zveza strokovnih društev medicinskih sester, babic in zdravstvenih tehnikov Slovenije, Sekcija medicinskih sester in zdravstvenih tehnikov v rehabilitaciji in zdraviliški dejavnosti; 77-81. http://sekcija-ms-v-rehabilitaciji-in-zdraviliski-dejavnosti.si/attachments/021_Zbornik%202010.pdf (15. 12. 2019)
2. Langley J: *Working with swallowing disorders*. Oxon 1997: Winslow Press Ltd.
3. Ickenstein GW: Diagnosis and treatment of neurogenic oropharyngeal dysphagia. Bremen 2014: UNI-MED.
4. Hočevar Boltežar I: Fiziologija požiranja ter nevrološko pogojene motnje požiranja. In: Petkovšek-Gregorin, R (ed.), *Motnje požiranja in načini hranjenja: zbornik predavanj*. Laško 2012: Zbornica zdravstvene in babiške nege Slovenije - Zveza strokovnih društev medicinskih sester, babic in zdravstvenih tehnikov Slovenije, Sekcija medicinskih sester in zdravstvenih tehnikov v rehabilitaciji in zdraviliški dejavnosti; 1-4. http://sekcija-ms-v-rehabilitaciji-in-zdraviliski-dejavnosti.si/attachments/023_Zbornik%202012.pdf (15. 12. 2019)
5. Ogrin M: Vključevanje logopeda v presojo sposobnosti žvečenja in hranjenja. In: Petkovšek-Gregorin, R (ed.), *Motnje požiranja in načini hranjenja: zbornik predavanj*. Laško 2012: Zbornica zdravstvene in babiške nege Slovenije - Zveza strokovnih društev medicinskih sester, babic in zdravstvenih tehnikov Slovenije, Sekcija medicinskih sester in zdravstvenih tehnikov v rehabilitaciji in zdraviliški dejavnosti; 17-22. http://sekcija-ms-v-rehabilitaciji-in-zdraviliski-dejavnosti.si/attachments/023_Zbornik%202012.pdf (15. 12. 2019)
6. Naruishi K, Nishikawa Y: Swallowing impairment is a significant factor for predicting life prognosis of elderly at the end of life. *Aging Clin Exp Res* 2017, 30(1): 77-80. https://doi.org/10.1007/s40520-017-0756-1
7. Ekberg O, Hamdy S, Woisard V, Wuttge-Hannig A, Ortega P: Social and psychological burden of dysphagia: its impact on diagnosis and treatment. *Dysphagia* 2002, 17(2): 139-146. https://doi.org/10.1007/s00455-001-0113-5
8. Gaspar MRF, Pinto GS, Gomes RHS, Santos RS, Leonor VD: Evaluation of quality of life in patients with neurogenic dysphagia. *Rev CEFAC* 2015, 17(6): 1939-1945. http://www.scielo.br/pdf/rcefac/v17n6/en_1982-0216-rcefac-17-06-01939.pdf (15. 12. 2019)
9. McHorney CA, Robbins J, Lomax K, *et al.*: The SWAL-QOL and SWAL-CARE outcomes tool for

oropharyngeal dysphagia in adults: III. Documentation of reliability and validity. *Dysphagia* 2002, 17(2): 97-114. https://doi.org/10.1007/s00455-001-0109-1

10. Pirc Š: Merske karakteristike slovenskega prevoda vprašalnika »The SWAL-QOL«: magistrsko delo. Ljubljana 2018: Univerza v Ljubljani, Pedagoška fakulteta. http://pefprints.pef.uni-lj.si/5156/1/Magistrsko_delo_-_%C5%A0pela_Pirc_(LS).pdf (15. 12. 2019)
11. Tarameshlu M, Azimi AR, Jalaie S, Ghelichi L, Ansari NN: Cross-cultural adaption and validation of the Persian version of the SWAL-QOL. *Medicine* 2017, 96(26): e7254. https://doi.org/10.1097/MD.0000000000007254
12. Vanderwegen J, Van Nuffelen G, De Bodt M: The validation and psychometric properties of the Dutch version of the Swallowing Quality of Life Questionnaire (DSWAL-QOL). *Dysphagia* 2013, 28(1): 11-23. https://doi.org/10.1007/s00455-012-9408-y
13. Kraus EM, Rommel N, Stoll LH, Oettinger A, Vogel AP, Synofzik M: Validation and psychometric properties of the German version of the SWAL-QOL. *Dysphagia* 2018, 33(4): 431-440. https://doi.org/10.1007/s00455-017-9872-5
14. Georgopoulos VC, Perdikogianni M, Mouskenteri M, Psychogiou L, Oikonomou M, Malandraki GA: Cross-Ccltural adaptation and validation of the SWAL-QOL questionnaire in Greek. *Dysphagia* 2018, 33(1): 91-99. https://doi.org/10.1007/s00455-017-9837-8
15. Marks L, Rainbow D: *Working with dysphagia.* London, New York 2001: Routledge.
16. Vogrič B: Motnje požiranja – diagnostični postopki in rehabilitacija: diplomsko delo. Ljubljana 2003: Univerza v Ljubljani, Pedagoška fakulteta. http://pefprints.pef.uni-lj.si/1532/1/diplomska_-_Motnje_po%C5%BE....pdf (15. 12. 2019)
17. Bibi S, Iqbal A, Ayaz SB, Khan AA, Matee S: The impact of oropharyngeal dysphagia on quality of life in individuals with age over 50 years. *RMJ* 2015, 40(1): 37-40. https://www.rmj.org.pk/fulltext/27-1407845085.pdf?1578775279 (15. 12. 2019)