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RESEARCH AND EDUCATION

Translation, cross-cultural adaptation, and validation of the Liverpool Oral Rehabilitation Questionnaire (LORQ) into the Dutch language

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ABSTRACT

Statement of problem. The Liverpool Oral Rehabilitation Questionnaire (LORQ) is a health-related quality of life instrument assessing the impact of oral rehabilitation on patients' health-related quality of life. Because a validated Dutch version of the LORQ is not available, the questionnaire cannot be used in the Netherlands.

Purpose. The purpose of this study was to translate and adapt the LORQv3 into a Dutch-language version and to evaluate the internal consistency, reliability, and validity of the resulting LORQv3-NL.

Material and methods. The original English-language LORQv3 was translated into Dutch via the forward-backward approach. The reliability and construct validity of the LORQv3-NL was tested on a sample of 158 participants. The participants were enrolled at the dental faculty of Radboudumc, at the Centre for Special Oral Care of the Radboudumc and Maastricht UMC+, and in general practices. Internal consistency was assessed by calculating the Cronbach α, and the test-retest reliability (n=34; 2-week interval) was assessed by weighted kappa coefficient. Furthermore, convergent validity was measured by comparing the outcomes with those of the Dutch version of the Oral Health Impact Profile 14-item (OHIP-NL14) (n=17), and patients with head and neck cancer (n=25) were added to test discriminative validity.

Results. Internal consistency and test-retest reliability were satisfactory (Cronbach α=0.75–0.89; intraclass correlation coefficient=0.89). In addition, all associations were in the expected direction.

Conclusions. The LORQv3-NL appears to be a good tool for assessing denture complaints and denture incompatibility. (J Prosthet Dent 2018;119:239-243)

Current research on denture satisfaction mainly focuses on oral health–related quality of life (OHRQoL). Different instruments have been developed for measuring OHRQoL, such as the Oral Health Impact Profile (OHIP)-49[1] and its shortened version for patients with edentulism, OHIP-edent.[2] Although these questionnaires concentrate on the influence of dental/denture problems on quality of life, they miss denture functionality details like mastication, swallowing, speech, esthetics, retention, and pain. It is to be expected that patients with poor adaptation to their dentures report a higher influence of denture problems on quality of life than do satisfied patients. To investigate satisfaction in patients with poor adaptation to their dentures, a questionnaire is needed that contains various detailed aspects of oral function, such as more specific information on the maxillary and mandibular dentures separately, and different aspects of esthetics, food intake, pain, and social interaction, and also focuses on OHRQoL.

The Liverpool Oral Rehabilitation Questionnaire (LORQ) was developed in 2004 to improve the assessment of issues and problems related to patients undergoing oral rehabilitation after oncologic treatment of the head and neck.[3] After some modifications, version 3 of the LORQ could be used in the clinical setting.[4,5] The LORQv3 demonstrated satisfactory psychometric properties of acceptability, reliability, and validity. This tool

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Clinical Implications

The translation and validation of the Liverpool Oral Rehabilitation Questionnaire, version 3 (LORQv3), into the Dutch language (LORQv3-NL) allows this health-related quality-of-life instrument to be used to assess the impact of oral rehabilitation on patients' health-related quality of life in Dutch-speaking countries.

was able to differentiate between cancer and noncancer groups and demonstrated significant correlations between items on the LORQ and in coadministered questionnaires.[6] The high variation among items and the level of detail in this questionnaire make it suitable for assessing denture complaints in patients with poor adaption.

Given the significance of identifying and evaluating denture complaints in Dutch patients with denture problems, the objective of this study was to translate and adapt the LORQv3 into a Dutch-language version and to evaluate the internal consistency, reliability, and validity of the resulting LORQv3-NL. The null hypotheses were that the LORQv3-NL would not identify differences between data from patients visiting general practices, patients visiting the university dental clinic, and head and neck oncology patients, and that the LORQv3-NL would not identify differences between test-retest data at an interval of 2 weeks.

MATERIAL AND METHODS

The English-language LORQv3 consists of 40 items divided into 2 primary sections. The first section contains 17 items that assess oral function, orofacial appearance, and social interaction. The second section assesses issues specific to prostheses and patient denture/prosthetic satisfaction.[5]

LORQ items refer to problems and symptoms experienced during the previous week and are rated 1 through 4, representing "never," "sometimes," "often," and "always."[6] Finally, there is a comment section for patients to identify issues not adequately addressed by the questionnaire. The questionnaire is self-administered and takes approximately 10 minutes to complete. It is available online (http://www.headandneckcancer.co.uk).

The LORQv3 was translated by 6 different translators into Dutch through the use of the forward-backward approach, following guidelines for cross-cultural adaptation of health-related quality of life (self-administered) measures.[7,8] Four independent bilingual translators whose native language was Dutch performed the forward translation into Dutch. One of them was a prosthodontist and another a maxillofacial surgeon; the remaining 2 were professional translators with no medical or clinical background. The 4 forward translations were compared and synthesized into one common version by an expert panel (M.E., D.B.), consisting of 2 dentists/prosthodontists and 1 psychologist specializing in the field of dentistry. Competing options for a translation were debated until consensus was reached. The resulting consensus forward translation was translated back into English by 2 independent, professional translators whose native language was English. The 2 back-translations were again discussed by the expert panel, comparing equivalence between the 2 versions. The back-translations were reviewed against the original English LORQv3 by the expert panel. Finally, the resulting LORQv3-NL was read and commented on by a prosthodontist (C.vH.) outside the expert panel.

To study the reliability and construct validity of the LORQv3-NL, a sample of 158 participants was recruited over a period of 2 years. The participants were enrolled during their procedure for new dentures at the dental faculty of Radboudumc in Nijmegen, or during regular examinations at the Centre for Special Oral Care of Radboudumc in Nijmegen and Maastricht UMC+ in Maastricht and in general practices in the Nijmegen area. Dentists from general practice were contacted and asked to participate through letters and telephone calls. Dentists who agreed to participate asked their patients to fill out the questionnaire. Participants completed the LORQv3-NL during their dental appointment.

The internal consistency of a questionnaire relates to its homogeneity. All items should measure different aspects of the same trait. Therefore, different items should correlate moderately with each other and with the total score.[9] The internal consistency of the total LORQv3-NL, as well as its 2 sections, was assessed by calculating Cronbach α values. Values of 0.70 to 0.80 are considered satisfactory for a reliable comparison between groups. For clinical purposes, a minimum of 0.90 is required, while values of at least 0.95 are normally considered desirable.[10] However, according to Streiner,[11] α values over 0.90 most likely indicate unnecessary redundancy rather than a desirable level of internal consistency when there are more than 20 or so items.

A subsample of 34 participants received a second LORQv3-NL questionnaire and completed it during another dental appointment, or they received and returned a second questionnaire by mail. The interval between the first and second questionnaire was 2 weeks. This interval was selected because the measured variable was assumed not to have changed in this time, and participants were unlikely to remember their first response over this interval. The test-retest reliability of the LORQv3-NL and its 2 sections was determined by calculating the weighted kappa coefficient.

Table 1. Cronbach α values for difference in internal consistency between English LORQv3 and Dutch version

Item Nos.	LORQv3	LORQv3-NL
1-17	0.92	0.89
20-23	0.87	0.83
26-31	0.84	0.75
34-39	0.92	0.81

LORQv3, Liverpool Oral Rehabilitation Questionnaire, version 3; NL, Netherlands.

Discriminative validity and convergent validity were used to measure construct validity. For convergent validity, the correlation between the questionnaire and other related measures was assessed. In this study, a subsample of 17 participants also filled out the OHIP-NL14, the Dutch-language version of the OHIP-14. A positive correlation between the 2 scores would indicate convergent validity. The LORQ questionnaire was originally designed for patients with head and neck cancer. To test discriminative validity, a group of 25 patients with head and neck cancer also filled out the LORQv3-NL. These patients were expected to have higher scores than the noncancer group because of their compromised oral environment as a result of surgery or radiotherapy.[12,13] Furthermore, a difference can be expected between patients visiting university dental clinics and patients going to a general practitioner for routine examinations. We hypothesized that the patients visiting the university dental clinic actively reached out for help, so they would have more complaints and therefore would demonstrate higher scores. The LORQv3-NL scores were compared among those 3 groups.

RESULTS

No serious difficulties were encountered during any part of the translation and adaption procedure. Items discussed were questions 18 and 19 and related to whether or not the participant had any natural dentition. The English word "teeth" refers to anterior teeth as well as premolars and molars. In Dutch, the straightforward translation of "teeth" refers only to the anterior teeth. Therefore, in the Dutch translation, this term was changed to "front teeth" and "back teeth." Instead of the straightforward translation, some idiomatic equivalent had to be found for the following words or phrases: "food particles," "upset," and "denture." For these words, several translations are possible that would have been understood by a Dutch-speaking person. Discussion was mainly based on which word would be most appropriate. Twelve of 158 participants did not answer all of the first 17 questions of the LORQv3-NL, but each of these questions was answered by at least 153 participants.

The internal consistency of the Dutch version of the LORQ can be considered satisfactory. Items 11 through 14, 29, and 37 had a low corrected item-total correlation (0.42, 0.43, 0.30, 0.31, 0.24, and 0.21, respectively). Results compared with the original LORQ are shown in Table 1.

Table 2. Mean scores and test-retest reliability measured for first 17 general items of LORQ: distribution per item

LORQ Item	No. per Score, 1/2/3/4	Weighted Kappa	Reliability	Decision-Making Error	Mean Score	*P*	95% CI
1	72/51/21/11	0.574	0.583	0.66	0.18	.280	-0.15, 0.50
2	89/45/13/6	0.401	0.408	0.70	0.15	.392	-0.20, 0.49
3	113/27/12/4	0.822	0.824	0.39	0.00	1.000	-0.19, 0.19
4	138/13/4/1	0.730	0.755	0.27	0.29	.661	-0.11, 0.16
5	104/36/11/3	0.614	0.637	0.48	0.29	.801	-0.21, 0.26
6	73/69/10/3	0.686	0.694	0.47	0.89	.447	-0.14, 0.32
7	88/53/9/5	0.743	0.752	0.44	0.29	.786	-0.19, 0.25
8	72/56/23/6	0.699	0.708	0.45	0.12	.292	-0.11, 0.34
9	108/36/8/5	0.743	0.765	0.42	0.21	.051	-0.00, 0.41
10	106/31/11/9	0.729	0.780	0.48	0.18	.136	-0.06, 0.41
11	132/19/3/2	0.705	0.713	0.37	0.03	.744	-0.15, 0.21
12	127/24/3/2	0.809	0.831	0.32	0.09	.263	-0.07, 0.25
13	135/15/4/1	0.696	0.726	0.35	0.06	.488	-0.11, 0.23
14	124/23/3/5	0.622	0.753	0.43	0.24	.030	0.02, 0.45
15	106/31/14/6	0.830	0.840	0.39	0.15	.134	-0.05, 0.34
16	70/50/23/13	0.708	0.743	0.54	0.29	.031	0.03, 0.56
17	126/20/6/5	0.672	0.681	0.51	-0.03	.812	-0.28, 0.22

CI, confidence interval; LORQ, Liverpool Oral Rehabilitation Questionnaire.

The explained variance of the mean score between the 2 time measurements was 0.89, indicating that 89% of the variance in the 2-week mean scores of the first 17 items can be explained or predicted correctly by the baseline scores. Table 2 shows various result measures on each item separately. Items 9, 14, and 16 had a low *P* value, indicating a structural difference between test and retest. The weighted kappa values were very good, with 0.401 as the lowest score for LORQ item 2. Figure 1 shows that participants tended to report fewer complaints at the second measurement.

For measuring the convergent validity, the LORQv3-NL was compared with the OHIP-NL14. The results can be seen in Figure 2. The association was in the expected direction, R^2=0.642.

The oncology patients scored higher on the first 17 items of the LORQ than the other patient groups. Furthermore, the general practice group reported fewer problems with their oral rehabilitation than the university dental clinic group. Box plots of this variable for the different patient groups are shown in Figure 3.

DISCUSSION

The results from this study support the rejection of the first null hypothesis, as the LORQv3-NL identified differences among the data from patients visiting general practices, patients visiting the university dental clinic, and patients with head and neck cancer. The second null hypothesis was retained, as the LORQv3-NL could not

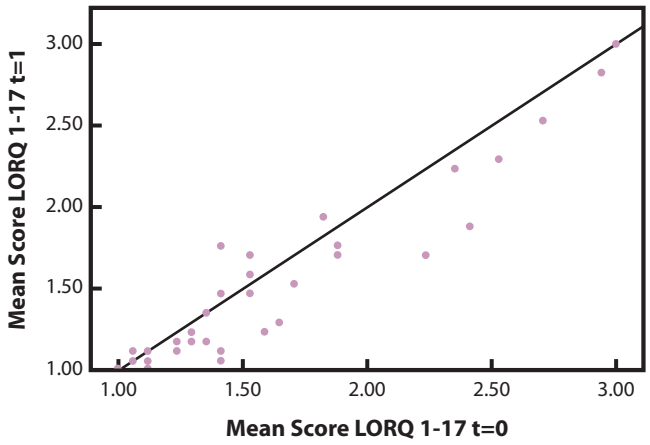

Figure 1. Test-retest reliability shown in scatterplot. T=0 first moment of registering, T=1 after 2 weeks. Line shows equation x=y, ideal curve.

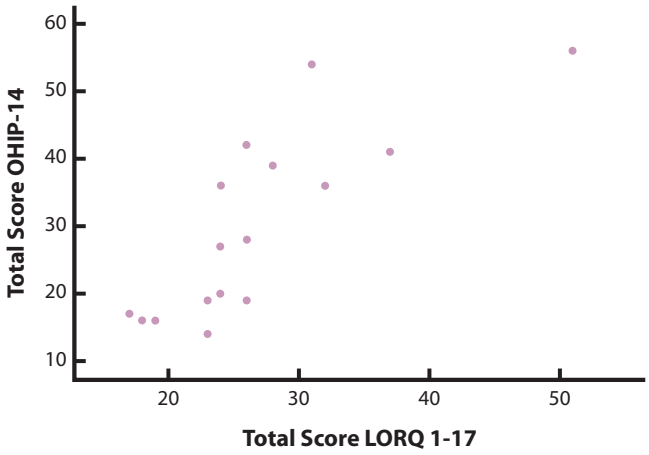

Figure 2. Association between total score on first 17 items of LORQ and OHIP-NL14 questionnaires. LORQ, Liverpool Oral Rehabilitation Questionnaire; OHIP-NL14, Dutch version of the Oral Health Impact Profile 14-item.

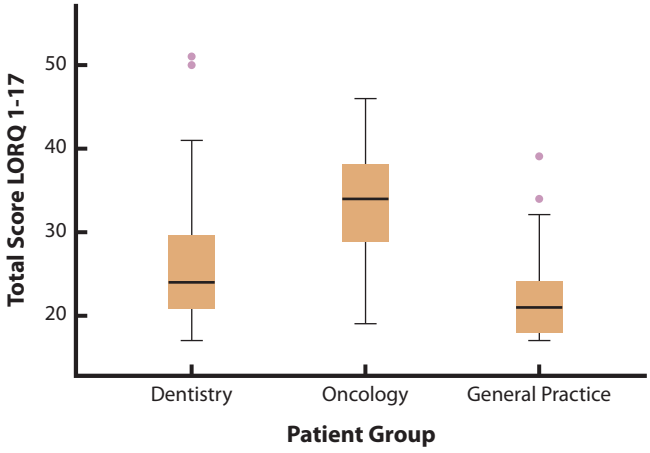

Figure 3. Box plots of results of different patient groups on first 17 items of Liverpool Oral Rehabilitation Questionnaire (LORQ).

identify differences between test-retest data at an interval of 2 weeks.

This study describes the translation, cultural adaptation, and validation of the LORQ into Dutch settings. To achieve a comparable version of an instrument to be used in a new country and culture, a cross-cultural adaptation of the instrument is necessary. A cross-cultural adaptation involves both linguistic translation and cultural adaptation to maintain the content validity of the instrument at a conceptual level across different cultures.[8,14]

The reliability and validity of the Dutch version of the LORQ were assessed to decide whether it could be recommended as a reliable and discriminating questionnaire. The LORQv3-NL showed good psychometric properties. The general internal consistency of the LORQv3-NL can be considered satisfactory and comparable with the original version. In general, the Cronbach α value of the Dutch version was slightly lower than the original English version. This might be due to the group size or the group composition. The English version has been tested mostly on patients with head and neck cancer. Their responses are probably more divergent than a general practice group because in general they have more complaints.

A few items showed a low correlation with the total. Items 11 through 14 deal with esthetics and express how much the patient feels disturbed by his or her appearance. The rest of the questionnaire focuses more on other functional aspects such as mastication, swallowing, and pain. This might explain the lower item-total correlation of these questions. Items 29 and 37 ask whether, during eating, the patient has ever removed his or her their maxillary or mandibular denture. These questions are very specific and might not relate to pain or lack of masticatory ability directly, leading to low item-total correlations. For a few items, the item-total correlation was high (highest was 0.76 for item 34). This might suggest that these items are redundant. The original LORQv3 questionnaire formed the basis for this translation. To keep the LORQv3-NL comparable with the original questionnaire LORQv3, no items were deleted despite the possibility of some items being redundant.

The test-retest reliability was observed to be good. In Figure 1 a slight tendency to report fewer complaints after 2 weeks than at baseline can be noted. Most participants filled out the first questionnaire during a dental appointment. The second questionnaire was sent by mail. Maybe the dental evaluation itself resulted in a slight decrease in complaints because patients were able to discuss their problems and were reassured.

Three groups of patients were compared: patients visiting general practices, patients visiting the university dental clinic, and head and neck oncology patients. Overall group scores followed the expected pattern, with

the oncology group reporting the most problems and the general practice group the least. This supports the discriminative validity of the LORQv3-NL. Remarkably, no difference could be found on items 11 to 14 concerning facial appearance. One might expect the oncology group to have a compromised appearance because of surgery and/or radiotherapy. Therefore, either this oncology group was not compromised in their facial appearance or they did not perceive it as a burden. As expected, only the oncology group was experiencing difficulty swallowing liquids and opening the mouth. This can be fully explained by the compromised oral environment after oncologic treatment.

CONCLUSIONS

On the basis of the findings of this study, the following conclusions were drawn:

1. The translation, cultural adaptation, and validation of the LORQv3 in Dutch has resulted in an instrument that can be used in Dutch-speaking populations.
2. The LORQv3-NL not only measures OHRQoL but also focuses on different aspects of denture functionality. The Dutch version has proven, like the original version, to be reliable and valid with respect to internal consistency, construct validity, and test-retest reproducibility.
3. The LORQv3-NL will provide a new tool for studying denture complaints and denture incompatibility.

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