Validity and Reliability of the Portuguese Version of the Rapid Estimate of Adult Literacy in Dentistry - READ-29 PT

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Abstract

Background

Health literacy is a main factor in health for its improvement, allowing the individuals to have a greater capacity to engage and participate in collective health promotion actions. The assessment of functional health literacy to determine the ability that each individual has to understand basic health information is essential. The aim of the present study was to translate and perform the cross-cultural adaptation of the Rapid Estimate of Adult Literacy in Dentistry (REALD-30) to Portuguese language and test the reliability and validity of this version.

Methods

The REALD-30 in the Portuguese language (REALD-29 PT) was applied to a group of individuals that participate in the program Atividade Senior, developed by the municipality of Viseu, Portugal. The final sample was composed by 206 participants that accepted responding to the questionnaire and to the REALD-30 Portuguese version (REALD-29 PT). Translation and cultural adaptation of the questionnaire and the statistical validation was accomplished in order to complete the process and obtain the REALD-29 PT.

Results

The REALD-29 PT presented good internal reliability. Cronbach's alpha ranged from 0.89 to 0.90 when words were deleted individually. The analysis of test-retest reliability revealed excellent reproducibility. We can verify that the REALD-30 scale for assessment of oral health literacy among older adults presents an acceptable internal consistency, with a global Cronbach´s alpha of 0.894.

Conclusions

The REALD-29 PT scale can be applied to assess oral health literacy among older Portuguese adults, presenting an acceptable internal consistency and is validated to assess oral health literacy and is crucial in epidemiological studies.

Background

Health literacy is essential in order to empower the community to improve their own health and quality of life levels, allowing individuals to have a greater capacity to involve and participate in collective health promotion actions (1). Low levels of health literacy can be a main barrier for the adoption of adequate daily habits, reflecting the increased demand for health services and increasing spending on medical care (2). It is fundamental to evaluate the functional health literacy in order to determine the capacity that

each individual has to understand basic health information (3, 4). In recent years there has been an increase in studies developed about health literacy (5), however it is very recent the development of studies dedicated to oral health literacy (OHL). OHL can be described as the level that an individual has to obtain, process and understand the basic oral and craniofacial information and health services necessary to make appropriate oral health decisions (6). In these studies, it appears that a low OHL leads to less frequent adoption of positive and adequate oral health habits. On the other hand, an increase in the level of OHL is associated with better communication between the patient and the oral health professional, which promotes a reduction in anxiety levels during the dental appointment and less reluctance to receive medical help (7). Studies on OHL are not consensual regarding the association between OHL levels and the individual's oral health condition (8). Nevertheless, it is important to assess functional health literacy to determine capacity. There are several instruments in the literature that can me applied in order to measure the level of OHL. The most used requires word recognition, as is the case of the Rapid Estimate of Adult Literacy in Dentistry (REALD-30) (8). The REALD-30 is a specific tool to assess the level of OHL through the recognition of words ordered in a list with varying degrees of difficulty (4). This instrument is easy and quick to apply in clinical practice, which is why most studies carried out use it (8, 9). Despite the fact that REALD-30 is a word recognition tool and evaluates only some of the skills in terms of individual literacy, studies show that it is highly correlated with functional health literacy as well as having good psychometric properties (4, 10). Several studies indicate that there is a relationship between the level of oral health literacy and oral health status, the adoption of positive oral health behaviors and satisfaction with oral health care services (11, 12). For this reason, it is imperative to have valid and credible instruments capable of measuring the level of oral health literacy.

Therefore, the aim of this study consisted in the translation, development of a cross-cultural adaptation of REALD-30 into the Portuguese language (REALD-29 PT) and test the reliability and validity of this version.

Methods

The REALD-30 in the Portuguese language (REALD-29 PT) was applied to individuals participating in the program Atividade Senior, developed by the municipality of Viseu, Portugal. The final sample was composed by 206 participants that accepted responding to the questionnaire and to the REALD-30 Portuguese version (REALD-29 PT). The data collection was accomplished between January 2019 and December 2019. Patients participating in the study signed an Informed Consent Form confirming their willingness to participate in this study.

The REALD-30 is a specific instrument for assessing the level of literacy among adults regarding oral health through the recognition of words referring to etiology, anatomy, prevention and treatment of specific oral conditions. The instrument is composed by 30 words that should be read aloud by the participant to the interviewer. The list of words is arranged in ascending order of difficulty based on both the average word length, number of syllables and the level of difficulty of combining sounds. For each word pronounced correctly, one point is assigned to the REALD-30 score and zero is recorded when the

pronunciation is incorrect. The total score is obtained by summing the scores and ranges from 0 (lowest degree of literacy) to 30 (highest degree of literacy) (13).

For the translation, adaptation, and validation of the REALD-30 two complementary phases were followed - translation and cultural adaptation of the questionnaire and the statistical validation. The cultural adaptation was performed to obtain the equivalent to the questionnaire developed in the original country to ensure equivalence of contents and semantics. For this adaptation, the translation-retroversion method for bilingual individuals was applied. The translation process began with two translations from the original REALD-30 scale by two translators, both native of Portugal and fluent in English. The translated version was reviewed by an English native doctor in Portugal. Retroversion was accomplished by an independent translator, who didn't have any knowledge or contact with the original version in English. The original and retranslated versions were confronted to assess the content of items and finally the correction of technical terms was performed.

Statistical analysis of the database was performed using the IBM-SPSS® 24.0. and Factor 10.8.

Most of the items were categorical or dichotomous items, and the test-retest reliability of questionnaire was assessed by calculation of the Cronbach´s alpha coefficient. A coefficient higher than 0.6 indicates an acceptable consistency and the coefficient for each item is presented as a median with a 95.0% confidence interval.

Results

An exploratory factorial analysis was developed, based on the following analysis details.

The scale was validated in a sample consisting of 206 participants with an average age of 72.3 ± 5.4, most of them female (n=149, 72.3%). All the participants answered to all questions of the REALD-30 scale. Therefore, we considered 206 valid cases (100%), none excluded.

REALD-30 had a mean of 19.25 ± 5.794 and an average execution / response time of 30 words of 1 minute and 34 seconds, minimum of 0.48 minutes and maximum of 3.18.

Regarding the word "sugar" on the scale and at the time of its validation, the same word was excluded for presenting variance 0, meaning it was a homogeneous response. Thus, when validating the REALD-30 scale for Portugal, we considered only 29 items (REALD-29 PT).

The statistics (mean, confidence interval, asymmetry and shortness) of each item of the REALD-29 PT scale are presented in Table 1. According to the values of asymmetry (higher than 3) and kurtosis (higher than 7) we could eliminate items if necessary.

Table 1
Statistics of each item of the REALD-29 PT scale.

Variable	Item	Mean	Confidence Interval	Variance	Skewness	Kurtosis
a2	Fumar	0.971	(0.94-1.00)	0.028	-5.628	29.521
a3	Fio dentário	0.811	(0.74-0.88)	0.153	-1.594	0.533
a4	Escovar	0.903	(0.85-0.96)	0.088	-2.735	5.449
a5	Polpa	0.854	(0.79-0.92)	0.124	-2.019	2.062
a6	Fluor	0.587	(0.50-0.68)	0.242	-0.357	-1.868
a7	Aparelho	0.947	(0.91-0.99)	0.051	-3.992	13.866
a8	Genética	0.796	(0.72-0.87)	0.162	-1.477	0.176
a9	Restauração	0.922	(0.87-0.97)	0.072	-3.171	8.013
a10	Bruxismo	0.689	(0.61-0.77)	0.214	-0.822	-1.322
a11	Abcesso	0.563	(0.47-0.65)	0.246	-0.256	-1.930
a12	Extração	0.830	(0.76-0.90)	0.141	-1.767	1.110
a13	Dentadura	0.801	(0.73-0.87)	0.159	-1.515	0.289
a14	Esmalte	0.927	(0.88-0.97)	0.068	-3.304	8.869
a15	Dentição	0.660	(0.58-0.74)	0.224	-0.680	-1.535
a16	Placa	0.942	(0.90-0.98)	0.055	-3.790	12.303
a17	Gengiva	0.820	(0.75-0.89)	0.147	-1.677	0.805
a18	Mal oclusão	0.238	(0.16-0.31)	0.181	1.237	-0.472
a19	Incipiente	0.510	(0.42-0.60)	0.250	-0.039	-1.994
a20	Caries	0.723	(0.64-0.80)	0.200	-1.003	-0.994
a21	Periodontal	0.121	(0.06-0.18)	0.107	2.330	3.409
a22	Selante	0.709	(0.63-0.79)	0.206	-0.923	-1.147
a23	Hipoplasia	0.311	(0.23-0.39)	0.214	0.822	-1.322
a24	Halitose	0.549	(0.46-0.64)	0.248	-0.196	-1.957
a25	Analgesia	0.199	(0.13-0.27)	0.159	1.515	0.289
a26	Celulite	0.704	(0.62-0.79)	0.208	-0.898	-1.193
a27	Fistula	0.563	(0.47-0.65)	0.246	-0.256	-1.930

Variable	Item	Mean	Confidence Interval	Variance	Skewness	Kurtosis
a28	Temporo mandibular	0.044	(0.01-0.08)	0.042	4.487	18.037
a29	Hiperemia	0.374	(0.29-0.46)	0.234	0.524	-1.722
a30	Apicectomia	0.141	(0.08-0.20)	0.121	2.076	2.293

After performing the Bartlett`s sphericity test (Bartlett's statistic) a value of 1871.0 (df=406; p<0.001) was obtained. The Kaiser-Meyer-Olkin (KMO) test was calculated as 0.87453 which represents a good classification and the BC Bootstrap 95% confidence interval of KMO was 0.877-0.878. All these values indicate that the level of acceptance for the validation process was very positive. With these values an exploratory factor analysis was performed, and a single factor structure resulted with eigenvalues greater than one (eigenvalue = 2,985). The parallel analysis reinforces the existence of a single factor with an explained variance percentage of 12.8%.

A Cronbach's alpha coefficient ranging between 0.5 and 0.7 is generally considered satisfactory for comparisons between groups, while values higher than 0.85 are sufficiently reliable for comparisons on the individual level.

Cronbach´s alpha for 29 items was 0.894, varying between 0.887 and 0.894 when words were excluded individually, that is, the instrument had good internal reliability with 29 items. Therefore, the REALD-29 PT shows satisfactory psychometric properties for use among Portuguese adults.

Table 2
Values of Cronbach´s alpha coefficient por the REALD-29 PT (n= 206).

Variable	Item	r	R without item	α without item
a2	Fumar	0.3179	.294	.894
a3	Fio dentário	0.4841	.430	.891
a4	Escovar	0.2867	.240	.894
a5	Polpa	0.5942	.553	.889
a6	Fluor	0.5893	.529	.889
a7	Aparelho	0.3850	.353	.893
a8	Genética	0.6454	.602	.888
a9	Restauração	0.4971	.462	.891
a10	Bruxismo	0.5737	.516	.890
a11	Abcesso	0.6649	.613	.887
a12	Extração	0.5782	.533	.889
a13	Dentadura	0.5352	.484	.890
a14	Esmalte	0.3969	.358	.893
a15	Dentição	0.6182	.564	.888
a16	Placa	0.3279	.293	.894
a17	Gengiva	0.5564	.508	.890
a18	Mal oclusão	0.4648	.404	.892
a19	Incipiente	0.5502	.485	.890
a20	Caries	0.5977	.544	.889
a21	Periodontal	0.2615	.208	.895
a22	Selante	0.5566	.499	.890
a23	Hipoplasia	0.5423	.482	.890
a24	Halitose	0.5678	.505	.890
a25	Analgesia	0.4157	.356	.893
a26	Celulite	0.6262	.574	.888
a27	Fistula	0.5854	.525	.889
a28	Temporomandibular	0.2536	.220	.894

Variable	Item	r	R without item	α without item
a29	Hiperemia	0.5044	.438	.891
a30	Apicectomia	0.3880	.335	.893

Discussion

In Portugal, the lack of oral health literacy is still a serious public health issue (13). Therefore, the application of proper scales to assess oral health literacy is important for the establishment of proper health education strategies in the community.

The results show that the Cronbach´s alpha, that permits the measurement of internal consistency (that is the extent to which an item is related to other items) was considered ideal, so we can conclude that the REALD-29 PT scale for assessment of oral health literacy among older adults presents an acceptable internal consistency. The REALD-29 PT demonstrated a considerably high internal consistency, as the Cronbach's alpha coefficient was 0.89, similar to that of the original instrument (validation of the HKREALD-30 and Arabic REALD-30) (14).

This is as far as we could ascertain the first validation of this scale for Portugal and presents as an important tool to define oral health literacy criteria and to understand what must be developed in terms of oral health behavior education, promotion and motivation at a community level.

The REALD-29 PT demonstrated acceptable psychometric properties and proved to be a quick, simple, and reliable instrument to measure oral health literacy among older portuguese adults. It turns out to be an efficient instrument for screening on an individual level to identify individuals with a low degree of oral health literacy, allowing oral health professionals to adjust their communication strategies for each patient specifically.

The instrument can be applied in association with other indicators to better assess the oral health literacy among the population, providing information to health administrators and policymakers, supporting the development of appropriate educational and oral health promotional approaches and prevention strategies.

Conclusion

The REALD-29 PT scale to assess oral health literacy among older portuguese adults presents an acceptable internal consistency and proved to be a reliable and valid tool, self-reported to identify the level of oral health literacy. REALD-29 PT is a validated scale to assess oral health literacy and is crucial for epidemiological studies.

Abbreviations

REALD: Rapid estimate of adult literacy in dentistry; PT: Portugal; OHL: Oral health literacy.

Declarations

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Authors' contributions

NV, MJC and HC were responsible for the conceptualization and design of the project. HC and MJC were responsible for the data collection. OA and JD were responsible for the statistical analysis and contributions to the various analytical approaches and interpretations of data. JFLM, NV, HC and MJC drafted the main manuscript and made major contributions to the revising of the manuscript. All authors read and approved the final manuscript submitted.

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Availability of data and materials

The data used to generate and support the findings of this study are available from the corresponding author upon request.

Ethics approval and consent to participate

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research was approved by the Health Ethics Committee of the Universidade Católica Portuguesa (Approval number 100). Written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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