

Psychometric properties of a new questionnaire for evaluating the literacy of parents concerning children's oral health (POHeLM)

ABSTRACT

Background and Objective: Parents' oral health literacy may be a reliable predictor of children's oral health. Therefore, the present study was conducted to develop and validate a questionnaire to assess parents' oral health literacy about their children's oral health.

Materials and Methods: This study was conducted from April 2020 until October 2020. Questionnaire items were developed by evaluating content validity based on expert opinions, content validity ratio, and content validity index, and cognitive interview. Random sampling was used to recruit a total of 500 patients from referral hospitals in the city of Kerman. Based on factor analysis, construct validity included exploratory factor analysis via SPSS software version 22, and confirmatory factor analysis via Mplus software version 7.4. The invariance of the model evaluation and the evaluation of the reliability of the questionnaire were assessed based on Cronbach's alpha coefficient.

Results: First, 71 items were chosen for evaluation, and then 19 items were promoted to the next stage, based on the content validity coefficients. The results of the exploratory factor analysis led to the extraction of a three-factor model of Parent's Oral Health Literacy Measure (POHeLM) about children's oral health. These three factors explained 56% of the total variance of the questionnaire altogether. These three factors include the accessibility domain (two items), the utilization domain (eleven items), and the communication domain (six items). Model fit indices based on confirmatory factor analysis confirmed the proper fit of the three-factor model. Also, in measuring the factor invariance, the model's validity in both male and female was authenticated. The Cronbach's alpha coefficient was calculated as 0.81.

Conclusion: This study shows that the POHeLM questionnaire possesses appropriate validity and reliability by 19 questions and 3 subclass.

Paper Type: Research Article

Keywords: oral health, health literacy, questionnaire design, validation.

► **Citation:** Najmi Nouri F, Tavallaee M, Nakhaei N. Psychometric properties of a new questionnaire for evaluating the literacy of parents concerning children's oral health (POHeLM). *Journal of Health Literacy*. Spring 2023; 8(1): 19-27.

Fateme Najmi Nouri

Assistant Professor, Department of Community Dentistry, faculty of Dentistry, Kerman University of Medical Sciences, Kerman, Iran.

Morteza Tavallaee

Assistant Professor, Department of Community Dentistry, faculty of Dentistry, Kerman University of Medical Sciences, Kerman, Iran.

Nouzar Nakhaei

* Professor, Social Determinants of Health Research Centre, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran. (corresponding) nakhaeen@gmail.com

Received: 19 August 2022

Accepted: 26 December 2022

Doi: 10.22038/jhl.2022.66184.1311

Introduction

In the Global Conference on Health Promotion in Mexico, the World Health Organization defined health literacy as “cognitive and societal skills that demonstrate the individual’s motivation and ability to obtain, understand, and process information to promote and preserve health” (1). Also, it was mentioned that health literacy should be considered a personal attribute and essential health and hygiene factor in populations (2). Oral health literacy is a subdivision of health literacy skills. The subject of oral health literacy or OHL (oral health literacy) as a subdivision of health literacy or HL (health literacy) came into attention in the late 1990s (3). Evaluating the characteristics of oral health in a society is potentially necessary to meet health requirements. Oral health literacy is dynamic, depending on variables such as the dominant culture of the community, the health system, the education system, and the overall health conditions of the society. As a result, developing and validating a suitable evaluation tool that can consider all these angles is of great importance (4, 5).

Based on the results of studies, OHL evaluation tools are divided into three general categories concerning the evaluation context included A) tools based on word recognition, with REALD (rapid estimate of adult literacy in dentistry) family as a prominent example; B: tools based on the ability of the respondent to understand the information (e.g., OHL, Held, and Test of Functional Health Literacy in Dentistry or ToFHLiD) family; C: tools based on communication skills and non-numerical conceptual knowledge, such as the CMOHK and BHLOHKP (Baltimore Health Literacy and Oral Health Knowledge Project) Survey tools (6). Although most of the published studies on oral health literacy examine the health of adults, inadequate health literacy related to children’s oral and dental health among child

caregivers are mostly reported because children are dependent on their parents for accessing health care (7). Low health literacy in parents can have potentially harmful consequences for oral health of the children (8). As oral health literacy is a multidimensional issue, numerous and various OHL evaluation tools are necessary to cover the different aspects of oral health literacy. As a result, the conduction of a comprehensive review is necessary in the first phase (9). The systematic review results showed that the HKOHLAT-P (Hong Kong Oral Health Literacy Assessment Task for Pediatric Dentistry) questionnaire is the only valid tool to evaluate oral health literacy in parents (6). Although it is made of various parts, it does not consider all the aspects needed to evaluate children’s oral health literacy, and its completion is time-consuming (10). On the other hand, studies showed that evaluation base on tools (word recognition and the ability of the respondent to understand and use the information) cannot be a good criterion to assess the level of parents’ oral health literacy and other aspects of health literacy such as like conceptual knowledge, perception, and mentality (11). Therefore, because of the deficiencies in the existing questionnaires, the present study was conducted to create and verify a new questionnaire to evaluate the parents’ literacy concerning children’s oral health.

Materials and Methods

This study was conducted in Kerman, Iran, from April until October 2020. The stages of this study consisted of six general phases according to Boateng.et. al, (9). First, Item development was conducted with target of the assumption of framework, definitions of concepts, determining of study dimensions. and identification and establishing the domains and dimensions, which determining the framework

of the study. This phase was carried out based on the available literature (literature review) (9, 12). After establishing the domain, the gathering of the items started. This procedure is also called "question development" or "item development." The method used in this stage is called "logical partitioning," based on the description of related domains and identifying the types of questions (9). This stage was completed by a literature review and evaluating the available domains, indices, and scales. Second, expert panels conducted content validity evaluation with target of assessment the level of consistency and sufficiency of tool content. The point of view of experts is essential to develop questions of the questionnaire. Therefore, an expert panel of five members was chosen among experts in oral disease, medicine, oral health, community dentistry, community medicine, pediatric dentistry, and restorative dentistry was held. In this Study, two coefficients of content validity ratio (CVR) and content validity index (CVI) were used to evaluate quantitative content validity. Then, each expert expressed their opinion on the CVI and CVR for each question. Third stage, pre-testing the questions was carried to help the researcher ascertain that the questions are meaningful and comprehensible to the study target group before the survey is carried out. In this stage, we attempted to elicit and eliminate the misunderstandings of the questions, minimize measurement errors, and remove weak items. Also, questions with grammatical errors or unsuitable sentence structure were identified and edited.

This stage was conducted via the final draft of the questions on participants except of the main study population. A sample size of 10 people is ideal for this stage (13). Pretesting was done through cognitive interviews. Forth a stage is survey administration, which was conducted on

parents who referred to the referral hospitals in Kerman in 2020. The inclusion criteria included fathers or mothers who agreed to participate in this study and had the minimum literacy of reading and writing. Parents are excluded from this study if their employment is in line with dentistry. The sample selection was randomly done on different days of the week over five months. The target group in this study was selected from the companions of patients in the referral hospitals in Kerman in order to cover the different cultural and social characteristics of the population from different city areas, and increase the precision of the study. Different studies showed that the patients' companions who refer to hospitals can be considered as the general public (14, 15).

We asked parents to participate in the project after acquiring the necessary permissions and explaining the study goals. In order to assure the privacy of the participants and receive reliable answers, they were asked to drop the completed questionnaires into a sealed box. All questions were read to participants in a loud voice if they requested. The minimum sample size for the development of the questionnaire was 300 subjects (16).

In the first phase, 300 participants were entered into the study based on exploratory factor analysis (EFA). In the second phase, we used the confirmatory factor analysis (CFA) because a separate sample analysis was needed. Therefore, 200 participants were entered second phase of study based on the principles for sample recruitment (17) and based on the scores associated with survey statements. The data gathering tools included three general parts as follow: questions about measuring different areas of parents' oral health literacy (19 questions), background questions in the field of oral and dental health (3 questions), and demographic questions (4 questions). The choices for answering

the questions were designed using the Likert scale and set as “never,” “seldom,” “sometimes,” “most of the time,” and “always,” which were graded with points from 1 to 5, respectively. After entering the data into the SPSS software (version 21), construct validity, whether the construct in question can measure the set goal or not, was examined as follows (9, 18)

Exploratory factor analysis (EFA) includes the Kaiser-Meyer-Olkin (KMO) and Bartlett Tests of sphericity which was used to assess the operability and the adequacy of sampling.. A factor loading higher than 0.4 was considered important. The scree plot and the Kaiser rule were used to find the number of factors (9). We used geomin rotation (13), and the labeling of the factors, to execute personal, theoretical, and inductive process (17).

B) The confirmatory factor analysis (CFA) was used to determine the data set’s factor structure on 200 parents who referred to the referral hospitals of the city of Kerman in 2020. What happens in the CFA is that the structure extracted from the EFA is approved. In CFA, various analytic tests are done to determine the proportion of the model to the data. “Good model fit” shows the acceptability of the proposed model (19). The maximum likelihood estimation (ML) was also used to estimate the parameters. The model fit was measured based on several indices such as comparative fit indices (CFI), the Tucker-Lewis index (TLI), the root mean squared residual (SRMR), the root mean square error (RMSEA), and the comparative chi-square (which is the proportion of chi-square to degree of freedom) (16, 17). After the approval of the structure of the model in Iran, multi-group confirmatory factor analysis (MGCFA) was carried out to determine whether the perception and measurement of the set model’s dimensions are invariable across genders. Likewise, we followed a series of

suggested steps to test invariability as follow: 1) configure invariance, 2) metric invariance, and 3) scalar invariance. In this study, Cronbach’s alpha coefficient was used to measure reliability. Figures more than 0.7 for confirmatory factor analysis were accepted, and figures more than 0.8 showed a high convergent validity (9, 12). Mplus version 7.4 was used for the statistical analysis of the data.

Results

The sampling adequacy index (KMO) in the present study was 0.91, which is very close to 1 (P-value <0.001). These indices show the quality of sampling and the correlation between measurement variables, and are used to determine whether the correlation matrix between the items is fit enough for factor analysis. Before implementing the EFA and the CFA, the data for the analysis of multivariable covariance was studied. The normal distribution of the data shows the 2.0 cutoff for skewness and 7.0 for kurtosis. All the figures of skewness and kurtosis showed that the assumption of normality was established. Moreover, item communality or the correlation coefficients was positive for each items. As a result, the concepts included in the questionnaire items were all in one direction and convergent (positive). Three factors had an eigenvalue higher than 1, which elucidated 56% of the variance of the questionnaire. The scree plot also showed that the three factors could be selected and extracted for final analysis (Figure 1).

The naming of the factors was carried out with regard to the content of the items and the suggestions of experts. The naming of these factors, CVI, CVR, factor load (level of significance is 5%) and communality index (or correlation coefficients of each item with the whole) of the questions related to each factor has been mentioned (Table 1).

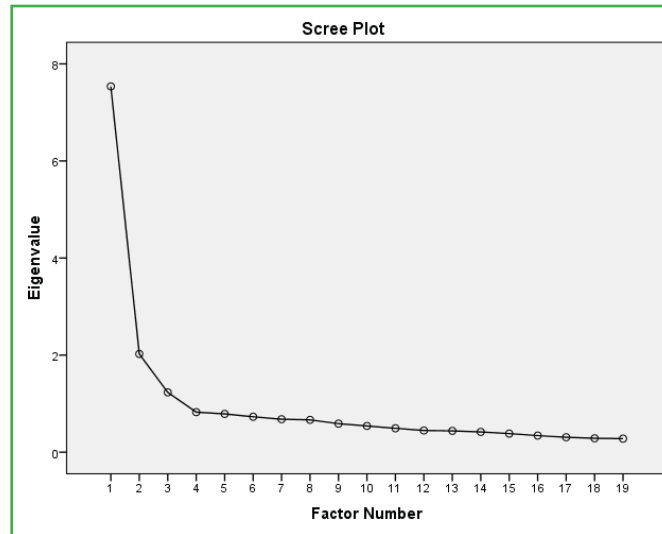


Figure 1: Scree plot of the extracted components of the questionnaire.

Table 1: Naming, CVI, CVR, factor load and communality index of the questions related to each factor.

First domain (Accessibility)	CVI	CVR	Factor loading	communality index
1. I can gather my child's oral health and treatment information from different sources (doctors, the radio and television, the internet, etc.).	1	1	0.443	.471
2. In times of sickness or dental problems, I can find the proper place for receiving dental services and help for my child. In other words, I know where or whom to go to.	1	1	0.655	.740
Second domain (Utilization)				
7. I understand the nutritional information and sugar content that is available on the packaging of foods.	1	0.6	0.517	.451
8. I try my best to obtain the necessary information about my child's oral and dental health.	0.8	1	0.523	.537
9. I use products that prevent tooth decay and other dental and oral problems for my child.	1	1	0.699	.555
10. If my child's tooth has cavities, I will notice it.	1	1	0.580	.406
11. I can protect the oral and dental health of my child by using my own knowledge.	1	1	0.646	.540
12. When I am faced with new information regarding my child's oral and dental health, I can understand its credibility.	1	1	0.718	.528
14. Even if my child does not show any dental or oral diseases symptoms, I still make appointments with a dentist for routine examinations.	0.8	1	0.773	.595
15. I know what to do in emergencies regarding children's oral and dental health (for example, trauma to the teeth, broken teeth, or major tooth infection).	1	1	0.787	.492
17. I oversee and pay attention to my child's brushing procedure or their use of dental floss and mouthwash.	1	1	0.448	.444
18. I try to buy products that are low in sugar or substances that can lead to tooth decay.	1	1	0.650	.442
19. I try to prevent the formation of habits harmful to my child's oral and dental health (like unhealthy nutrition or lack of hygiene).	1	1	0.533	.401
Third domain (Communication)				
3. Reading and answering my child's medical and dental forms (like patient admittance form, consent, documentation, etc.) is easy for me.	1	1	0.602	.444
4. Reading educational material (like booklets, brochures, pamphlets, etc.) concerning my child's oral and dental health is easy for me.	1	1	0.670	.494
5. I understand what the dentist says about my child's oral and dental health.	1	1	0.678	.583
6. I understand the medication instructions my child's dentist gives me	1	1		
13. When visiting the dentist, I can present them with my child's personal and medical information.	0.8	1		
16. I will not continue or discontinue the medications that the doctor has prescribed for my child, even if the disease symptoms are gone.	1	1		

CFA: In CFA, the following pattern has been achieved (Figure 2). As it can be seen, all the

factor loads on the questions have a figure higher than 0.4 and are meaningful.

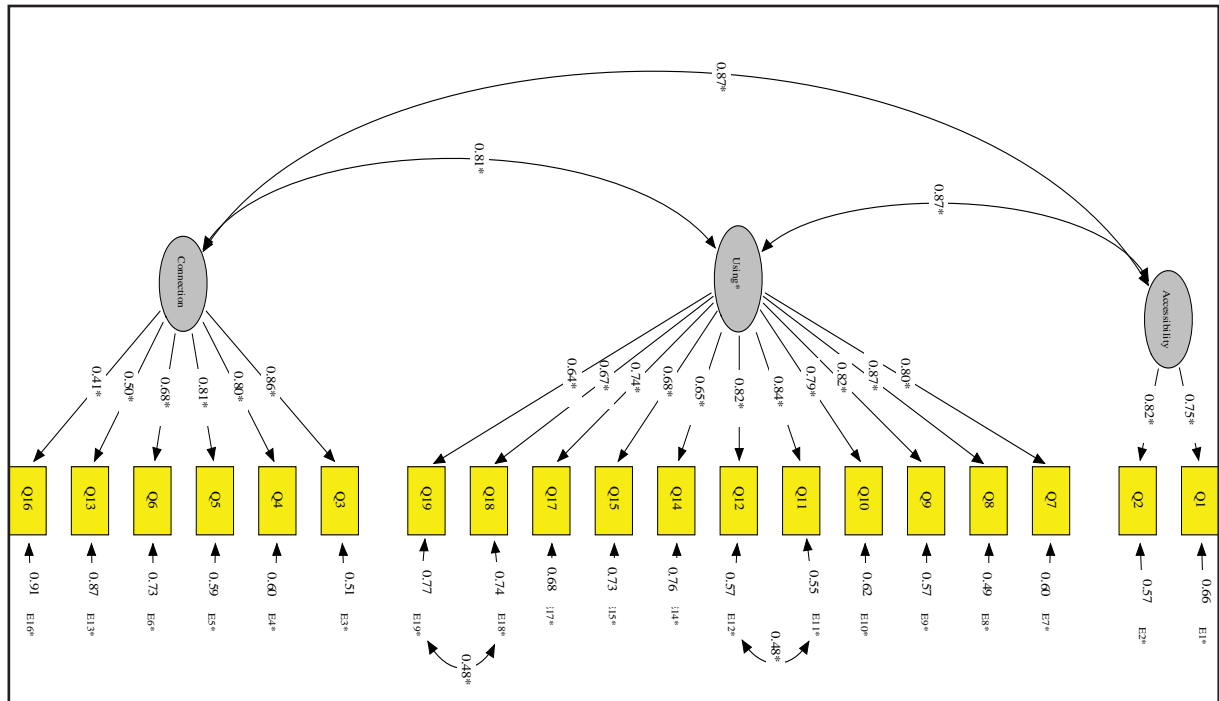


Figure 2: Confirmatory factor analysis of the pattern structure of the three-factor model

Concerning the following chart, it can be seen that the results of EFA show a good fit to

the three-factor model. Model fit indices are shown in the following chart (Table 2).

Table 2: Model fit indices

	AIC	BIC	aBIC	χ^2	df	RMSEA	CFI	TLI	SRMR
CFA-3 factors	10044.4	10250.7	10054.3	340.2	147	0.07	0.95	0.93	0.056

Measurement invariance (MI) analysis between the two genders is shown in table 3. Measurement invariance has been observed

between the two genders (male and female) in all three-factor models included configure, metric, and scalar levels are observed (Table 3).

Table 3: Studying the measurement invariance between the two genders.

Model	N-Parameters	χ^2	df	$\Delta\chi^2$	df	p-value	RMSEA	Δ RMSEA	CFI	Δ CFI
Configural	124	631.2	294				0.068		0.908	
Metric	108	647.1	310	8.2	16	0.94	0.066	0.002	0.908	0
Scalar	92	678.9	326	31.5	16	0.01	0.066	0	0.903	0.005

The total Cronbach alpha coefficient for all items is (0.81). Cronbach's alpha of each of the

three domains and the gestalt of the questionnaire are presented in the following chart (Table 4).

Table 4: The reliability of the questionnaire based on Cronbach's alpha.

Domains			
Communication	Utilization	Accessibility	Average of the questionnaire
0.80	0.90	0.74	0.81

Discussion

It was evidenced that oral health literacy (OHL) level measurement has become a developing research field. This study shows that the POHeLM (parents oral health literacy tool) questionnaire based on the multidimensional nature of OHL can be used as a valuable tool to measure parent's literacy regarding their children's oral health. In the first step of this study, an expert panel including five experts from specific fields assessed content validity, and their evaluation showed that the this tool has enough content validity. However, Wong et al. (2013) do not have an expert panel to evaluate the content validity (10). Although this may a drawback in the HKOHLAT-P questionnaire, the reason could be in the different method of questionnaire item development because HKOHLAT-P has been designed based on media, radio, and television content (20). In this study, the questions are designed fully, and the responses are acquired on the Likert scale. Dickson et al.'s study (2014) showed that it is difficult to determine whether the patient really understands the meaning and concept of the word or just pronounces it correctly based on word recognition (21,22). In the present study, content validity was evaluated through connection-level or CVI and connection degree or CVR; from 71 questions, 19 questions with good content validity were selected to enter the construct validity phase.

According to the exploratory factor analysis (the results of the KMO and Bartlett Tests of sphericity) the implementation of exploratory factor analysis on this questionnaire is justifiable. The exploratory factor analysis extracted three

domains, elucidating 56% of the overall variance of the questionnaire, which means that the questionnaire obtains enough validity (23). These domains include accessibility (2 items), utilization (11 items) and communication (6 items). In Jones et al. (2015), five domains are extracted for oral health literacy, which including two questions (24). In the final version of the questionnaires based on word recognition, like REALD-30, introduced by Lee et al. (2007), no domain is identified (25). This difference in domains can be due to the integration of domains by the researchers, focusing on different aspects of item development, difference in the scope of the field, which is being evaluated, or difference in the number of questions. In the present study, the sampling quality indices and the correlation between the measured variables were used to determine the correlation matrix between the items. The factor analysis findings showed that the factor loading of all the questionnaire items is high (higher than 0.4). This means that these items are important for the questionnaire and have the appropriate validity (23).

The model fit indices of the CFA were all above the accepted level, which shows the construct validity of the questionnaire. As a result, the present questionnaire possesses the appropriate construct validity. In the present study, the confirmatory factor analysis results show that the three-factor model extracted from the exploratory factor analysis has a good fit based on the model fit indices. In the present study, the measurement invariance results between the two genders in the three-factor

model were confirmed. This model is valid for both the male and female gender. The evaluation of this parameter is often undermined even though it is imperative in a society-based study, and as a result, very few studies have examined it (18).

The Cronbach's alpha in the present study was 0.81, which means appropriate reliability in the final version of the questionnaire. The studies of Wong et al. (2013) also had the appropriate reliability of 0.71 (10). The results of the study of Gong et al. (2007) report the Cronbach's alpha of the TOFHILD questionnaire to be 0.63 (26).

The strength of this research is the design of a new questionnaire for the important and influential group of children in the field of oral and dental health. The limitation of this study was the non-cooperation of the parents due to the situation of the corona virus epidemic. Thus, we tried to get their cooperation by explaining the importance of the research.

Conclusion

This study shows that the POHeLM questionnaire possesses appropriate validity and reliability based on 19 questions and 3 subclass. Likewise, all number of questions showed the appropriate comprehensibility, validity, and reliability, therefore, it seems that the POHeLM is a suitable and valuable tool for measuring parents' literacy concerning their children's oral health.

Acknowledgement: We are grateful to surveyors for their valuable contributions to the data collection process. We also thank all the participants in our study

Consent for publication: Not applicable

Availability of data and materials: All data generated or analysed during this study are included in this published article [and its supplementary information files].

Conflicts of interest: There is no Conflicts of

interest.

Ethical considerations: Informed consent was obtained from all participants. They had the right not to participate in the research and were assured that their names would not be used in any part of the research.

Funding: No financial support was received for this study.

Authors' contributions: Fatemeh Najminouri: Resources and Writing – Original Draft Preparation. Nouzar Nakhaee: Methodology, Formal Analysis and Supervision. Morteza Tavallaee: Review and Editing and Visualization.

References

1. Neves ÉTB, Lima LCM, Dutra LDC, Gomes MC, Siqueira MBLD, Paiva SM, Ferreira FM, Granville-Garcia AF. Oral health literacy, sociodemographic, family, and clinical predictors of dental visits among Brazilian early adolescents. *Int J Paediatr Dent*. 2021 Mar;31(2):204-211. <https://doi.org/10.1111/ipd.12660> PMID:32413175
2. Navabi N, Najminouri F, Nikravesht P, Pourgharib S. Validity and Reliability of the Persian Version of the Health Literacy Dental Scale (HeLD-14). *Journal of Health Literacy*. 2022;7(1):26-33. Healthy People: 2010, [<http://www.healthypeople.gov>]
3. Ju X, Brennan DS, Parker E, Chrisopoulos S, Jamieson L. Confirmatory factor analysis of the health literacy in dentistry scale (HeLD) in the Australian population. *Community dental health*. 2018;35(3):140-7.
4. Wang Y, Xing L, Yu H, Zhao L. Prevalence of dental caries in children and adolescents with type 1 diabetes: a systematic review and meta-analysis. *BMC oral health*. 2019;19(1):1-9. <https://doi.org/10.1186/s12903-019-0903-5> PMID:31521152 PMID:PMC6744653
5. Navabi N, Najminouri F, Tavallaie M. Assessment of oral health literacy: A systematic review of validated worldwide versus Persian measures. *Journal of Oral Health and Oral Epidemiology*. 2020 Jan 1;9(1):7-15.
6. Firmino RT, Ferreira FM, Martins CC, Granville-Garcia AF, Fraiz FC, Paiva SM. Is parental oral health literacy a predictor of children's oral health outcomes? Systematic review of the literature. *International journal of paediatric dentistry*. 2018 Sep;28(5):459-71. <https://doi.org/10.1111/ipd.12378> PMID:29984431
7. Adil AH, Eusufzai SZ, Kamruddin A, Wan Ahmad WM, Jamayet NB, Karobari MI, Alam MK. Assessment of Parents' Oral Health Literacy and Its Association with Caries Experience of Their Preschool Children. *Children*. 2020 Aug;7(8):101.

- <https://doi.org/10.3390/children7080101>
PMid:32824693 PMCID:PMC7464453
8. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in public health*. 2018; 6:149. <https://doi.org/10.3389/fpubh.2018.00149> PMid:29942800 PMCID:PMC6004510
 9. Wong HM, Bridges SM, Yiu CK, McGrath CP, Au TK, Parthasarathy DS. Validation of the Hong Kong Oral Health Literacy Assessment Task for paediatric dentistry (HKOHLAT-P). *Int J Paediatr Dent*. 2013 ;23(5):366-75. <https://doi.org/10.1111/ipd.12021> PMid:23947421
 10. Tehrani H, Nejatian M, Moshki M, Jafari A. Psychometric properties of Persian version of depression literacy (D-Lit) questionnaire among general population. *International Journal of Mental Health Systems*. 2022;16(1):1-11. <https://doi.org/10.1186/s13033-022-00550-x> PMid:35962416 PMCID:PMC9372931
 11. Cabrera-Nguyen P. Author guidelines for reporting scale development and validation results in the *Journal of the Society for Social Work and Research*. *Journal of the Society for Social Work and Research*. 2010;1(2):99-103. <https://doi.org/10.5243/jsswr.2010.8>
 12. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of clinical epidemiology*. 2007;60(1):34-42. <https://doi.org/10.1016/j.jclinepi.2006.03.012> PMid:17161752
 13. Motlaq ME, Eslami M, Yazdanpanah M, Nakhaee N. Contraceptive use and unmet need for family planning in Iran. *International Journal of Gynecology & Obstetrics*. 2013;121(2):157-61. <https://doi.org/10.1016/j.ijgo.2012.11.024> PMid:23473347
 14. Worthington RL, Whittaker TA. Scale development research: A content analysis and recommendations for best practices. *The counseling psychologist*. 2006;34(6):806-38. <https://doi.org/10.1177/0011000006288127>
 15. Henson RK, Roberts JK. Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological measurement*. 2006;66(3):393-416. <https://doi.org/10.1177/0013164405282485>
 16. Williams B, Onsmann A, Brown T. Exploratory factor analysis: A five-step guide for novices. *Australasian journal of paramedicine*. 2010;8(3). <https://doi.org/10.33151/ajp.8.3.93>
 17. Rezapour M, Khanjani N, Mirzaee M. Construct Validity of Maryland Safe and Supportive Schools Climate Survey in Iran: A Validation Study. *International Journal of School Health*. 2020;7(2):1-13.
 18. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC. Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of clinical epidemiology*. 2007 Jan 1;60(1):34-42 <https://doi.org/10.1016/j.jclinepi.2006.03.012> PMid:17161752
 19. Richman JA, Huebner CE, Leggott PJ, Mouradian WE, Mancl LA. Beyond Word Recognition: Understanding Pediatric Oral Health Literacy. *Pediatric Dentistry*. 2011;33(5):420-425.
 20. Pakpour AH, Lawson DM, Tadakamadla SK, Fridlund B. Validation of Persian rapid estimate of adult literacy in dentistry. *J Investig Clin Dent*. 2016 ;7(2):198-206. <https://doi.org/10.1111/jicd.12135> PMid:25329835
 21. Dickson-Swift V, Kenny A, Farmer J, Gussy M, Larkins S. Measuring oral health literacy: a scoping review of existing tools. *BMC Oral Health*. 2014;1(14):1-13. <https://doi.org/10.1186/1472-6831-14-148> PMid:25472659 PMCID:PMC4417207
 22. Montazeri A, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health Literacy for Iranian Adults (HELIA): development and psychometric properties. *Payesh (Health Monitor)*. 2014;13(5):589-99.
 23. Jones K, Brennan D, Parker E, Jamieson L. Development of a short-form Health Literacy Dental Scale (HeLD-14). *Community dentistry and oral epidemiology*. 2015;43(2):143-51. <https://doi.org/10.1111/cdoe.12133> PMid:25388410
 24. Lee JY, Rozier RG, Lee SY, Bender D, Ruiz RE. Development of a word recognition instrument to test health literacy in dentistry: the REALD-30—a brief communication. *J Public Health Dent*. 2007 ;67(2):94-8. <https://doi.org/10.1111/j.1752-7325.2007.00021.x> PMid:17557680
 25. Gong DA, Lee JY, Rozier RG, Pahel BT, Richman JA, Vann Jr WF. Development and testing of the test of functional health literacy in dentistry (TOFHLID). *Journal of public health dentistry*. 2007 Mar;67(2):105-12. <https://doi.org/10.1111/j.1752-7325.2007.00023.x> PMid:17557682