Turkish Validity-Reliability Study of the Celiac Disease-Specific Pediatric Quality of Life Scale

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ABSTRACT

Background: *Celiac disease is an autoimmune enteropathy triggered by the presence of gluten. There are Celiac Disease Dutch-Child Quality of Life Scale, Celiac-Specific Pediatric Quality of Life Scale for children/adolescents patients to measure the quality of life. In this study, due to lack of quality of life scales for children with celiac in Turkey, we aimed at Turkish adaptation of the Celiac-Specific Pediatric Quality of Life Scale.*

Methods: *This methodological study was conducted in Ankara University Faculty of Medicine, Cebeci Hospital Hospital between July 2019 and July 2020. A total of 192 children were included. Reliability was demonstrated by the Cronbach's alpha coefficient. Structural validity was evaluated using explanatory factor analysis and confirmatory factor analysis. The Statistical Package for Social Sciences (SPSS) 22.0 and Amos were used in analyses.*

Results: *In 8-12 age groups; Cronbach's alpha was 0.92 in negative emotions dimension, 0.88 in school dimension, and 0.74 in enjoyment dimension. In explanatory factor analysis, Kaiser-Meyer-Olkin measure of sampling adequacy value was 0.698, Bartlett's test of sphericity was significant ($P < .001$). Variance explained was 75.8%. In confirmatory factor analysis, X^2/df was 3.26, root mean square error of approximation value was 0.07, comparative fit index value was 0.96. In 13-18 age groups; Cronbach's alpha was 0.87 in social dimension, 0.84 in uncertainty dimension, 0.78 in isolation dimension, and 0.83 in limitations dimension. In explanatory factor analysis, Kaiser-Meyer-Olkin measure of sampling adequacy was 0.684, Bartlett's test of sphericity was significant ($P < .001$). Variance explained was 68.6%. In confirmatory factor analysis, X^2/sd value was 3.78, root mean square error of approximation value was 0.061, and comparative fit index value was 0.961.*

Conclusion: *Cronbach's alpha values of the groups were found to be above 0.70. Kaiser-Meyer-Olkin values were above 0.5 in terms of sample size, Bartlett's tests for sphericity were significant in terms of correlations between variables, root mean square error of approximation values were below 0.08, comparative fit index and goodness of fit index values were above 0.95 in terms of model fit. If the scales have been found to be valid and reliable, it is recommended for use in Turkey.*

Keywords: *Celiac disease, child, quality of life, CDPQOL scale*

INTRODUCTION

Celiac disease is an autoimmune enteropathy that is triggered by gluten in genetically susceptible individuals and causes a wide variety of clinical manifestations. Its incidence is 0.5%-7.0% in the world[1] and 0.5%-3.0% in Turkey.[2-4] Studies show that most of the patients are in an atypical and silent form and the time of the onset of the clinical symptoms of the disease has shifted from infancy to the older childhood therefore they are diagnosed late and their treatment is delayed.[5,6]

The diagnosis is made with characteristic histological findings in serological examinations and small intestine biopsy specimens. The treatment is a life-long gluten-free diet. The gluten-free diet should be strict and therefore there may be difficulties and problems with adherence to treatment. As it changes the eating habits and lifestyle of the person, it also affects the quality of life.[7] The symptoms improve with compliance with the treatment, and the serological and histopathological findings that indicate the presence of the disease also regress. However, a special diet has a negative impact on the quality of life due to the social stigma and exclusion of patients as well as difficulties.[7]

Comprehensive, valid, and reliable disease-specific scales are required to accurately measure health-related quality of life in patients with celiac disease. While some scales

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require different versions for age groups, some of the tools include children, adolescents, and adults. Some scales have also been developed for celiac disease. There is a Celiac Disease-Specific Quality of Life (CD-QOL) scale for adults. For children/adolescents, there are Celiac Disease Dutch-Child Quality of Life (CDDUX) and Celiac-Specific Pediatric Quality of Life (CDPQOL) scales.[8] The CDPQOL scale used in this study was developed by Jordan et al[9] for children/adolescents aged 8-18 years in the United States of America in 2013.[7] This scale consists of 13 items for 8-12 years old and 17 items for 13-18 years old.[9]

Since the development of a quality of life tool is time-consuming and costly, an existing scale can be translated and adapted in accordance with methodological methods. In this study, due to lack of celiac disease quality of life scale for children in Turkey, we aimed at Turkish adaptation of Pediatric Celiac Disease-Specific Quality of Life Questionnaire.

MATERIALS AND METHODS

Participants

This research is a methodological validity-reliability study. It was conducted between July 2019 and July 2020 in patients aged 8 years and over who were followed up with a diagnosis of celiac disease at the Ankara University Faculty of Medicine, Department of Pediatrics, Division of Pediatric Gastroenterology.

It was determined that 271 celiac patients applied to the Pediatric Gastroenterology outpatient clinic within the last 6 months from the patient follow-up program. Since there was not enough literature data on dietary compliance in celiac patients, the unknown frequency was taken as 50%. The sample size was 160 in the Epi info 7.0 program, taking the population as 271, CI was 95%, error margin was 5%, and prevalence was 50%. In addition, in determining the sample size in scale studies, it is recommended to reach a sample of at least 5 times the number of items.[10] In this study, since there are 13 items in the quality of life scale of the 8-12 age group, a minimum of $13 \times 5 = 65$ children from this age group; since there are 17 items in the scale of the 13-18 age group, it was aimed to reach a minimum of $17 \times 5 = 85$ children from this group. Providing all conditions, a total of 192 children, 81 of which were 8-12 years old and 111 of 13-18 years were included in the study.

Data Collection Tools

Patient information was collected with the data collection form and the Turkish version of quality of life scale. While a parent of the child filled in the data collection form, the child filled in the quality of life scale under the supervision of the researchers. The quality of life scale was of 2 types, for 8-12 years and 13-18 years. The scale appropriate for the patient's age was given to him/her. Pre-application of the prepared data collection form and scale form was done with 10 patients in Ankara University Faculty of Medicine Pediatric Gastroenterology Clinic as soon as the permissions were obtained.

Data Collection Form

The data collection form consisted of 28 questions prepared to be filled by the parents of the child and 6 questions filled by the doctor. While the first 18 questions asked sociodemographic descriptive information, the second part consisted of 10 questions about the disease and gluten-free diet. The part filled in by the doctor contained information about the disease and symptoms, as well as the child's height, weight, and laboratory information.

Celiac Disease-Specific Pediatric Quality of Life Scale

The CDPQOL scale developed by Jordan et al[9] was used in this study. The CDPQOL scale is a scale with 2 different versions consisting of 13 items for 8-12 years old and 17 items for 13-18 years old. The scale appropriate for the child's age was given to him/her. After verbal and written consents of both him/her and his/her parents, they were asked to fill out under the supervision of the researchers. Participants chose the appropriate Likert-type statements ranging from 0 = never, 1 = almost never, 2 = occasionally, 3 = often to 4 = almost always. Thus, a score between 0 and 4 was obtained from each item. A total score was obtained based on the options marked. While the 8-12 age scale consists of "negative emotions" (7 factors), "school" (4 factors), and "enjoyment" (2 factors), the 13-18 age scale consisted of "social" (7 factors), "uncertainty" (3 factors), "isolation" (4 factors), and "limitations" (3 factors) dimensions.

Adaptation to Turkish (Translation) Process

The scales were first translated from English to Turkish and then from Turkish to English by 2 bilingual English teachers who knew Turkish/English languages very well. Researchers and translators came together and compared the last English questions with the original scale questions and decided that Turkish translation was valid in terms of language.

Ethical Dimension of Research

Before the study, permission was obtained from Peter H. R. Green, who was in the team that developed the scale,

and the Ethics Committee of Ankara University Faculty of Medicine (date: May 13, 2019, decision no: 09-696-19). Verbal and written informed consent was obtained from the parent who completed the questionnaire and from the child who completed the scale according to his/her age.

Statistical Analysis

Statistical analysis was performed using SPSS 22 and Amos 22 (SPSS Inc.; Chicago, IL, USA) statistical package programs. The total scores of the items and dimensions are presented as mean ± standard deviation. The reliability of the scale was demonstrated by "item-total correlation" and "internal consistency coefficient". In item analysis, correlation coefficients were corrected according to the overlap between each question score, the total score were obtained, and the contributions of the questions to the scale were examined. Internal consistency was demonstrated by Cronbach's alpha internal consistency coefficient. In the validity analysis, the structural validity of the Turkish version of the scale was evaluated. Structural validity was evaluated using explanatory factor analysis (EFA) and confirmatory factor analysis (CFA) approach. In EFA, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett sphericity test were performed to determine the suitability of the data for factor analysis. In CFA, chi-square/degrees of freedom (X^2/df) comparative fit index (CFI), goodness of fit index (GFI), and root mean square error of approximation (RMSEA) values were calculated. Statistical significance level was accepted as $P < .05$.

RESULTS

This study included 192 patients. While the mean age of the patients aged 8-12 was 10.3 ± 1.4, it was 15.3 ± 1.6 for the 13-18 age group. The mean age at diagnosis was 6.7 ± 3.0 in the 8-12 age group and 9.9 ± 3.9 in the 13-18 age group. The mean time spent with the disease was 3.6 ± 2.9 years in the 8-12 age group and 5.3 ± 3.8 years in the 13-18 age group. Also, 70.4% of those in the 8-12 age group and 62.2% of those in the 13-18 age group were girls. Both groups mostly had atypical celiac disease. A total of 74.1% of the patients did not have any symptoms during the control. The frequency of comorbidities was 16.0% in the first group and 44.4% in the second group (Table 1).

The descriptive characteristics and reliability results of the 8-12 age group items of the scale are given in Table 2. The mean scores of the 8-12 age scale were 9.53 ± 8.24 in the "negative emotions" dimension, 6.44 ± 5.47 in the "school" dimension, and 1.79 ± 2.35 in the "enjoyment" dimension. Cronbach's alpha values were 0.923 in the "negative emotions" dimension, 0.877 in the "school" dimension, 0.740 in the "enjoyment" dimension, and 0.858 for the total scale score. Item-total correlation coefficients were between 0.600 and 0.899 in the "negative emotions" dimension, between 0.649 and 0.862 in the "school" dimension, and 0.599 in the "enjoyment" dimension. All item-total correlations were above 0.30. When it was removed, there was no item that significantly increased the Cronbach's alpha value. There was no need to extract items from the scale.

The descriptive characteristics and reliability results of the 13-18 age group items of the scale are given in Table 3. The mean scores of the scale were 13.00 ± 7.21 in the "social" dimension, 5.00 ± 3.86 in the "uncertainty" dimension, 5.06 ± 4.03 in the "isolation" dimension, and 6.21 ± 3.38 in the "limitations" dimension. Cronbach's alpha values were 0.866 for the "social" dimension, 0.843 for the "uncertainty" dimension, 0.776 for the "isolation" dimension, 0.829 for the "limitations" dimension, and 0.886 for the scale total score. Item-total correlation coefficients were between 0.580 and 0.711 in the "social' dimension, between 0.667 and 0.782 in the "uncertainty" dimension, between 0.438 and 0.715 in the "isolation" dimension, and between 0.592 and 0.774 in the "limitations" dimension. All item-total correlations were above 0.30. When it was removed, there was no item that significantly increased the Cronbach's alpha value. There was no need to extract items from the scale.

Explanatory factor analysis factor loadings are included in Tables 4 and 5. Accordingly, factor loadings of the Scale for the 8-12 age group were between 0.635 and 0.830 in the "negative emotions" dimension, between 0.690 and 0.782 in the "school dimension," and between 0.731 and 0.782 in the "enjoyment" dimension. In the 13-18 age group, factor loadings were between 0.508 and 0.655 in the "social" dimension, between 0.603 and 0.786 in the "uncertainty" dimension, between 0.515 and 0.773 in the "isolation" dimension, and between 0.653 and 0.728 in the "limitations dimension." Since there was no item with a factor loading of less than 0.40, no item was removed from the scale and the original items of the scale were preserved.

Table 6 contains the results of EFA and CFA for age groups. For the 8-12 age group, according to the EFA, KMO value was 0.698 and Bartlett's sphericity test result was significant ($P < .001$). The total variance explained was 75.8%.

Table 1. Descriptive Characteristics of Participants

	Group					
	8-12 years (n = 81)		13-18 years (n = 111)		Total	
Age (years)						
Mean ± SD	10.3 ± 1.4		15.3 ± 1.6		13.2 ± 2.9	
Median (min-max)	10.2 (8.0-12.9)		14.8 (13.0-17.9)		13.3 (8.0-17.9)	
Age at diagnosis (years)						
Mean ± SD	6.7 ± 3.0		9.9 ± 3.9		8.6 ± 3.9	
Median (min-max)	7.8 (0.7-10.2)		10.0 (0.8-17.9)		8.9 (0.7-17.9)	
Disease duration (years)						
Mean ± SD	3.6 ± 2.9		5.3 ± 3.8		4.6 ± 3.5	
Median (min-max)	2.5 (0.7-12.2)		4.8 (0.1-15.0)		3.6 (0.1-15.0)	
	n	%	*n*	%	*n*	%
Gender						
Female	57	70.4	69	62.2	126	65.6
Male	24	29.6	42	37.8	66	34.4
Celiac disease type						
Typical	15	20.8	15	14.7	30	17.2
Atypical	51	70.8	78	76.5	129	74.1
Silent	3	4.2	9	8.8	12	6.9
Potential	3	4.2	0	0.0	3	1.7
Current symptom						
No symptoms	51	73.9	69	74.2	120	74.1
Abdominal pain	9	13.0	12	12.9	21	13.0
Diarrhea	6	8.7	0	0.0	6	3.7
Nausea	0	0.0	3	3.2	3	1.9
Abdominal swelling	0	0.0	6	6.5	6	3.7
Other	3	4.3	3	3.2	6	3.7
Additional disease						
Yes	12	16.0	48	44.4	60	32.8
No	63	84.0	60	55.6	123	67.2

n, number; %, column percentage; SD, standard deviation.

Confirmatory factor analysis fit indicators showing fit to the original structure were X^2/df = 3.26, RMSEA = 0.068, CFI = 0.962, GFI = 0.963. For the 13-18 age group, according to the EFA, KMO value was 0.684 and Bartlett's sphericity test result was significant ($P < .001$). The total variance explained was 68.6%. Confirmatory factor analysis fit indicators were X^2/df = 3.78, RMSEA = 0.061, CFI = 0.961, GFI = 0.934. According to the results of the construct validity analysis, the sample size for both age groups was sufficient (KMO > 0.5), the correlations between variables were significant (Bartlett's test $P < .05$), RMSEA value (<0.08), and CFI and GFI values (>0.90) was found to be sufficient for the model to be compatible.

DISCUSSION

This study included 192 children, which aimed to translate, adapt, and validate the CDPQOL Scale in order to evaluate health-related quality of life in children aged 8-18 years with celiac disease. The average age of the 8-12 age group was 10.3 years, and the 13-18 age group was 15.3 years. The mean age at diagnosis was 6.7 years in the 8-12 age group and 9.9 years in the 13-18 age group.

Table 2. Descriptive Characteristics and Reliability Results of the 8-12 Age Group Items of the Scale

	Mean ± SD	Item-Total Correlation Coefficient	Cronbach's Alpha Value	Cronbach's Alpha Value When the Item Is Removed
Negative emotions dimension	9.53 ± 8.24		0.923	
A1	1.30 ± 1.66	0.764		0.913
A2	1.15 ± 1.44	0.600		0.928
A3	1.67 ± 1.55	0.899		0.897
A4	1.20 ± 1.21	0.870		0.903
A5	1.30 ± 1.16	0.765		0.913
A6	1.48 ± 1.41	0.748		0.913
A7	1.44 ± 1.46	0.738		0.914
School dimension	6.44 ± 5.47		0.877	
A8	1.48 ± 1.65	0.649		0.877
A9	1.78 ± 1.48	0.717		0.850
A10	1.78 ± 1.63	0.723		0.847
A11	1.41 ± 1.63	0.862		0.790
Enjoyment dimension	1.79 ± 2.35		0.740	
A12	1.09 ± 1.44	0.599		-
A13	0.70 ± 1.19	0.599		-
Total	17.77± 11.57		0.858	

SD, standard deviation.

The mean time spent with the disease was 3.6 years in the 8-12 age group and 5.3 years in the 13-18 age group. Also, 70.4% of the 8-12 age group and 62.2% of the 13-18 age group were girls. Both groups mostly had atypical celiac disease. Three quarters of the patients did not have any symptoms during the control. The frequency of additional diseases was 16.0% in the first group and 44.4% in the second group. In the original study of the scale,[9] the mean age was 9.8 years in the 8-12 age group and 15.1 years in the 13-18 age group. The mean age at diagnosis was 6.0 years in the 8-12 age group and 9.8 years in the 13-18 age group. The mean time spent with the disease was 3.9 years in the 8-12 age group and 5.3 years in the 13-18 age group.[9] As can be seen, the age, age at diagnosis, and duration of disease of the children included in both studies are similar. In the study of Jordan et al[9] 63% of the 8-12 age group and 45% of the 13-18 age group were girls. While female gender was higher in both groups in our study, males were more in the 13-18 age group in Jordan's study.[9] According to Jordan's study, the frequency of girls in our study was approximately 7% higher in the 8-12 age group and 17% higher in the 13-18 age group. This difference may be caused by the different patient populations, as well as the different methods of both studies, because, in our study, only children with celiac disease who came to the outpatient clinic for control were included, but the other study included children who were contacted via e-mail, fax, face-to-face communication through celiac disease support groups and pediatric gastroenterologists.

An important indicator of reliability in studies of adapting scales to other cultures is internal consistency. Cronbach's alpha coefficient is a measure of internal consistency in the scales with Likert-type items. The Cronbach's alpha coefficient varies between 0 and 1. A Cronbach's alpha coefficient of 0.60-0.80 indicates that the scale is quite reliable, and a value higher than 0.80 indicates that it is highly reliable.[11,12] The Cronbach's alpha coefficient is the indicator of the consistency of the items in the scale.[13] The Cronbach's alpha coefficient of the scale was 0.858 for the 8-12 age group and 0.886 for the 13-18 age group. Cronbach's alpha coefficient values we calculated showed that our scale is highly reliable. Cronbach's alpha coefficient was not included in the original study. Since this study was the first known adaptation of the original study, there was no literature data to compare it. However, the Cronbach's alpha coefficient values we

Table 3. Descriptive Characteristics and Reliability Results of the 13-18 Age Group Items of the Scale

	Mean ± SD	Item-Total Correlation Coefficient	Cronbach's Alpha Value	Cronbach's Alpha Value When the Item Is Removed
Social dimension	13.00 ± 7.21		0.866	
B1	1.32 ± 1.25	0.580		0.854
B2	1.45 ± 1.40	0.597		0.852
B3	1.92 ± 1.41	0.711		0.836
B4	1.94 ± 1.46	0.658		0.844
B5	2.17 ± 1.29	0.648		0.846
B6	1.84 ± 1.37	0.622		0.849
B7	2.35 ± 1.49	0.652		0.845
Uncertainty dimension	5.00 ± 3.86		0.843	
B8	1.56 ± 1.41	0.667		0.820
B9	1.78 ± 1.54	0.680		0.810
B10	1.67 ± 1.48	0.782		0.707
Isolation dimension	5.06 ± 4.03		0.776	
B11	1.17 ± 1.37	0.438		0.822
B12	1.06 ± 1.31	0.681		0.696
B13	1.39 ± 1.27	0.592		0.742
B14	1.44 ± 1.19	0.715		0.685
Limitations dimension	6.21 ± 3.38		0.829	
B15	1.98 ± 1.30	0.592		0.836
B16	2.34 ± 1.34	0.669		0.761
B17	1.89 ± 1.29	0.774		0.653
Total	29.28 ± 13.93		0.886	

SD, standard deviation.

found for both groups in our study show that the Turkish version of the scale is reliable.

Another way to evaluate the reliability of the scale is to look at item-total score correlations. An item-total score correlation coefficient of 0.30 and above is good for reliability. The fact that the item-total score correlation coefficient is below 0.30 makes us think that there is a problem with this item and this item can be removed from the scale. Before eliminating the items below this value, the effect of these items on the Cronbach's alpha coefficient is also examined.[14] In this study, the item-total score correlation coefficient of any item was not found below 0.30.

One of the methods available to test construct validity in scales is EFA. In this analysis, the KMO test result is required to be greater than 0.50. It has been reported that 0.50-0.60 value is bad, 0.60-0.70 value is weak, 0.70-0.80 value is medium, 0.80-0.90 value is good, and value above 0.90 is excellent.[10] Kaiser-Meyer-Olkin test indicates whether the sample size is sufficient. In this study, the KMO value was found to be 0.698 for the 8-12 age group and 0.684 for the 13-18 age group, and both values were within acceptable limits.

Another test result examined in the EFA is the Bartlett's test of sphericity. This test determines the factors at the significance level of $P < .05$. If the result of this test is $P > .05$, it means that the desired variance level could not be reached and it says that EFAcannot be performed.[15] In this study, Bartlett's tests of both age group scales were significant ($P < .001$).

In the EFA, it is recommended to exclude items with a factor loading below 0.40.[10] However, there are also those who accept 0.30 as a limit. It is stated that items with a factor loading of 0.70 and above explain the

Table 4. Explanatory Factor Analysis Factor Loadings of the 8-12 Age Group of the Scale

	Negative Emotions	School	Enjoyment
I feel bad that my family has to order special food for me.	0.707		
I feel different when I am with my family.	0.635		
I feel different when I'm at school.	0.823		
I get jealous when I can't eat what my friends eat.	0.830		
I get upset because I can't eat what my friends eat.	0.765		
I wish I was like everyone else.	0.680		
I feel like my friends think I'm different.	0.653		
I have trouble talking to my friends about my celiac disease.		0.751	
I have trouble eating with my friends at school.		0.717	
I have trouble enjoying school parties.		0.690	
I get annoyed when my classmates ask me about my food.		0.782	
I have trouble enjoying after-school activities.			0.731
I have trouble enjoying activities with friends.			0.782

scale structure well.[14] In this study, there were 3 factors explaining 75.8% of the total variance in the 8-12 age group and 4 factors explaining 68.6% of the total variance in the 13-18 age group. It is important for the scale to be single or multi-factor in EFA.[16] It is said that the total variance should be at least 30% in scales with a single factor and higher in multi-factor scales like ours.[17] In this case, we can say that our scales have sufficiently valid variance and the items are adequately related to the scale. The factor loadings of the items in the first group ranged from 0.64 to 0.83, and the factor loadings of the items in the second group ranged from 0.51 to 0.79, and

Table 5. Explanatory Factor Analysis Factor Loadings of the Scale for the 13-18 Age Group

	Social	Uncertainty	Isolation	Limitations
I feel bad when others forget that I have celiac disease.	0.508			
I get embarrassed when I am at restaurants.	0.602			
I feel like a burden when I go out to eat.	0.647			
I feel like no one understands me.	0.637			
I feel like a burden on others.	0.605			
I find it difficult to eat healthy.	0.534			
I feel bad that my food is more expensive.	0.655			
I get bored at having to go to the same restaurants.		0.717		
I believe that celiac disease will affect what college I choose.		0.603		
I find it harder to be on a gluten free diet as I get older.		0.786		
I find it hard to enjoy eating with my family members.			0.515	
I feel different when I am with my family.			0.634	
I feel different when I am at school.			0.592	
I get jealous when I can't eat what my friends eat.			0.773	
I avoid going to parties or events.				0.653
I dislike having to bring my own food when I go out.				0.687
I get nervous when I go to a friend's house.				0.728

Table 6. Results of Explanatory and Confirmatory Factor Analysis of the Scale

		8-12 Years	13-18 Years
Explanatory factor analysis results	KMO	0.698	0.684
	Bartlett's test of sphericity	<0.001	<0.001
	Cumulative explained variance percentage	75.8%	68.6%
Confirmatory factor analysis results for goodness of fit	Chi-square/degrees of freedom	3.26	3.78
	RMSEA	0.068	0.061
	CFI	0.962	0.961
	GFI	0.963	0.934

KMO, Kaiser-Meyer-Olkin measure of sampling adequacy; RMSEA, root mean square error of approximation; CFI, comparative fit index; GFI, goodness of fit index.

no item was removed from the scale since there were no items below 0.40. In the study of Jordan et al[9] who developed the scale, it was observed that the factor loadings varied between 0.45 and 0.86 in the 8-12 age group and between 0.36 and 0.88 in the 13-18 age group.

In this study, CFA was performed in the last step of validity analysis and fit values and factor loadings of this analysis were examined. In the literature, it is stated that CFI and GFI coefficients above 0.90 show good fit.[15,18] In terms of good fit, the RMSEA value is required to be less than 0.10 and the X^2/df value to be less than 2.0.[19] In another literature, it is stated that the X^2/df shows good fit up to 3 and below and sufficient fit up to 5.[20] RMSEA was 0.068 and X^2/df was 3.26 in the first group. In the second group, RMSEA was 0.061 and X^2/df was 3.78. While RMSEA values showed good fit in both age groups, our X2/df values were sufficient.

In the CFA, factor loadings are desired to be higher than 0.30.[18] In our study, the factor loadings of CFA were between 0.64 and 0.97 in the 8-12 age group and between 0.59 and 0.95 in the 13-18 age group.

CONCLUSION

Cronbach's alpha values for the total and dimensions in the 2 groups were above 0.70. Kaiser-Meyer-Olkin test values were above 0.5 in terms of sample size, Bartlett's tests were significant in terms of correlations between variables, RMSEA values were below 0.08 in terms of model fit, and CFI and GFI were above 0.95. As a result of the Turkish validity-reliability study of the CDPQOL Scale developed to measure the quality of life in children aged 8-18 years with celiac disease, the instrument met the language, construct validity, and reliability criteria and it was shown that it can be used in children with celiac disease. The items in the original of the scale were preserved, and no item was removed from the scale.

The main limitation of the study is that the sample of this study consists of patients enrolled in only one hospital. An important limitation of the study is the lack of known group validity analyses. In addition, test-retest analyses showing the invariance of the form over time were not performed. According to the results obtained from the study planned and implemented in order to include the Pediatric Quality of Life Scale for Celiac Disease to Turkish, it has been determined that the validity and reliability of this scale have been ensured and it can be used in children with celiac disease in our country, and it is recommended to use this scale as a data collection tool in determining the quality of life of children with celiac disease aged 8-18 years.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethical Committee of the Ankara University Faculty of Medicine, numbered as 09-696-19, dated May 13, 2019.

Informed Consent: Informed consent forms were obtained from all patients and their parents.

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