

Reliability and Validity of the Turkish Version of Impact of Weight on Quality of Life for Kids

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What is already known about this topic?

- The *Impact of Weight on Quality of Life—Kids (IWQOL-Kids)* is a self-reported weight-related quality of life (QOL) measure that has been validated for children and adolescents. *IWQOL-Kids* does not have a Turkish version.

What this study adds on this topic?

- This study provides the first translation of a Turkish version of the *IWQOL-Kids*. It looks at the validity and reliability of *IWQOL-Kids*, as well as the usability of the Turkish version for assessing the QOL, as it relates to weight for Turkish adolescents between the ages of 11 and 18.

ABSTRACT

Objective: The Impact of Weight on Quality of Life—Kids is a self-reported weight-related quality of life measure that has been validated for children and adolescents aged between 11 and 19. Impact of Weight on Quality of Life—Kids does not have a Turkish version. The aim of this study was to explore the reliability and validity of the Impact of Weight on Quality of Life—Kids in Turkish.

Materials and Methods: The Impact of Weight on Quality of Life—Kids was translated into Turkish using Mapi Research Institute's suggested international translation technique. The psychometric evaluation included test-retest reliability, internal consistency, discriminant validity, concurrent validity, exploratory factor analysis, and confirmatory factor analysis.

Results: For the total score, the internal consistency of the scale (Cronbach's alpha coefficient) was 0.93. The item-total score correlation coefficients ranged from 0.178 to 0.785. The test-retest coefficients were found to be 0.94 for the total score and the subscales ranged from 0.66 to 0.89 after 2 weeks. Discriminant validity analysis demonstrated that the instrument differentiated well between the obese and non-obese samples. Five variables were discovered via factor analysis that explained 66.9% of the total variation. The chi-square/degree of freedom ratio value was 3.535, the comparative fit index value was 0.834, and the value of root mean square error of approximation was 0.10, as determined by confirmatory factor analysis.

Conclusion: Our results demonstrated the adequate reliability and validity of the Impact of Weight on Quality of Life—Kids, suggesting that this scale is a useful tool for screening Turkish children and adolescents for weight-related quality of life.

Keywords: Children, adolescents, reliability, validity, weight-related quality of life

INTRODUCTION

Childhood and adolescent obesity is a serious public health issue with its increasing prevalence and in the worldwide. In Turkey, there are no data on the prevalence of pediatric obesity across the country, although regional statistics show that the prevalence ranges between 2% and 8.4%.¹ In another study conducted among children in the 14-15 age group in Turkey, it was found that obesity prevalence was 12.8%, the prevalence of being overweight (OW) was also 26.1%, and obese (OB) children and adolescents expressed more weight-related physical and mental health issues compared to their normal-weight peers.² Excess weight leads to significant health problems such as diabetes and cardiovascular diseases. Additionally, the psychosocial implications of childhood obesity are one of the most prominent repercussions.³⁻⁶ Children and adolescents with OW often suffer from negative self-evaluation, poor self-esteem, depression and anxiety symptoms, are frequently the targets of bullying and

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teasing, and face social stigma.⁷⁻¹⁰ These psychological aspects affect quality of life (QOL).¹¹ Many research studies have been shown throughout the previous decade that obesity causes a significant decrease in QOL among children and adolescents who are overweight/obese (OW/OB).^{8,11-19}

Quality of life has been defined as “a comprehensive concept that intricately combines individuals’ physical health, psychological states, levels of independence, social relations, personal beliefs, and relationships with salient features of the environment.”²⁰ The influence of health or disease on physical, mental, and social well-being from the patient’s perspective is characterized as health-related quality of life (HRQOL).²¹ It is important to know the HRQOL of the patient before and after treatment in order to assess the efficacy of medical interventions and side effects, to guide health policies, and to conduct medical research. There are 2 types of HRQOL assessments: generic and condition-specific assessments. Generic measures of pediatric HRQOL, such as the Pediatric Quality of Life Inventory’s (PedsQL) general core scales,²² include objects that are not specific to anything in particular, evaluate outcomes in a wide variety of settings, measure general well being, and enable cross-sectional comparisons. Since the information provided by generic instruments may not be specific enough to address the specific QOL difficulties associated with a specific condition, it has become important to develop condition-specific measures. The domains are the focus of condition-specific measures, characteristics, and concerns that are unique to a specific disease or condition.²³ Generic measures can be used for both sick and healthy children/adolescents, and therefore, in community health studies with large samples. General measurements lack uniqueness for a specific group due to their generality, and therefore, it may not be correct to assess the QOL in a particular population. Generic quality of life scales (QLSs) have low sensitivity, are generally lengthy, and reflect small changes in children/adolescents compared to the condition-specific QLSs.²⁴ Condition-specific QLSs are valid only in the assessment of a specific disease, which increases the internal validity, sensitivity, and specificity of the scale.²⁴ Condition-specific measurements place a greater emphasis on symptoms and elements of functioning that are unique to a disease or condition. Therefore, these are more suitable for comparing different treatment modalities, evaluating treatment approaches, and comparing the effectiveness and side effects of different treatments.²³⁻²⁵ These are the advantages of condition-specific QLSs compared to generic QLSs.

Obese adolescents reported having a worse general HRQOL than those with asthma or atopic dermatitis²⁶ and normal-weight peers in community samples taken from the general population.^{13,27} These findings show that OW and obesity have a significant impact on HRQOL in children and adolescents. Nonetheless, there are some limitations of generic HRQOL measurements in pediatric obesity. For example, generic measures reveal differences in only some domains of HRQOL between different body mass index (BMI) groups. Swallen et al¹³ found differences that were statistically significant between BMI groups in terms of general health and functional limitations, but not in psychosocial domains such as school/social functionality, self-esteem, and depression. Williams et al²⁷ discovered differences

in physical and social domains, but not in school or emotional domains, between BMI groups. Moreover, a child with obesity may report problems in perception of QOL due to problems not related to body weight (e.g., diseases such as chronic type I diabetes, acute symptoms such as stomach pain).²⁸

All these data from the literature highlight the importance of using weight-specific HRQOL in pediatric obesity. Previous research has found that weight-specific HRQOL is more sensitive to the physical and psychological effects of obesity, and may be more responsive to weight loss following therapy than general HRQOL.^{17,29} Therefore, using a weight-related QOL scale can assist healthcare providers in gaining a better understanding of the effects of obesity/OW on children’s QOL. As the first weight-related scale in the World QOL measure for youth, IWQOL-Kids has been proven to be an important tool for assessing weight-related QOL for 11- 18 years old children and adolescents.³⁰ The IWQOL-Kids is sensitive to differences in BMI categories and between clinical and community samples, as well as being responsive to weight loss/social support intervention. Although there is an increasing interest in evaluating the HRQOL of children and adolescents with obesity and there are many studies on this subject, there is no Turkish version of the weight-specific QOL. The purpose of this study was to see whether the Turkish version of IWQOL-Kids is reliable and valid.

MATERIALS AND METHODS

Participants

The sample size required for the multivariate study of the validity of scales, such as factor analysis, has been described in the literature in varied quantities and with differing opinions. One of the most typical recommendations in this regard is that the sample size should be at least 5 times or even 10 times greater than the number of variants or items.³¹ There are 27 items in the IWQOL-Kids. For this purpose, we determined that there should be at least 135 subjects in the study. The research was carried out with a total of 233 participants between the ages of 11 and 18 years. In order to determine whether the scale could distinguish the general sample from the clinical sample, the study included both a clinical sample of 112 OW/OB children admitted to the pediatric endocrine outpatient clinic and a general sample of 121 non-OW healthy volunteers who were contacted outside the hospital setting and completed the questionnaires online. The criteria for the inclusion in the study sample were an age between 11 and 18 years and an adequate cognitive capacity to follow research instructions and complete the scale. Children with developmental disabilities, mental disorders, and physical illness were excluded from the study.

Turkish IWQOL-Kids Translation Process

To translate the English version of IWQOL-Kids into Turkish, we used an internationally acknowledged translation approach provided by the Mapi Research Institute. First, 2 researchers who were fluent in both languages independently translated the original IWQOL-Kids questionnaire from English into Turkish. Second, the study group examined, updated, and compared each question from the 2 Turkish versions to generate the Turkish version of IWQOL-Kids. Third, the reconciled Turkish translation was then back-translated into the original

language (English) by a linguist who was unfamiliar with the English version of IWQOL-Kids. Dr. Kolotkin examined the back-translated version and compared it to the original scale to ensure that the concepts it contained were consistent. The scale's text was produced after receiving the required confirmation. The Turkish version of the IWQOL-Kids was administered to 10 children and adolescents (11-18 years old; 5 female, 5 male) to assess the instructions and each of the 27 components for clarity. Participants completed the IWQOL-Kids in Turkish, and then were requested to interpret the instructions in their own terms, and what the items and response choices meant to them. Interviews with cognitive debriefers revealed that all participants accurately understood the instructions and could explain each item in the original English context. There was no question which the study population thought was unclear or unintelligible. After all these linguistic validation processes, the Turkish version of IWQOL-Kids was finalized and used in the present study.

Anthropometric Measures and Classification

Overweight and OB individuals' body weights and heights were measured by a pediatric endocrinologist using calibrated scales and stadiometers. The height and weight of all non-OW healthy volunteers were recorded according to their verbal reports. Weight (in kilograms) divided by height (in meters) squared was used to compute the BMI. Obesity was defined as a BMI of 95th percentile (P) or higher, BMI the 85th P for age and sex was used to define OW.³² Children and adolescents were classified as non-OW using Neyzi's BMI for age growth charts (< BMI 85th P), OW or OB.³³

Instruments for Evaluation Form of Sociodemographic Data

The researchers devised a sociodemographic data form to collect personal characteristics from the study group. The questionnaire asked about the subject's age, gender, weight, and height, as well as whether or not the subject had a physical or mental illness, the parents' educational level, whether or not they worked, and the family structure. The children's and parents' statements were believed to be accurate.

The Impact of Weight on Quality of Life—Kids

This 27-item self-report scale was created by Kolotkin et al in 2006 to examine aspects of weight-related QOL in children and adolescents aged 11-19 years old.³⁰ All items were written with the phrase "because of my weight," (e.g., "I avoid gazing at myself in mirrors or on photographs because of my weight."), to orient the answers to be weight-specific.³⁴ The IWQOL-Lite and the IWQOL were used to create the items,³⁴⁻³⁷ both of which assess weight-related QOL in adults. The impact of weight on quality of life in children is measured across 4 domains: physical comfort (6 items), body esteem (9 items), social life (6 items), and family relations (6 items). With internal consistency values ranging from 0.88 to 0.95 for subscales and 0.96 for the total score, the instrument exhibits high psychometric qualities.³⁰ It additionally discriminates among weight status groups, and is responsive to weight change. The alternatives for responses varied from "always true"¹ to "never true."⁵ Items were pilot-tested for readability with older children and adolescents at 1 site (Cincinnati Children's Hospital Medical Center), and the wording was subsequently modified. The IWQOL-Kids total and scores on the subscales range from 0 to 100, with higher scores indicating improved weight-related QOL.

Pediatric Quality-of-Life Inventory

The Pediatric Quality-of-Life Inventory (PedsQL) was used to assess the generic HRQOL, which consists of 23 items divided into 4 subscales: physical (8 items), emotional (5 items), social (5 items), and school (5 items). The PedsQL is a generic HRQOL self-report measure including scales for children (ages 8-12) and adolescents (ages 13-18).²² Using a 5-point response-scale format, children rated how often the item had been a problem for them in the previous month. Scales are standardized, and scores range from 0 to 100, with higher scores representing improved HRQOL. The total PedsQL score was calculated by dividing the total number of items answered by the total number of items answered.²² The validity and reliability for the Turkish version of the PedsQL for adolescents (ages 8-12 and 13-18) was confirmed by Memik et al.³⁸

Disclosing Ethical Standards

This study was carried out in accordance with the Declaration of Helsinki, and all methods involving the study participants were authorized by the Manisa Celal Bayar University Ethics Committee (20.478.486/604). The children included in the study and their families were made aware of the research topic and a written informed voluntary consent form was acquired from both the participants and their families. Written permission was obtained from Dr Ronette L Kolotkin to conduct the Turkish investigation of the reliability and validity of the IWQOL-Kids for children and adolescents between the ages of 11 and 18.

Statistical Analysis

The study data were analyzed using the Statistical Package for Social Sciences, version 15.0 software (SPSS Inc.; Chicago, IL, USA). The level of significance was determined to be $P \leq .05$ within a 95% CI.

The reliability of the Turkish version of IWQOL-Kids was assessed by internal consistency and test-retest reliability. Internal consistency was analyzed by calculating Cronbach's alpha coefficient, for which a value >0.7 is considered acceptable. The test-retest reliability was evaluated after administering the scale again to 43 healthy volunteers 2 weeks after the first use, and calculating the correlation coefficient between the 2 administrations; a value >0.7 was considered to indicate good reliability. Convergent validity was considered via Pearson correlation coefficients with PedsQL. The *t*-test was used to determine whether the scores of the Turkish version of IWQOL-Kids could discriminate among the BMI groups. For the construct validity of the scale, exploratory factor analysis (EFA) was performed using all data of the study groups. To control sampling adequacy, Kaiser-Meyer-Olkin test and Bartlett's test were used. Exploratory factor analysis was done with the principal component method using varimax rotation; factors with an eigenvalue of 1 or above were included in the evaluation. Among the factor constructs, items with factor loads of 0.4 and above were included in the analysis. The structure resulting from the EFA was compared with the original dimensional structure of the scale. In addition, construct validity was analyzed by confirmatory factor analysis (CFA) and different types of goodness-of-fit indices were used (chi-square/degree of freedom ratio (CMIN/DF), root mean square error of approximation (RMSEA), and comparative fit index (CFI)).

RESULTS

The research was carried out with 112 patients who were OB and OW and 121 healthy volunteers. The final sample included 233 subjects. Between the 2 groups, there were no significant differences with respect to gender distribution, the mean age of participants, and parental education level. Body mass index, BMI standard deviation score (SDS), and BMI P were significantly higher in the OW/OB group as expected. Table 1 shows the study groups' weight status and other sociodemographic characteristics.

Reliability Analysis

Cronbach's alpha consistency coefficient was calculated and found to be 0.93 for the total score of IWQOL-Kids in the reliability analyses. Cronbach's alpha values were 0.73 for physical comfort, 0.94 for body esteem, 0.87 for social life, and 0.83 for family relations. Table 2 shows the Cronbach's alpha for each item. Correlation coefficients between item and overall score ranged from 0.178 to 0.785. The correlation coefficient of the item-total scale score of item 3 in the physical comfort subscale and item 24 in the family relations subscale were below 0.20.

Test-retest reliability was evaluated in 43 volunteers in whom the scale was applied twice with an interval of 2 weeks. The correlation coefficients between the 2 administrations were found to be 0.94 ($P < .001$) for the overall score, 0.85 ($P < .001$) for the physical comfort subscale, 0.89 ($P < .001$) for the body esteem subscale, 0.72 ($P < .001$) for the social life subscale, and 0.66 ($P < .001$) for the family relations subscale (Table 2).

Validity Analysis

The IWQOL-Kids and PedsQL were applied for the concurrent validity analysis. The correlation coefficient between the total scores of the 2 scales was found to be statistically significant ($r = 0.611$). Relationships between IWQOL-Kids total and subscale scores and PedsQL total score are presented in Table 3.

The IWQOL-Kids total score and subscale scores were compared with Student's *t*-test to evaluate the IWQOL-Kids' discrimination between obese individuals and healthy volunteers. The differences were found to be significant between the OW/

Table 2. Cronbach's Alpha Coefficient and Test-Retest Correlation Coefficient Values of Total and Subscales of IWQOL-Kids

	Cronbach's Alpha Coefficient	Test-Retest Correlation Coefficient
IWQOL-Kids Physical comfort	0.73	$r = 0.85$ $P < .001$
IWQOL-Kids Body Esteem	0.94	$r = 0.89$ $P < .001$
IWQOL-Kids Social Life	0.87	$r = 0.72$ $P < .001$
IWQOL-Kids Family Relations	0.83	$r = 0.66$ $P < .01$
IWQOL-Kids Total	0.93	$R = 0.94$ $P < .001$

r, Pearson's correlation coefficient; IWQOL-Kids, Impact of Weight on Quality of Life-Kids.

Table 3. Pearson's Correlation Coefficients Between IWQOL-Kids and PedsQL

	PedsQL Total Score
IWQOL-Kids Physical comfort score	$r = 0.541$ $P < .001$
IWQOL-Kids Body esteem score	$r = 0.547$ $P < .001$
IWQOL-Kids Social life score	$r = 0.530$ $P < .001$
IWQOL-Kids Family relations score	$r = 0.273$ $P < .001$
IWQOL-Kids Total score	$r = 0.611$ $P < .001$

r, Pearson's correlation coefficient.
IWQOL-Kids, Impact of Weight on Quality of Life-Kids; PedsQL, Pediatric Quality of Life Inventory.

OB and healthy volunteer groups for all the subscale scores as well as the overall score, the OW/OB group reflecting a decline in performance ($P = .007$ for the family relations scores, $P < .001$ for the other scores). Differences in the IWQOL-Kids mean scores and the PedsQL total score by BMI groups (non-overweight and OW/OB) were shown in Table 4.

The Kaiser-Meyer-Olkin test was used to ensure that the sample group was adequate, and the results showed a coefficient value of 0.882. The chi-square result of Bartlett's test was calculated as 4355.88 ($P < .001$). As a result, the sample group was determined to be sufficient for factor analysis. When using factor analysis, 5 factors that explained 66.9% of the variance in total were obtained. Table 5 shows the factor loadings.

To determine the congruity of the scale construct, confirmatory factor analysis (CFA) was performed. When all items in the scale were included, it was observed that they did not comply with the structure. CFA was reapplied without including items with an item-total score correlation coefficient of less than 0.2 (items 3-24 and 27). The CMIN/DF value was 3.535, the CFI value was 0.834, and the RMSEA value was 0.10, as determined by CFA, and it was found to be weakly compatible.

Table 1. Demographic Characteristics of the Samples

	Overweight and Obese Group, n = 112	Non-Overweight Group, n = 121	P
Age, years, Mean (SD)	14.6 (1.8)	14.1 (1.9)	.053*
Gender			.725**
Female (%)	71(36.6)	74 (38.8)	
Male (%)	41 (63.4)	47 (61.2)	
BMI, kg/m ² , Mean (SD)	29.9 (4.6)	19.5 (2.5)	<.001*
BMI P, Mean (SD)	96.4 (9.7)	38.8 (27.4)	<.001*
BMI SDS, Mean (SD)	3.05 (7.83)	-0.37(1.12)	<.001*

*Student's *t*-test, **Chi-square test.
SD, standard deviation; BMI, body mass index; P, percentile; SDS, standard deviation score.

Table 4. Mean IWQOL-Kids and PedsQL Scores by the Body Mass Index Groups

	Overweight and Obese Group, n =112, Mean (SD)	Non-Overweight Group, n =121, Mean (SD)	P*
IWQOL-Kids Physical comfort score	86.3 (14.4)	98.6 (4.6)	< .001
IWQOL-Kids Body esteem score	72.8 (22.1)	95.6 (10.9)	< .001
IWQOL-Kids Social life score	91.4 (13.2)	98.5 (5.7)	< .001
IWQOL-Kids Family relations score	93.8 (10.9)	97.4 (8.8)	.007
IWQOL-Kids Total score	84.6 (12.5)	97.3 (6.1)	< .001
PedsQL Total score	80.2 (11.7)	86.9 (9.5)	< .001

*Student's t test.
IWQOL-Kids, Impact of Weight on Quality of Life—Kids; PedsQL, Pediatric Quality of Life Inventory, SD, standard deviation.

DISCUSSION

The IWQOL-Kids is a validated self-report weight-related QOL measure for kids and adolescents aged 11 to 19. The IWQOL-Kids possesses exceptional psychometric characteristics.³⁰ Previously, it has been translated into a number of languages, including Dutch, Finnish, Hebrew, Korean, Malay, Mandarin, Portuguese, and Spanish. However, only the Dutch and Mandarin versions have been validated to date.^{39,40} This study has adapted the IWQOL-Kids in the Turkish translation, additionally assessed its validity and reliability, as well as the Turkish version's usability for assessing the weight-related QOL for Turkish adolescents aged between 11 and 18 years. The analysis

results of this study demonstrate that the scale has strong psychometric properties and distinguishes between OW/OB and normal-weight groups.

The research, which led to the creation of the instrument for children and adolescents with obesity, found a Cronbach's alpha coefficient of 0.96 for overall score and 0.91 for physical comfort, 0.95 for body esteem, 0.92 for social life, and 0.88 for family relations subscale scores.³⁰ In the study of the Chinese version of IWQOL-Kids, physical comfort received an α value of 0.891, body esteem received an α value of 0.900, social life received an α value of 0.927, family relations received an α value of 0.897, and the total score received

Table 5. Exploratory Factor Loadings

Items	IWQOL-Kids Subscales				
	Physical Comfort	Body Esteem	Social Life	Family Relations	Additional Factor
1. Avoid stairs	0.642	0.401			
2. Hard to bend over	0.693				
3. Hard to move around	0.424				
4. Hard to fit in public seats	0.607				
5. Knees or ankles hurt	0.717				
6. Hard to cross legs	0.489	0.483			
7. Ashamed of body		0.847			
8. Don't like myself		0.848			
9. Avoid mirrors		0.805			
10. Hard believing compliments		0.840			
11. Lack self-confidence		0.740			
12. Avoid shorts/bathing suits		0.795			
13. Difficult to buy clothing		0.734			
14. Dislike undressing		0.794			
15. Embarrassed to try out for sports		0.635			
16. People make fun		0.506			
17. People talk behind my back		0.439			
18. People avoid me			0.794		
19. People stare at me		0.507	0.656		
20. Trouble making friends			0.847		
21. People think I am not smart			0.677		
22. Family treats me differently				0.751	
23. Family talks behind my back				0.761	
24. Family rejects me				0.439	0.784
25. Parents not proud of me				0.701	
26. Family makes fun of me				0.751	
27. Family not seen with me				0.391	0.820

Exploratory factor analysis: Factor loadings >0.40 are reported. Bold values indicate maximum factor loadings.
IWQOL-Kids; Impact of Weight on Quality of Life—Kids.

an α value of 0.956.⁴⁰ The closer Cronbach's alpha value is to 1, the more reliable the test is deemed in psychometric evaluations.⁴¹ Cronbach's alpha for internal consistency was 0.93 in our study for total score. This is a high value indicating that the scale structure can accurately represent the whole. Cronbach's alpha values were 0.73 for the physical comfort, 0.94 for the body esteem, 0.87 for social life, and 0.83 for family relations. According to the literature, in order to use a measurement device, the internal consistency coefficient must be 0.70 and above.⁴² Although Cronbach's alpha value is slightly lower for physical comfort, it is acceptable. Items evaluating physical comfort in IWQOL-Kids were adapted from adult studies.³⁰ In this age group, it can be thought that physical comfort is not affected as much as in adult OB individuals due to obesity, therefore a lower Cronbach's alpha value may have been obtained. Since our study's goal was to translate IWQOL-Kids into Turkish and to study its validity and reliability, we did not plan to examine whether there was an age-specific difference in the subscale evaluations. A Chinese study discovered that children's social lives are influenced by their age, as for adolescents with OW/OB, with older individuals reporting lower scores.⁴⁰ Similarly, we think that the negative effect of weight on physical comfort will be more pronounced with advanced age. However, future studies should examine whether the subscales of IWQOL-Kids are affected by age, and our hypothesis should be confirmed with further studies. As a result, the fact that the total and subscale Cronbach's alpha coefficients were over 0.70 in our study shows that the Turkish version of IWQOL-Kids is reliable.

In our study, the correlation coefficient of item-total scale score of item 3 ("It is difficult for me to move about due to my weight.") in the physical comfort subscale, and the item-total scale score of item 24 ("One or more members of my family reject me because of my weight.") in the family relations subscale was found to be below 0.20. Moving around does not seem physically uncomfortable for our sample with OW/OB. Family rejection just because of weight is very radical and out of the question in our culture. Since these items provide valuable information to the scale, we do not remove these items from the scale in order to maintain the integrity. However, we should take into account the limitations of these items while evaluating the scale results. Except for these 2 items, item-total correlation coefficients higher than 0.20 confirm the reliability of the scale's structure.⁴¹

Kolotkin et al³⁰ conducted the original study. The test-retest reliability was not performed and this was stated as a limitation of the study. In the Chinese study, the coefficients of intra-class correlation were determined to be 0.937 for the total score, 0.903 for physical comfort, 0.854 for body esteem, 0.865 for social life, and 0.847 for family relations.⁴⁰ Test-retest analysis in our study resulted in a correlation coefficient $r = 0.94$ for the total score, 0.85 for the physical comfort subscale, 0.89 for the body esteem subscale, 0.72 for the social life subscale, and 0.66 for the family relations subscale. Adolescence is a period of variable behavior and perspectives, and due to this variability, different emotions are experienced and more frequent problems with the family may occur. The value of $r = 0.66$ obtained for the family relations subscale in this study can be considered moderately valid. This result may be due to the fact that the

period of the study coincided with the Coronavirus disease 2019 (COVID-19) pandemic and the communication problems of the adolescents with the other family members were intense during this period. The evaluation of family relationships may be variable depending on the specific periods experienced. However, the overall results of the study confirm that the scale is reliable.

We looked at the correlation for concurrent validity analysis of IWQOL-Kids with PedsQL. In our study, a correlation coefficient of 0.611 has been found between the total scores of the 2 scales. This value was found to be 0.76 in the original study³⁰ and 0.45 in the Chinese study.⁴⁰ Pearson's correlation coefficients between PedsQL overall score and IWQOL-Kids subscale scores were positive and ranged from 0.27 to 0.54. These ranged from 0.40 to 0.72 in the original study³⁰ and 0.33 to 0.43 in the Chinese study.⁴⁰ In our study, the correlation coefficient between IWQOL-Kids family relationship score and PedsQL total score was found to be 0.273, which was a low value. This value was found to be 0.40 in the original article,³⁰ and 0.33 in the study conducted by the Chinese.⁴⁰ Similar to our results, in both studies, family relations scores showed the lowest correlation when compared to other subscales. The PedsQL does not have a specific subscale for family relationships, which may be a reason explaining the low correlation coefficient associated with this item. On the other hand, our low value may still be due to cultural differences. In our society, rejection from the family, exclusion of the child, and evaluation of the child as ugly are not a matter of question due to obesity. The concurrent validity analysis results of our study indicates that the scale could be utilized as a useful tool.

Previous studies reported significantly higher mean scores of IWQOL-Kids in healthy groups than in OB groups.^{30,40} In our study, the mean scores were statistically different between OW/OB and non-OB groups, with higher mean values in the normal-weight group than in the OW/OB group. In our study, the mean values of OW/OB and normal-weight groups obtained were closer to each other in comparison to previous studies. The reason behind this is that we did not evaluate the groups according to the severity of obesity and we included both children who were OW and OB in the same group. This can be considered as a limitation of our study. However, the scale was still distinctive for OB and non-OB groups.

In the original study of the scale, physical comfort, body esteem, social life, and family relations were identified as 4 characteristics that accounted for 71% of the variance.³⁰ In the study conducted by the Chinese, factor loadings were observed similar to the original article.⁴⁰ In our study, in addition to these 4 factors, we also found factor loading in a different domain for items 24 and 27. Items 24 (Family rejects me) and 27 (Family not seen with me) were loaded in a different field rather than family relations. The definition of family relationships in the original study suggests that stigmatization, isolation, and shame are present in the familial relationships of OB children. Items 24 and 27 can be considered as representing the "exclusion" in this definition. However, Turkish children and adolescents do not think they are excluded from their families because of their weight. Cultural differences may play a role in that result; in general, Turkish families do not bother because of their children's weight, and having OW children can even

be regarded as something to be proud of, as an indication of better care. On the physical comfort scale, there are a number of items to consider and they evaluate a person's perception of how weight affects comfort and mobility in daily life. In our study, items 1 (difficulty climbing stairs) and 6 (difficulty crossing legs) were mainly loaded in physical comfort, as in the original article, but also loaded in body esteem. Adults with obesity are known to have major problems with these physical discomforts.^{34,43} These items have been adapted to children and were shown to be affected in children in the original study.³⁰ However, considering that children's capacity for effort and mobility are better than adults, their ability to climb stairs may not be affected as much as adults due to obesity. Therefore, their body esteem may be significantly affected as well as their physical comfort. Unlike the original article in our study, items 16 ("People make fun of me or ridicule me because of my weight.") and 17 ("People gossip about me behind my back because of my weight.") were loaded in the body esteem column instead of social life. The social relationships mentioned in these items seem primarily to be unaffected by weight. Body perception seems to be affected more negatively. Additionally, item 19 ("People stare at me because of my weight.") is mainly loaded in social life, as in the original article, but is also loaded in the body esteem column. It can be thought that relationships in social life have a great impact on body esteem.

Study Limitations

The present study has some limitations. The children with OW/OB included in the study were those who complained of obesity and were admitted to the hospital; so the study did not include children in the community sample who were OB but did not complain about their condition and did not need to apply to the hospital. While the height and weight measurements of children with OW/OB were made by the clinician, the self-reported height and weight of children with normal weight were evaluated. Lack of face-to-face interviews with children with normal weight and their online response to the forms can be considered as limitations. In addition, the results obtained in CFA can be considered as a limitation. Values of <5.00 for CMIN/DF, <0.1 for RMSEA and >0.85 for CFI were considered sufficient for the model to be accepted.^{44,45} Although CFA showed weak compatibility according to these values, the Turkish translation of IWQOL-Kids is a usable scale in daily practice because other validity and reliability analyses showed appropriate results with the criteria. Re-evaluation of CFA in a new sample to be made with study groups from different sociocultural levels, different geographical regions of the country and different degrees of obesity may make a positive contribution. Coincidence with the COVID-19 pandemic during the period in which the study was conducted may also have affected the results. Another limitation of the study was omitting the severity of the obesity in the OW/OB group.

CONCLUSION

In conclusion, the current study's findings confirmed that IWQOL-Kids is a valid and reliable tool. Our findings demonstrated the feasibility of the Turkish version of the IWQOL-Kids. Further clinical studies should focus on testing the responsiveness and reliability of the IWQOL-Kids in treatment follow-up and long-term monitoring of children and adolescents with obesity. The take-home message of this study is that the QOL of

children and adolescents with obesity is affected and IWQOL-Kids can be used to assess the QOL in the 11-18 age group in Turkey.

Ethics Committee Approval: This study was approved by Ethics committee of Manisa Celal Bayar University, (Approval No: 20.478.486/604).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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