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Turkish adaptation and validation of the Eating Disorders Examination Questionnaire – Short Parent Version (EDE-QS-P)

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Abstract

Background Eating disorders are complex psychiatric conditions characterized by intense concerns related to body image and weight. Adolescents and school-aged children are considered at risk due to their developmental characteristics. However, difficulties in recognizing and expressing symptoms within this age group often complicate the diagnostic process. Parent-reported assessment tools play a crucial role in monitoring eating behaviours and supporting early intervention. Therefore, cultural adaptation and psychometric evaluation of eating disorders scales designed for children and adolescents are essential for enhancing the effectiveness of early diagnosis. This study aims to evaluate the validity and reliability of the Turkish version of the Eating Disorders Examination Questionnaire – Short Parent Version (EDE-QS-P), which was developed to assess eating disorder symptoms in children and adolescents.

Method This cross-sectional validity and reliability study was conducted with a total of 516 participants from two schools located in the Aegean region of Türkiye. Data were collected through face-to-face interviews. The original scale, consists of 11 items, is answered using a 4-point Likert scale, and yields a total score ranging from 0 to 33. Data analysis included confirmatory factor analysis, content validity index (CVI), Cronbach's alpha coefficient, McDonald's omega coefficient, test–retest method, and split-half reliability method.

Results In the study, the mean total score of the scale was determined as 3.73 ± 5.79 . The CVI was found to be 0.99, and confirmatory factor analysis results indicated a good model fit ($RMSEA = 0.075$; $\chi^2/df = 4.902$; $CFI = 0.97$). In the reliability analysis, Cronbach's alpha coefficient was calculated as 0.882 and McDonald's omega as 0.891. Test–retest results showed no statistically significant difference ($p > 0.05$).

Conclusions The Turkish version of the scale was found to have valid and reliable internal consistency. The findings support that the Turkish version of the scale is an effective assessment tool for monitoring eating disorder symptoms in children and adolescents.

Keywords Adolescents, Eating disorders, School-aged children, Reliability, Validity

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Introduction

Eating disorders are multifaceted psychiatric conditions characterized by significant deviations in eating behaviours, often accompanied by intense concerns related to body image and weight. Their etiology is shaped by a complex interplay of genetic predisposition, individual psychological traits, family dynamics, and sociocultural factors [1]. These disorders commonly manifest through excessive preoccupation with food, unhealthy weight control behaviours, and body dissatisfaction [2].

Research has shown that adolescents and school-aged children are particularly vulnerable to eating disorders due to their developmental and psychosocial characteristics [3]. Recent studies indicate that eating disorders in children represent a significant global public health concern, with a worldwide prevalence of approximately 1%. Moreover, there has been a marked increase in referrals and diagnoses among children and adolescents, particularly following the COVID-19 pandemic [4, 5]. These global estimates provide an important context for interpreting country-specific findings, as international studies consistently show that the prevalence of eating disorder risk among adolescents substantially exceeds rates of clinically diagnosed eating disorders across different countries. A study conducted among high school students in Türkiye reported an eating disorders risk prevalence of 9.5% [6]. Among adolescent girls, physiological changes associated with puberty are noted to increase body dissatisfaction, leading to restrictive eating behaviours. It has been found that 33.6% of girls with normal body weight frequently engage in dieting, while 43% express a desire to be thinner. In recent years, an increasing prevalence of eating disorders among boys has also been reported [7]. Furthermore, parental attitudes, the idealization of thinness, and exposure to traumatic life events have been highlighted as factors that may elevate the risk [8].

Previous studies have emphasised that parents' attitudes and behaviours relating to eating may be associated with the development and continuation of eating disorder risk in children and adolescents, and that the approaches reported by parents offer a meaningful theoretical perspective in situations where family dynamics play a significant role in shaping children's eating behaviours [9, 10]. Previous research has shown that parents can observe behavioural indicators such as changes in meal patterns, restrictive eating behaviours and an excessive focus on body weight and shape. These observations may contribute to the assessment of eating disorder risk in children [9, 10]. In the Turkish context, parents play a central role in monitoring children's health and well-being and are often the primary decision-makers regarding healthcare

utilisation. Teachers are less commonly involved in mental health screening processes, and children and adolescents typically access health services through parental initiative. These contextual characteristics further support the suitability of parent-reported screening tools for the early identification of eating disorder risk in Türkiye [11]. Studies have shown that practices aimed at directing children's eating behaviours (e.g. restriction, pressure to eat and monitoring) adopted by parents are associated with children's eating behaviours. Furthermore, children tend to model their parents' attitudes and behaviours related to eating [12, 13]. These findings highlight the importance of incorporating parental perspectives into screening tools designed for the early detection of eating disorder risk in paediatric populations.

Considering the family context in the assessment of eating disorders in children and adolescents is important for ensuring a comprehensive clinical evaluation process. Children may have difficulty identifying their internal symptoms, and adolescents may tend to deny or hide their eating disorder symptoms, increasing the need for parent-reported tools in the assessment process [14–16].

Although several instruments are available to assess eating disorder symptoms in children and adolescents, many are self-report measures completed by the child, are relatively lengthy, or are primarily designed for diagnostic rather than screening purposes [9, 10, 17]. Moreover, parent-reported screening tools suitable for early identification in community and clinical settings remain limited, particularly in the Turkish context. The Eating Disorders Examination Questionnaire–Short Parent Version (EDE-QS-P) was therefore selected for adaptation due to its brief format, strong psychometric properties reported in the original study, and its focus on parent-reported assessment, which is particularly valuable given children's limited insight and adolescents' tendency to conceal symptoms. The EDE-QS-P is a brief screening tool for parents to use to assess their children's or adolescents' eating disorder symptoms. The scale has been used across various populations and settings. Although the original English version [17] has been translated into Arabic [18], to date no study has evaluated the psychometric properties of a Turkish version. Accordingly, the present study aims to address this gap by examining the validity and reliability of the Turkish version of the EDE-QS-P. Specifically, the study seeks to answer the following research questions:

1. Is the Turkish version of the EDE-QS-P a valid instrument?
2. Is the Turkish version of the EDE-QS-P a reliable instrument?

Materials and methods

Study design

The translation and cultural adaptation of the EDE-QS-P into Turkish followed the six-step methodology proposed by Hawkins and Osborne (2010) [19]: forward translation, back translation, synthesis, expert review, pre-test, and final field testing.

First, an independent certified translator conducted the forward translation from English to Turkish. This version was then back-translated into English by another certified translator. The original and back-translated versions were compared, and necessary revisions were made to ensure linguistic accuracy and cultural appropriateness. Following the translation steps, content validity was assessed by 15 experts holding doctoral degrees. Of these, six were from the field of nutrition and dietetics, four from public health, three from psychiatric nursing, and two from paediatric nursing. Experts were asked to evaluate each item in terms of content relevance, linguistic clarity, and cultural appropriateness for Turkish society. Using Davis' technique, the content validity index (CVI) was calculated, and all items were deemed appropriate; thus, no items were excluded [20, 21]. During the adaptation process, experts carefully reviewed all scale items, establishing equivalence between the original and Turkish versions in terms of their semantic, idiomatic, experiential and conceptual dimensions. Based on these opinions, minor linguistic adaptations were made to help parents understand the items more easily. For example, although there is a direct Turkish equivalent for the term 'laxative', the word 'purgative' was preferred as it is more commonly understood in everyday language. Similarly, despite an established Turkish counterpart existing for the term 'body shape', it was translated as 'appearance' as this was considered clearer and more accessible for parents. Additionally, the term 'compulsive' was translated as 'obsessive' to improve comprehension for the target population.

The preliminary scale pilot sample size was determined in accordance with the methodology established by [22]. The calculation of Cronbach's alpha was based on a targeted sample. The Cronbach's alpha value was 0.71 for test-retest. The significance level was set at 0.05 and the power at 80%. The initial requirement was to identify 24 subjects, with the provision of an additional non-response rate of 20% and final minimum required pilot sample size calculated at 30 subjects to ensure the pilot study remained sufficiently powered. Subsequently, the adapted draft was pre-tested with a group of 30 parents aged between 32 and 48, who were demographically similar to the target population. Participants provided feedback regarding the clarity and comprehensibility of the items. No revisions were deemed necessary based on the feedback. This pre-test was conducted to assess linguistic

clarity and cultural appropriateness of the items, rather than to perform psychometric analyses. Parents were also encouraged to comment on the cultural relevance of the items and their applicability to everyday family practices in Türkiye. Participants involved in the pre-test were not included in the final study sample. The Turkish version of the EDE-QS-P was finalized and prepared for large-scale validation and reliability testing [23, 24].

Sample size

The study population comprised students from two public schools located in a metropolitan area of İzmir, Türkiye ($n=1,502$). The schools were situated in an urban district characterised by lower socio-economic indicators, where nutritional problems have been reported. For scale adaptation studies, it is recommended to recruit at least 10 participants per item [21]. Therefore, a minimum of 110 participants was targeted, and data were collected from a total of 516 participants. A convenience sampling method, a type of non-probability sampling, was employed based on the voluntary participation of parents whose children were enrolled in the sampled schools. Inclusion criteria were voluntary participation, being 18 years of age or older, being a parent of a child aged 9–18 years, and having the child enrolled in one of the sampled schools. The exclusion criterion was incomplete responses to either the demographic information form or the scale [16].

Measures

Participants were informed about the study's purpose, and written informed consent was obtained. Data were collected face-to-face. Data collection tools included a demographic form (capturing parental age, gender, marital status, education level, occupation, monthly income, child's age, anthropometric measurements, and presence of eating disorder symptoms) and the EDE-QS-P. The original English version of the EDE-QS-P was developed in the United States. The scale consists of 11 items with a single-factor structure and is designed to assess eating disorder symptoms in children. Items are rated on a 4-point Likert scale ranging from 0 to 3. Total scores range from 0 to 33, with higher scores indicating greater risk for eating disorders. A score of 0 suggests low risk, while 33 indicates high risk [17, 25, 26]. In the original development study, convergent validity of the EDE-QS-P was examined using parallel measures, including the Eating Disorders Examination Questionnaire (EDE-Q), the Generalised Anxiety Disorder Questionnaire (GAD-7), and the Patient Health Questionnaire (PHQ-9) [17]. In the present study, parallel test procedures were not conducted, as the primary aim was to evaluate the validity and reliability of the Turkish version of the EDE-QS-P within the context of a psychometric adaptation.

Body weight was measured in a fasting state, wearing light clothing and no shoes, using a calibrated digital scale (Tanita BC-730) with ± 0.1 kg sensitivity. Height was measured without shoes, with the head aligned to the Frankfurt plane, using a fixed stadiometer with 0.1 cm precision [27]. Body Mass Index (BMI) was calculated as $[\text{weight (kg)}/\text{height}^2 (\text{m}^2)]$. Age-adjusted BMI and height z-scores were determined using the WHO AnthroPlus software [28]. According to WHO growth standards, BMI z-scores < -1 SD were classified as underweight; -1 SD to $+1$ SD as normal; $> +1$ SD to $< +2$ SD as overweight; and $\geq +2$ SD as obese [29].

Human ethics and consent to participate

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of İzmir Kâtip Çelebi University (Decision No: 0600, Date: 26.12.2023). Institutional permission was granted by the İzmir Provincial Directorate of National Education (Reference No: E-12018877-604.01.02-94696970). Informed consent was obtained from all participants prior to data collection. Authorization to use the EDE-QS-P was granted by the original developers via email. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical analysis

All analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 27.0 (SPSS Inc., IBM, Chicago, IL, USA). Descriptive statistics were calculated as frequencies and percentages for demographic variables [21]. The Kolmogorov–Smirnov test was used to assess normality; the data were found not to be normally distributed. Means, medians, and standard deviations were reported, and 95% confidence intervals (CIs) were used. Statistical significance was set at $p < 0.05$ [21, 30].

To assess the construct validity of the scale, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. Prior to factor analyses, item–total correlations were examined to evaluate the contribution of each item to the overall scale. Item–total correlation coefficients of 0.25 or higher were considered acceptable, and items with negative correlations were evaluated for potential removal [21, 25, 30, 31]. No items met the criteria for exclusion, and all items were retained for subsequent analyses.

An EFA was conducted to evaluate the scale's factor structure [31, 32]. The principal component analysis with orthogonal varimax rotation was employed for factor extraction. The sampling adequacy was evaluated via the Kaiser–Mayer–Olkin (KMO) test, while Bartlett's test of sphericity was utilized to verify that the correlation matrix was suitable for factorability [30, 31]. The CFA was performed using LISREL 8.8 (Scientific Software

International, Inc., Lincolnwood, IL, USA). Model fit was evaluated using multiple fit indices: chi-square (χ^2), degrees of freedom (df), χ^2/df ratio, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted GFI (AGFI), Normed Fit Index (NFI), Standardized Root Mean Square Residual (SRMR), and Non-Normed Fit Index (NNFI) [30, 33–35].

Reliability was assessed using Cronbach's alpha and McDonald's Omega. A threshold of ≥ 0.70 was considered acceptable for item reliability. Additionally, internal consistency was examined using Spearman correlation coefficients and the Guttman split-half method. Test–retest reliability was evaluated using the Wilcoxon signed-rank test [21, 30, 36, 37].

Results

Participant characteristics

Descriptive characteristics of the participants, including anthropometric data, information on children's eating disorders status, and treatment history, are presented in Table 1. The mean age of participating parents was 42.0 ± 6.00 years, and the mean age of the children was 13.0 ± 2.22 years. The majority of respondents were mothers (73.3%). In terms of education level, 43.4% of parents had completed high school, and 20.9% held a university degree. The most frequently reported occupations were homemakers (34.7%) and private sector employees (22.5%). Regarding household income–expenditure balance, 64.9% of participants reported that their income and expenses were approximately equal. Among the children, 56.4% were male, and 61.2% were attending secondary school. The mean number of siblings was 1.0 ± 0.89 , and 80.4% of the children lived in immediate families. The children's BMI was 20.67 ± 3.46 kg/m². The mean height and weight z-scores were 0.54 ± 1.00 and 0.32 ± 1.02 , respectively, while the mean BMI z-score was 0.52 ± 1.05 . A diagnosis of eating disorders was not present in 94.2% of the children, and 97.9% had not received any treatment related to eating disorders.

Validity analysis results

Content, construct, external, and concurrent validity of the scale were assessed.

Content validity

To evaluate the content validity of the Turkish version of the EDE-QS-P, which had previously undergone linguistic validation, expert opinions were obtained from 15 professionals. As a result of the analysis, the CVI was calculated as 0.99. This high value indicates that the items retained semantic integrity with the original scale and were deemed valid in terms of content. Agreement among expert evaluations was assessed using the Fleiss

Table 1 Descriptive characteristics, anthropometric data, and eating disorders status of the children ($n=516$)

Descriptive Characteristics	$\bar{X} \pm SD$	Min–Max
Parent age (years)	42.0 $\pm$ 6.00	25–79
Child age (years)	13.0 $\pm$ 2.22	10–18
Number of siblings	1.0 $\pm$ 0.89	0–5
	<i>n</i>	%
Parent type		
Mother	378	73.3
Father	131	25.4
Other	7	1.3
Parental education level		
Illiterate	5	1.0
Primary school	93	18.0
Secondary school	86	16.7
High school	224	43.4
University	108	20.9
Parental occupation		
Unemployed	215	41.7
Government employee	59	11.4
Self-employed	93	18.0
Retired	33	6.4
Private sector employee	116	22.5
Income status		
Income < Expenses	96	18.6
Income = Expenses	335	64.9
Income > Expenses	85	16.5
Child's gender		
Female	225	43.6
Male	291	56.4
School type		
Secondary school	316	61.2
High school	200	38.8
Family structure		
Immediate family	415	80.4
Extended family	81	15.7
Single-parent family	20	3.9
Presence of eating disorders		
None	486	94.2
Anorexia nervosa	1	0.2
Bulimia nervosa	2	0.4
Binge eating disorder	10	1.9
Avoidant/restrictive food intake disorder	8	1.6
Other specified feeding or eating disorders (OSFED)	9	1.7
Receiving treatment for an eating disorder		
Yes	11	2.1
No	505	97.9

Table 1 (continued)

	$\bar{X} \pm SD$	Min – Max (95% Confidence interval Lower– Upper)
Body Mass Index (BMI) (kg/m ²)	20.67 $\pm$ 3.46	12.98–39.18 (20.37–20.97)
Height percentile (cm)	65.08 $\pm$ 26.97	2.02–99.98 (62.47–67.47)
Height z-score	0.54 $\pm$ 1.00	-2.05–3.72 (0.44–0.62)
Weight percentile (cm)	58.27 $\pm$ 27.62	0.04–99.98 (55.87–60.83)
Weight z-score	0.32 $\pm$ 1.02	0.04–99.98 (-0.11–0.40)
BMI z-score	0.52 $\pm$ 1.05	-3.00–4.00 (0.42–0.62)

 $\bar{X}$ Mean, *SD* Standard deviation

Kappa coefficient ($K=0.663$; $p=0.03$). The consistency of the evaluations was found to be statistically meaningful level of consensus, indicating statistically substantial agreement [21, 38, 39].

Construct validity

To evaluate construct validity, EFA and CFA were performed.

Explanatory factor analysis Factor analysis was employed to reduce the observed variables into a more parsimonious set of factors, thereby facilitating a clearer interpretation of the research questions [31, 32]. In the study, the KMO value was calculated as 0.895, which is considered meritorious for analysis. Furthermore, the results of the Bartlett test were calculated as $\chi^2(516)=2483.775$, $p<0.001$. These results show that the data was highly suitable for factor analysis. The EFA factor loadings of the scale are shown in Table 4. For factor structure, the eigenvalues were 1 and over; the total variance explained for a single-factor solution was 58.20%. The mean factor loadings ranged from 0.578 to 0.795.

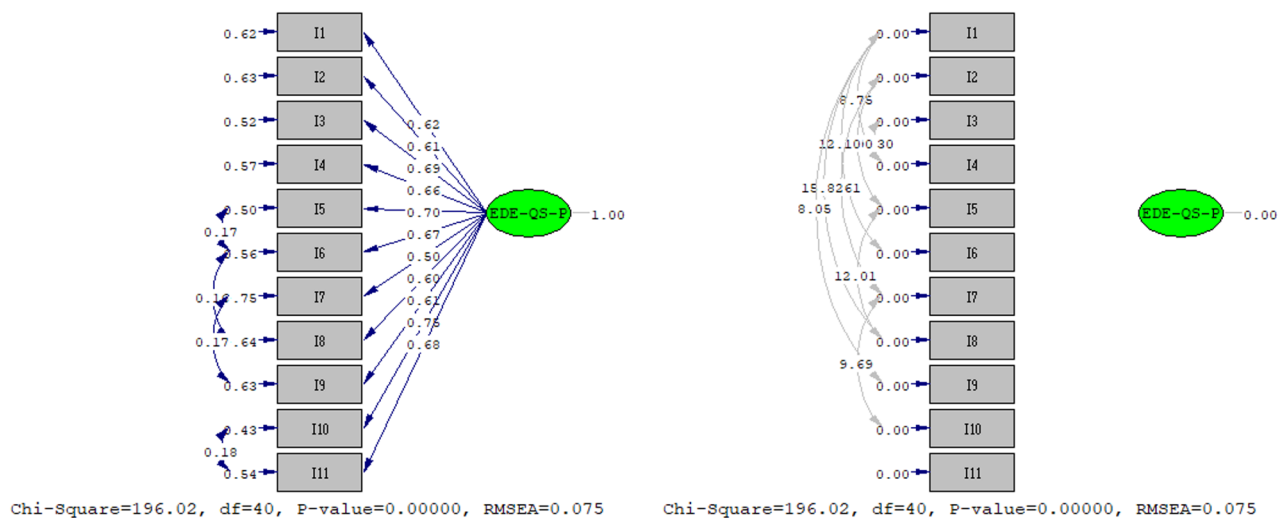
Confirmatory factor analysis To evaluate construct validity, CFA was performed. CFA tests whether the theoretical factor structure of the scale is supported by the data and to what extent individual items represent the intended construct. This analysis assessed whether the scale retained its unidimensional structure by examining factor loadings and fit indices [30, 34, 38].

Fit indices obtained from the CFA are presented in Table 2. As suggested by Byrne and Bentler & Chou,

Table 2 Fit Indices from the CFA of the Turkish version of the EDE-QS-P [34, 42]

Indices	Goodness fit criterion	Acceptable fit criterion	Before Modification	After Modification	Fit Evaluation
χ^2/df	$0.00 \leq \chi^2/df \leq 2.00$	$2.00 < \chi^2/df \leq 5.00$	373.17/44 = 8.48	196.02/40 = 4.90	Acceptable
GFI	$0.95 \leq GFI \leq 1.00$	$0.90 \leq GFI \leq 0.95$	0.87	0.96	Goodness
AGFI	$0.90 \leq AGFI \leq 1.00$	$0.85 \leq AGFI \leq 0.90$	0.81	0.92	Acceptable
CFI	$0.95 \leq CFI \leq 1.00$	$0.90 \leq CFI \leq 0.95$	0.94	0.97	Goodness
SRMR	$0.00 \leq SRMR \leq 0.05$	$0.05 \leq SRMR \leq 0.08$	0.06	0.04	Goodness
RMSEA (%90 CI)	$0.00 \leq RMSEA \leq 0.05$	$0.05 \leq RMSEA \leq 0.10$	0.13 (0.12; 0.14)	0.075 (0.055; 0.080)	Acceptable
NFI	$0.95 \leq NFI \leq 1.00$	$0.90 \leq NFI \leq 0.95$	0.93	0.96	Goodness
NNFI	$0.97 \leq NNFI \leq 1.00$	$0.95 \leq NNFI \leq 0.97$	0.92	0.96	Goodness

χ^2/df Degrees of freedom, *RMSEA* Root mean square error of approximation, *CFI* Comparative fit index, *NFI* Normed fit index, *NNFI* Non-normed fit index, *GFI* Goodness of fit index, *SRMR* Standardized root mean square residual, *AGFI* Adjusted goodness of fit index, *ECVI* Expected cross-validation index, *CI* Confidence interval

**Fig. 1** Standardized Solution and Modification Indices Path Diagram of the Turkish Version of the EDE-QS-P

given that a limited number of modifications would improve model fit [40, 41], four modification indices were applied between the following item pairs: item 11 to item 10; item 9 to item 7; item 8 to item 6; item 6 to item 5. After these modifications, the model fit indices were as follows: GFI = 0.96, AGFI = 0.92, CFI = 0.97, SRMR = 0.04, RMSEA = 0.075, NFI = 0.96, NNFI = 0.96. These values indicate that the model provides an acceptable and good fit to the data [34]. Figure 1 presents the standardized path diagram of the EDE-QS-P, confirming the scale's unidimensional structure. Based on these results, the Turkish version of the EDE-QS-P demonstrates satisfactory construct validity. The covariance matrix showing the linear relationships among items is provided in Table 3, and all values indicate positive correlations.

External validity

For the assessment of external validity, item and scale means, as well as standard deviations, and mean of all inter-item correlation coefficients were calculated. The mean total score of the Turkish version of the EDE-QS-P

was 3.73 ± 0.79 (range: 0–30), with a 95% confidence interval of 3.22–4.23. The skewness value was 1.91 (standard error of skewness: 0.10), and the kurtosis value was 3.36 (standard error of kurtosis: 0.21). These results indicate that the total scale scores were not normally distributed ($p < 0.001$). Specifically, Item 4 (Skewness = 2.689, Kurtosis = 9.325) and Item 7 (Skewness = 2.527, Kurtosis = 9.009) exhibited higher values. However, Tabachnick and Fidell (2019) and Kline (2023), argues that skewness within a range of -3 and $+3$ and kurtosis within -10 and $+10$ do not represent severe violations of normality in large samples [31, 34]. Consequently, these two items were not considered problematic enough to warrant exclusion from the dataset. By applying square root transformation, and the total EDE-QS-P score was re-evaluated. Following the transformation, the Turkish version of the EDE-QS-P demonstrated a mean of 3.66 ± 1.62 , with a 95% confidence interval of 3.22–4.17 (Table 4). The final skewness value was found to be 1.840 (standard error of skewness: 0.108), and the kurtosis value was 1.925 (standard error of kurtosis: 0.215), thereby ensuring that the distributional assumptions are met.

Table 3 Covariance matrix and correlations of the items in the Turkish version of the EDE-QS-P based on CFA

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11
Covariance Matrix											
Item 1	1.00										
Item 2	0.42	1.00									
Item 3	0.39	0.43	1.00								
Item 4	0.34	0.46	0.54	1.00							
Item 5	0.43	0.37	0.48	0.39	1.00						
Item 6	0.52	0.42	0.38	0.36	0.65	1.00					
Item 7	0.26	0.41	0.41	0.38	0.38	0.30	1.00				
Item 8	0.50	0.34	0.33	0.34	0.50	0.58	0.29	1.00			
Item 9	0.30	0.35	0.44	0.48	0.43	0.35	0.48	0.31	1.00		
Item 10	0.46	0.40	0.52	0.50	0.56	0.52	0.29	0.46	0.50	1.00	
Item 11	0.45	0.40	0.47	0.41	0.51	0.50	0.25	0.41	0.43	0.69	1.00
Correlations											
Item 1	1										
Item 2	0.440**	1									
Item 3	0.383**	0.426**	1								
Item 4	0.321**	0.440**	0.521**	1							
Item 5	0.414**	0.355**	0.520**	0.373**	1						
Item 6	0.504**	0.383**	0.377**	0.343**	0.677**	1					
Item 7	0.266**	0.376**	0.438**	0.371**	0.376**	0.303**	1				
Item 8	0.482**	0.310**	0.305**	0.298**	0.482**	0.573**	0.298**	1			
Item 9	0.284**	0.338**	0.469**	0.465**	0.420**	0.329**	0.520**	0.296**	1		
Item 10	0.454**	0.396**	0.561**	0.466**	0.568**	0.531**	0.315**	0.420**	0.499**	1	
Item 11	0.432**	0.383**	0.485**	0.372**	0.519**	0.497**	0.268**	0.373**	0.442**	0.703**	1
Total EDE-QS-P	0.625**	0.510**	0.545**	0.496**	0.654**	0.722**	0.354**	0.628**	0.544**	0.751**	0.797**

**Correlation is significant at the 0.01 level

Table 4 Analysis of factor loadings, R^2 , t-values, and item-total correlations for the Turkish version of the EDE-QS-P

	Factor Loadings	$R^2 \pm SD$	t-value	Mean $\pm$ SD	95% Confidence interval		Scale mean if item deleted	Scale variance if item deleted	Item-total correlation	α if item deleted	ω if item deleted
					Lower	Upper					
I1	0.654	0.37 $\pm$ 0.04	14.39	0.40 $\pm$ 0.89	0.32	0.47	3.27	25.534	0.585	0.873	0.884
I2	0.629	0.35 $\pm$ 0.04	13.88	0.20 $\pm$ 0.59	0.15	0.25	3.46	27.921	0.536	0.875	0.886
I3	0.728	0.46 $\pm$ 0.04	16.44	0.23 $\pm$ 0.65	0.18	0.29	3.43	26.939	0.627	0.870	0.882
I4	0.650	0.40 $\pm$ 0.04	14.92	0.13 $\pm$ 0.40	0.09	0.17	3.53	28.931	0.587	0.876	0.885
I5	0.765	0.51 $\pm$ 0.04	17.61	0.40 $\pm$ 0.89	0.33	0.47	3.27	24.582	0.704	0.864	0.873
I6	0.737	0.47 $\pm$ 0.04	16.51	0.52 $\pm$ 0.98	0.44	0.60	3.15	24.058	0.685	0.866	0.876
I7	0.578	0.28 $\pm$ 0.04	11.55	0.06 $\pm$ 0.29	0.04	0.09	3.60	30.020	0.480	0.882	0.888
I8	0.633	0.35 $\pm$ 0.04	13.75	0.36 $\pm$ 0.82	0.30	0.44	3.30	26.178	0.569	0.873	0.884
I9	0.663	0.37 $\pm$ 0.04	14.33	0.27 $\pm$ 0.70	0.21	0.33	3.39	27.077	0.549	0.874	0.886
I10	0.795	0.60 $\pm$ 0.04	19.54	0.47 $\pm$ 0.84	0.39	0.55	3.19	24.768	0.734	0.862	0.872
I11	0.735	0.49 $\pm$ 0.04	17.06	0.63 $\pm$ 0.92	0.54	0.71	3.04	24.671	0.669	0.867	0.877
Total	-	-	-	3.664 $\pm$ 1.62	3.22	4.17	-	-	-	$\alpha = 0.882$	$\omega = 0.891$

I Item, R^2 Determination coefficient, SD Standard deviation, α Cronbach's alpha, ω McDonald's Omega

Concurrent validity As demonstrated in Table 3, the item correlations and total EDE-QS-P correlations were shown. The EDE-QS-P demonstrated a positive and statistically significant correlation ($p < 0.001$) across all items (1–11). Items were ranged from 0.354 (indicative of a moderate relationship) to 0.797 (indicative of a very strong relationship). Item-total correlation coefficients ranged from 0.485 (item 7) to 0.733 (item 10). As shown

in Table 4, all item-total correlations were statistically significant ($p < 0.001$), supporting the concurrent validity of the Turkish version of the EDE-QS-P.

Reliability analysis

Scale internal consistency reliability and item analysis

For internal consistency reliability analysis, Cronbach's alpha, McDonald's Omega, Hotelling's T-squared test,

Spearman–Brown coefficient, and Guttman split-half reliability coefficient were utilized [37, 43]. While these indices are indeed correlated, it should be noted that psychometric assumptions. Cronbach's alpha is predicated on the assumption of tau-equivalence, a supposition which is frequently invalidated by empirical evidence [37]. Therefore, the study supplemented the original model with McDonald's Omega, which accounts for varying factor loadings and provides a more robust estimate of reliability in congeneric models [43]. For the Turkish version of the EDE-QS-P, the Cronbach's alpha for the total scale was calculated as 0.882, and McDonald's Omega was 0.891. These values indicate a strong level of internal consistency. According to the results of Hotelling's T-squared test, the scale's total score yielded a T^2 value of 222.46 ($p < 0.001$), suggesting no significant differences among items and indicating that all items were understood similarly by participants. The Spearman–Brown coefficient was 0.88, and the Guttman split-half coefficient was 0.876, both of which support the internal homogeneity of the scale items. The Cronbach's alpha coefficient for the first six items was 0.81, while the remaining items had a coefficient of 0.77, indicating

acceptable to high levels of internal consistency across subcomponents of the scale.

Test–retest reliability

Test–retest reliability was evaluated using repeated administration of the scale. According to the Wilcoxon signed-rank test, there was no statistically significant difference between the initial test scores (3.9 ± 3.75) and the retest scores (3.5 ± 3.64) ($p > 0.05$). This result suggests that the scale produces consistent measurements over time and has high temporal reliability. The Intra-class Correlation Coefficient (ICC) was also calculated to assess test–retest agreement. The ICC value for the EDE-QS-P was 0.935 (95% CI: 0.86–0.96), indicating excellent reliability across time points.

EDE-QS-P total score differences by group and correlation with continuous variables

Group differences for EDE-QS-P total scores are presented in Table 5, while the correlation analysis, presented as a heatmap, is shown in Fig. 2. The total score of the scale showed statistically significant differences by gender, child's education level, and BMI category. Girls

Table 5 Distribution of the total EDE-QS-P score by independent variables and correlation analysis for the Turkish version

	<i>n</i>	Median $\pm$ IQR	Min-Max	$\bar{X} \pm SD$	
Gender					$Z = 2.233$ $p = 0.026^*$
Female	225	1.0 ± 6.00	0–30	4.5 ± 6.67	
Male	291	1.0 ± 4.00	0–22	3.1 ± 4.92	
Child's education level					$Z = -6.042$ $p < 0.001^*$
Secondary school	316	0.0 ± 3.00	0–21	2.4 ± 4.34	
High school	200	2.0 ± 9.00	0–30	5.6 ± 7.10	
Parental education level					$H = 2.810$ $p = 0.590$
Illiterate	5	3.0 ± 3.00	0–6	3.0 ± 2.12	
Primary school	93	2.0 ± 5.00	0–21	3.8 ± 5.39	
Secondary school	86	0.5 ± 4.00	0–26	3.1 ± 5.44	
High school	224	1.0 ± 6.00	0–30	3.8 ± 6.12	
University	108	0.0 ± 6.00	0–26	3.8 ± 5.84	
Parental employment status					$Z = -1.087$ $p = 0.277$
Employed	301	1.0 ± 6.00	0–30	4.0 ± 6.00	
Unemployed	215	1.0 ± 4.00	0–26	3.3 ± 5.46	
Family structure					$H = 1.092$ $p = 0.579$
Immediate family	415	1.0 ± 6.00	0–29	3.7 ± 5.69	
Extended family	81	1.0 ± 5.00	0–30	3.9 ± 6.08	
Single-parent family	20	0.0 ± 2.00	0–24	3.3 ± 6.77	
Income status					$H = 0.454$ $p = 0.797$
Income < Expenses	96	1.0 ± 4.75	0–26	3.2 ± 5.21	
Income = Expenses	335	1.0 ± 5.00	0–30	3.7 ± 5.83	
Income > Expenses	85	1.0 ± 6.00	0–26	4.2 ± 6.00	
BMI group					$H = 33.403$ $p < 0.001^*$
Normal	355	0.0 ± 3.00	0–26	2.7 ± 4.75	
Overweight	115	2.0 ± 10.00	0–29	5.3 ± 7.10	
Obese	46	6.5 ± 10.50	0–30	7.3 ± 7.13	

IQR Interquartile range, $\bar{X} \pm SD$ Mean, standard deviation, Z Z test, H Kruskal-Wallis test $p < 0.05$, r Correlation coefficient *Spearman's rank correlation coefficient $p < 0.05$, BMI Body mass index, $p < 0.05$ was considered statistically significant. Bold values indicate statistically significant results

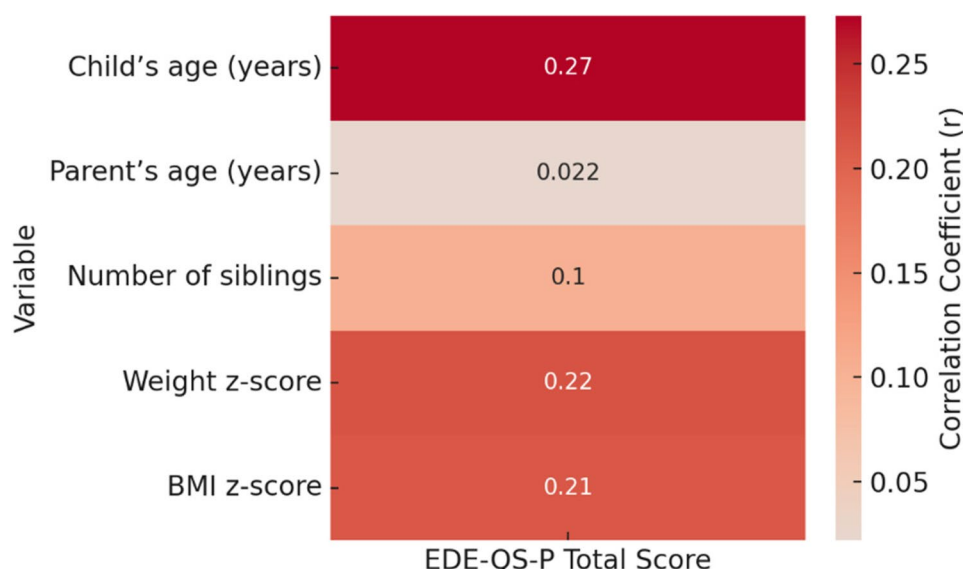


Fig. 2 Correlation between EDE-QS-P total score and variables

The heatmap visually represents the correlation coefficients between the EDE-QS-P total score and each variable, where darker red indicates a stronger positive correlation, while lighter shades reflect weaker or non-significant relationship

scored significantly higher than boys ($p < 0.05$). Likewise, children attending high school had significantly higher scores than those in secondary school ($p < 0.001$). Based on BMI categories, the mean total scores were as follows; normal weight: 2.7 ± 4.75 , overweight: 5.3 ± 7.10 , obese: 7.3 ± 7.13 . The differences between BMI groups were statistically significant ($p < 0.001$). No significant differences were found in EDE-QS-P scores based on parent's education level, employment status, or family structure ($p > 0.05$). Pearson correlation analysis revealed significant and positive relationships between the total score and the following variables; child's age ($r = 0.273$; $p < 0.001$), number of siblings ($r = 0.104$; $p < 0.05$), child's weight z-score ($r = 0.216$; $p < 0.001$), child's BMI z-score ($r = 0.216$; $p < 0.001$). No significant correlation was found between parent's age and the child's EDE-QS-P total score ($r = 0.022$; $p > 0.05$).

Discussion

This study is the first to evaluate the validity and reliability of the Turkish version of the EDE-QS-P, originally developed by Webster et al. [17]. The findings demonstrate that the Turkish version of the EDE-QS-P is a valid and reliable instrument with adequate internal consistency and test-retest reliability.

Theoretical model fit is a fundamental criterion in the assessment of an instrument's validity and reliability [24, 30, 36]. In the present study, the sample size ($n = 516$) was considered adequate for factor analytic procedures across both secondary and high school subgroups. The EFA results were consistent with the original development of the scale, supporting its underlying theoretical

structure. Performing EFA prior to CFA has provided a more robust validation of the scale's dimensionality in the Turkish context. The KMO value (0.895) indicated excellent sampling adequacy [30] and Bartlett's test yielded sufficient results for exploratory factor analysis [21, 30]. Item-total correlation analyses revealed no values below the recommended threshold (0.25) or negative correlations, indicating that all items contributed adequately to the construct. EFA conducted on the 11 items revealed a clear one-factor structure with eigenvalues greater than 1 [21, 31] accounting for 58.20% of the total variance. This finding provides strong evidence for the construct validity of the scale. Following EFA, CFA was conducted as recommended to further confirm the goodness-of-fit between the empirical data and the hypothesised theoretical model [30, 31, 33]. In this study, CFA was conducted to evaluate the construct validity of the EDE-QS-P, examining the degree to which individual items reflected the hypothesized factor structure of the scale [42]. The results confirmed the unidimensional structure of the scale and demonstrated an overall good model fit. Prior to CFA, item-total correlations were calculated and ranged from 0.485 to 0.733. While Webster et al. [17] only reported factor loadings in their CFA results and did not provide item-level correlation statistics, Esin et al. [44] reported item-total correlations ranging from 0.32 to 0.88. In this context, the narrower but consistent range observed in the present study suggests a high level of item homogeneity.

During the CFA process, various fit indices were utilized to assess the scale's theoretical model fit. The analysis indicated that the model fit the data at an acceptable

level and showed a strong overall fit. According to Byrne and Bentler & Chou, keeping a parsimonious number of modifications minimal ensures the model's integrity and acceptable if they are theoretically meaningful [40, 41]. As suggested, the modifications were restricted to only four item pairs (Items 11–10, 9–7, 8–6, and 6–5). Modification indices were applied to improve fit. Moreover, the CFI (0.97), NFI (0.96), and NNFI (0.96) values have all been demonstrated to exceed the 0.95 threshold for incremental fit indices [45], further supporting the robustness of the model. Regarding absolute fit, the SRMR (0.04) reflected good model fit, was well below the 0.08 threshold, and the RMSEA (0.075) fell within the acceptable range of <0.08 [46]. The GFI (0.96) and AGFI (0.92) both exceed the conventional 0.90 threshold, thus confirming the adequacy of the model structure [41]. These results collectively demonstrate that the Turkish version of the EDE-QS-P has a strong and statistically sound construct validity [30, 33, 34, 36]. In the original scale development study by Webster et al. [17], model fit was assessed through similar statistics, with results showing RMSEA = 0.06, CFI = 0.99, and SRMR = 0.06. Likewise, in the Arabic adaptation study by Kfourì et al. [18], post-modification indices were reported as RMSEA = 0.08, SRMR = 0.02, and CFI = 0.96. These findings are comparable to those obtained in the current research, as all three studies reported acceptable model fit, particularly with strong CFI values indicative of good fit.

To evaluate content validity, the translated scale was reviewed by 15 experts, and the Davis technique was used for quantitative analysis of their feedback. The overall CVI was calculated as 0.994, with all individual item CVIs exceeding the accepted threshold of 0.80, indicating strong content validity. Agreement among expert opinions was tested using Kendall's W, with no statistically significant differences found ($W = 0.134$; $p > 0.05$). In contrast, the Arabic adaptation study by Kfourì et al. [18] involved only three expert reviewers during the translation process, and content validity was not quantitatively assessed. Additionally, neither the Turkish validation study of the Eating Disorders Examination Questionnaire–13 conducted by Esin et al. [44], nor the original EDE-QS-P development study by Webster et al. [17], included any CVI scores or systematic quantitative expert evaluations. In this regard, the present study offers a more rigorous and methodologically robust assessment of the EDE-QS-P's content validity.

Reliability

In terms of correlation coefficient between item 7 and the EDE-QS-P was moderate at 0.354. The correlations between item 7 and items 8 and 11 were weak (0.298 and 0.268, respectively). Although item 7 appeared problematic, removing it did not result in any significant change

when CFA was applied. Furthermore, as it is recommended not to discard items with a correlation coefficient above 0.25 [30] and as laxative use is crucial for diagnosing serious eating disorders according to the DSM-V diagnostic criteria [47], it was decided not to discard item 7. The correlation level between the EDE-QS-P and the other items was high at 0.50 or above [30].

Since the EDE-QS-P is a Likert-type scale, various statistical methods were employed to assess its reliability, including Cronbach's alpha, McDonald's Omega, Hotelling's T-squared test, Spearman correlation coefficient, Guttman split-half method, and test–retest analysis [21, 30, 37]. Prior to the analyses, normality tests were conducted to assess the distribution of the data. The data was then subjected to normalisation and analysis.

One of the primary indicators used to evaluate the reliability of a scale is internal consistency, which reflects the degree to which all items measure the same construct. The Cronbach's alpha coefficient for the current study was calculated as 0.88, which is considered to indicate good and acceptable internal consistency [21, 30]. Similarly, McDonald's Omega was found to be 0.89, supporting the conclusion that the scale demonstrates strong internal reliability [37, 43]. Hotelling's T-squared test also yielded a statistically significant result ($p < 0.001$), indicating a high level of item reliability. For split-half reliability, Cronbach's alpha was calculated separately for the first and second halves of the scale, with coefficients of 0.81 and 0.77, respectively [21, 30]. These values suggest acceptable internal consistency for both halves of the instrument. In the original study by Webster et al. [17], Cronbach's alpha was reported as 0.91, although McDonald's Omega was not calculated. In the validation study by Esin et al. [44], only Cronbach's alpha (0.89), test–retest correlation (0.93), and Spearman correlation were reported; complementary analysis such as McDonald's Omega, split-half reliability, or Hotelling's T-squared test were not included. In this respect, the current study provides a more comprehensive psychometric evaluation of the EDE-QS-P by employing a broader range of reliability analysis. In Kfourì et al.'s [18] study, Cronbach's alpha and McDonald's Omega were both calculated as 0.96, indicating very strong internal consistency. This finding may be associated with the lower prevalence of eating disorder symptoms in the sample or with differences in the parents' levels of observational insight.

The preliminary scale was tested at two time frame within the two weeks on sample 30 students. For the test–retest reliability analysis, the scale was initially administered to a pre-test group of 30 participants and re-administered to the same group two weeks later. The Wilcoxon signed-rank test was used to compare scores, and no statistically significant differences were found between the two administrations, suggesting that the

scale produces stable results over time. In the study by Esin et al. [44], temporal stability was assessed using a 15-day interval between test and retest administrations. Similarly, in Webster et al.'s [17] original study, the test–retest evaluation was conducted over a two-week interval, and in both studies, the findings supported the temporal consistency of the instrument. Notably, Kfour et al.'s [18] Arabic validation study did not include a test–retest analysis.

Discussion of findings regarding intergroup differences in EDE-QS-P scores and their relationship with variables

In the present study, the mean total score of the EDE-QS-P was found to be 3.73, which is lower than the mean score of 6.31 reported in a study conducted in Lebanon with parents of children aged 6–11 years [18]. This discrepancy may be attributed to various factors such as cultural differences, sample characteristics, parental perceptions, age groups, and data collection methods. In particular, parental awareness, societal norms, and body image ideals can influence how symptoms are perceived and reported. Additionally, parental control may vary by the child's age, potentially affecting the level of symptoms observed and reported. Conversely, in a study by Webster et al. [17] conducted with parents of children receiving treatment at an eating disorders clinic, the mean score was much lower (1.23). This lower score is likely attributable to symptom reduction during the treatment process, increased parental awareness, and participation in psychoeducational programs. Structured clinical interventions may influence parental responses and lead to lower reported scores on the scale.

In this study, total EDE-QS-P scores differed significantly by gender, with girls scoring higher than boys. Additionally, a positive correlation was found between child age and total scale score. These findings may indicate that sociocultural and psychosocial pressures related to body image and eating behaviours become more salient among girls and tend to increase with age [1, 6, 48]. The higher scores observed among high school students compared to secondary school students may be associated with greater body awareness and heightened social comparison processes during adolescence [1]. Supporting this, Sempere-Ferré et al. [1] reported in a study from Spain that concerns about thinness were more prevalent among female students, with greater levels of body dissatisfaction particularly noted between the ages of 14 and 17. Similarly, in Türkiye, Yassıbaş et al. [6] found significantly higher levels of hedonic hunger and food addiction among adolescent girls compared to boys. Ghidini Dias et al. [48] also reported that eating disorder symptoms were significantly more prevalent among female adolescents than males in a Brazilian sample of 14–17-year-olds. Taken together, these findings suggest

that body image-related issues may follow a broadly similar pattern in different cultural contexts. These issues are influenced by age and gender and may be shaped by social media, societal expectations and the physical changes associated with puberty.

The current study also found a positive and significant correlation between total EDE-QS-P scores and the number of siblings. This suggests that a higher number of siblings may be associated with an increased risk of eating disorder symptoms. However, few quantitative studies have directly examined this relationship. Existing literature has more often addressed eating behaviours in the context of sibling illness experiences or intra-family dynamics [48, 49]. For example, having a sibling with anorexia nervosa has been shown to impact one's own body image [49], and increases in sibling number have been associated with higher levels of emotional eating symptoms [50]. These findings suggest that in larger families, competition for parental attention and emotional burden may indirectly influence eating attitudes.

In this study, significant differences in EDE-QS-P scores were observed across BMI categories; students classified as obese scored notably higher than those of normal weight. Additionally, both weight-for-age z-scores and BMI z-scores were positively and significantly correlated with EDE-QS-P scores. These findings indicate a parallel relationship between increasing body weight and the severity of eating disorder symptoms. Similarly, Ghidini Dias et al. [48] found a significant association between BMI and eating disorder symptoms among adolescents in Brazil. Al-Shoaibi et al. [51], in a large-scale study conducted in the United States with children aged 9–13, reported that high BMI levels were significantly associated with increased risk for binge eating disorder. In contrast, Lehto et al. [52] did not find a significant relationship between BMI and body dissatisfaction, although a relationship was found with binge eating behaviour. This highlights the potential influence of cultural factors on body image perception. In conclusion, while a significant association exists between BMI and eating disorder symptoms, this relationship may vary depending on cultural and individual factors.

When interpreting the findings of this study, several methodological limitations should be considered. The cross-sectional design precludes causal inference, and the use of self-reported data may have introduced reporting bias. In addition, the use of convenience sampling and recruitment from only two schools in a single province may limit the representativeness of the sample, thereby restricting the generalisability of the findings to the broader population. The imbalance between middle school and high school participants may further constrain the generalisability of the results across different developmental stages. Moreover, this sampling approach

may not fully capture regional, socio-economic, and cultural variability in parental perceptions of children's eating-related behaviours. Another limitation is that parents' mental health status was not assessed or controlled for. As parental psychological characteristics may influence perceptions and reporting of children's eating-related behaviours, this should be considered a potential source of bias. In addition, the study was conducted in a non-clinical, community-based sample, which limits the generalisability of the findings to clinical populations with diagnosed eating disorders. The absence of a gold-standard diagnostic comparison and the lack of longitudinal validation also restrict conclusions regarding diagnostic sensitivity and temporal stability. Future studies must prioritize clinical samples to establish temporal stability and diagnostic sensitivity.

Despite these limitations, the study is strengthened by its relatively large sample size ($n=516$), which exceeds commonly recommended thresholds for scale adaptation studies. The inclusion of a community-based, non-clinical sample provides valuable insight into the potential use of the scale for early screening purposes. To the best of our knowledge, this is the first study to adapt and validate the EDE-QS-P for use in the Turkish context. In addition, the inclusion of sibling number as a potential risk factor enhances the originality of the research. Future studies should prioritise longitudinal designs and clinical samples to establish temporal stability and diagnostic sensitivity, as well as replicate these findings in larger and more diverse populations, including children under the age of nine.

Conclusion

The Turkish version of the 11-item EDE-QS-P was found to be a valid and reliable instrument for assessing eating disorder symptoms in children aged 9–18 years. The scale demonstrated satisfactory content and construct validity, internal consistency, and test–retest reliability, and both exploratory and confirmatory factor analyses supported a unidimensional structure consistent with the original version.

Beyond its psychometric properties, EDE-QS-P total scores differed significantly according to key demographic and anthropometric variables. Higher scores were observed among girls and adolescents attending high school, and total scores increased significantly with higher body mass index. These findings indicate that the scale reflects patterns consistent with established risk indicators for eating disorders.

From an applied perspective, the Turkish EDE-QS-P, as a brief and parent-reported screening tool, has the potential to support early identification of eating disorder risk in clinical settings, school-based screening programmes, and primary healthcare services. Its practical format facilitates efficient use in routine assessments.

From a research perspective, the Turkish adaptation of the EDE-QS-P fills an important gap in the literature and provides a valuable tool for epidemiological studies, intervention research, and cross-cultural comparisons in the field of eating disorders during childhood and adolescence. Future studies may further examine the scale's predictive validity and utility in longitudinal and clinical outcome research.

Abbreviations

AGFI	Adjusted goodness of fit index
BMI	Body mass index
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CIs	Confidence intervals
CVI	Content validity index
df	Degrees of freedom
EDE-QS-P	Eating Disorders Examination Questionnaire – Short Parent Version
GFI	Goodness of fit index
ICC	Intraclass correlation coefficient
NFI	Normed fit index
NNFI	Non-normed fit index
RMSEA	Root Mean Square Error of Approximation
SD	Standard deviation
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Root Mean Square Residual

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s40359-026-04397-6>.

Supplementary Material 1.

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Authors' contributions

Study conception and design: GPA, GYD, JGY, GK; Data collection: GPA; Data analysis and interpretation: JGY; Drafting of the article: GPA, GYD, GK; Critical revision of the article: GK.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was initiated after receiving approval from the Non-Interventional Clinical Research Ethics Committee at İzmir Kâtip Çelebi University to ensure compliance with ethical standards. Prospective participants were adequately informed about the study, and written informed consent was obtained from those who voluntarily agreed to participate, in accordance with the principles outlined in the Declaration of Helsinki. Permission to conduct the study was also obtained in writing from the İzmir Provincial Directorate of National Education, Ministry of National Education of the Republic of Türkiye.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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