

Psychometric Properties of the Turkish Version of the Epilepsy Module of the KINDL Quality of Life Scale

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ABSTRACT

Introduction: This study aims to present the psychometric properties of the Turkish version of the KINDL quality of life scale, epilepsy module.

Method: The psychometric properties of the KINDL Epilepsy module were evaluated from the aspect of internal consistency, reliability, and construct validity on an inpatient sample of 159 Turkish children (mean age 10.84±2.77 years) who had epilepsy.

Results: The KINDL Epilepsy module (36 items) showed acceptable α coefficients ranging from 0.80 (social well-being) to 0.55 (treatment) for each domain. EFA suggested three sub-dimensions that we named as Physical, Mental and Social Well-being sub-dimensions. Root Mean

Square Error of Approximation was found as 0.053, and Comparative Fit Index was 0.95. Good known groups results supported the construct validity of the instrument. Correlations between the income perception, family support and Duration of Epilepsy and the domains of its Epilepsy module were significantly high, indicating a satisfactory convergent validity.

Conclusion: The Turkish version of the KINDL Epilepsy module showed module is a promising tool in this study. However, further research on the versions of the module in other languages is needed for its global use.

Keywords: Epilepsy, psychometrics, child, quality of life, KINDL

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INTRODUCTION

Epilepsy is a chronic medical condition that significantly affects the quality of life of due to its side effects and its social exclusion of the patient (1). A child with epilepsy has also concerns and fears about the diagnosis process; accordingly, whether and when seizures will occur, the nature of the seizures, and how they can be controlled (2). Therefore, studies argue that along with epileptic attacks, significant number of the children with epilepsy are under the severe risk for unwanted psychosocial outcomes, anxiety and depression, low self-esteem, behavioral problems, and academic difficulties (3–5).

The clinical outcomes of child epilepsy management are the number of seizures (objective outcome) and psychosocial consequences of the illness (subjective outcomes) which should be both considered. So, along with the advanced seizure control therapies in epilepsy, health-related quality of life measurement adds new and important information to traditional objective outcome measures such as seizure control (6).

Quality of Life (QoL) experts suggest assessing quality of life by generic and disease specific instruments simultaneously in QoL research and clinical practice. This is especially important for children and adolescents having epilepsy. Generic QoL domains probe general aspects of life such as physical, psychological, and social relations whereas for children with epilepsy, condition-specific domains need to focus on concealment of their epilepsy and the pursuit for normality (7). There is some frequently used epilepsy specific QoL instruments in children having epilepsy globally

Highlights

- The 31-item Epilepsy Module of the KINDL Quality of Life measures the quality of life on child with epilepsy.
- Epilepsy Module of the KINDL Quality of Life scale has three sub-dimension with 0.90 Cronbach's Alpha coefficient value.
- Sub-dimensions assess the level of physical well-being, mental well-being, and social well-being associated with quality of life in child with epilepsy.
- The Turkish version of the KINDL Epilepsy Module was found to be a valid and reliable tool.

(8, 9), most of which are not supported by generic HRQoL instruments. We can identify only two comprehensive measurement tools that include both a generic tool and an epilepsy specific HRQoL module in the literature. The European DISABKIDS project (10) and the KINDL instrument (11, 12). The generic KINDL scale has three different age specific versions (age 4–7 Kiddy; age 8–12 Kid and 8–16 Kiddo) and two parent proxy versions (<http://kindl.org/english/questionnaires/-versions>). The generic KINDL also have a generic disease domain. There are illness specific modules of KINDL such

as oncology, spina bifida, diabetes, obesity, eczema, bronchial asthma, and epilepsy module. KINDL has been widely used to assess HRQoL of children and adolescents in Turkey. So, we preferred to validate Turkish version of the Epilepsy module of KINDL that can be used in clinical practice along with generic KINDL.

This study aims to present the psychometric properties of the Turkish version of the KINDL Epilepsy module.

METHODS

Subjects

Children with epilepsy between the ages of 7–18 who were being followed up in the pediatric neurology department of Manisa Celal Bayar University Hospital and who agreed to participate in the study were recruited in the study. Intellectually disabled children were not considered as eligible for the study.

Questionnaire battery and data collection

In addition to the KINDL Epilepsy module, the questionnaire battery included KINDL Generic questionnaire, socio-demographic, and illness specific characteristics of the children such as seizure frequency, duration, outpatient visits and hospitalization.

Generic KINDL

The generic KINDL was developed for children and adolescents aged between 4 to 17 in three versions for different age groups of children and, two “parent forms” for young children (aged 4 to 6) and for older children and adolescents (aged 7 to 17) (11, 12). The KINDL questionnaire consists of 24 Likert-Scaled items in six domains: physical, emotional, self-esteem, family, friends, school (or nursery school/kindergarten) and chronic illness domain. Each of the domains contain 4 items. Turkish version of the KINDL generic form was adapted and validated for Turkish by Eser et al. (13).

KINDL Epilepsy Module

The original KINDL Epilepsy module comprises two dimensions: Epilepsy (the first 31 items) and the Treatment (items 32, 33, 34, 35, and 36) dimensions. Higher values reflecting better quality of life (14). The psychometric properties of the KINDL epilepsy module have not been studied before.

Translation and adaptation

The KINDL Epilepsy Module was first translated into Turkish by two independent translators and the consensus version was then tested in the consecutive cognitive debriefing interviews on five epileptic children independently one another. The suggestions of each of the respondents were asked to the next interviewee. Final Turkish version was then applied to the target children with epilepsy.

Assessment of psychometric properties

Psychometric analyses of the Turkish version of the Epilepsy Module were carried out both by using exploratory and confirmatory approaches, following the distribution properties of the instrument.

Distribution properties

We tested the scale distribution by skewness/kurtosis and ceiling-floor effects. Values ≤ 1.0 were accepted as acceptable for skewness/kurtosis, and $\leq 15.0\%$ for ceiling-floor effects (15).

Exploratory approach

First, we needed to conduct exploratory analyses need due to the absence of any prior psychometric analyses of this module. Exploratory Factor

Analyses (EFA) were run via Principal Component's analyses by Varimax rotation on the Epilepsy dimension of the module excluding the treatment dimension of the original scale. EFA suggested three sub-dimensions that we named as Physical, Mental and Social sub-dimensions.

Confirmatory approach was used reliability and validity analyses based on the new proposed three sub-scale structure of EFA.

Reliability

The reliability of the scale structure was evaluated by analyzing (a) internal consistency using Cronbach's α for each domain, a value of ≥ 0.70 considered as acceptable internal consistency and, (b) by item scale correlations (corrected for overlap). Each item is expected to give correlation coefficient ≥ 0.30 with its own sub-dimension (16).

Construct Validity

The construct validity analyses consisted of Confirmatory Factor Analysis (CFA), Convergent/divergent validity and Known-groups analyses.

Fit indices were tested in CFA and their acceptable limits were as follows: Root Mean Square Error of Approximation RMSEA < 0.08 , Comparative Fit Index-CFI > 0.90 ; and Goodness of Fit Index-GFI > 0.90 (15). We used the mother KINDL generic scale for testing convergent/divergent validity of the KINDL Epilepsy Module. Related dimensions of the KINDL generic scale and the KINDL Epilepsy module were expected to have greater inter correlations. Correlation coefficients between 0.31 and 0.50 as medium and over 0.51 as high (17). Sociodemographic variables such as income family support and illness related variables were tested in the Known-groups validity analyses.

EFA and conventional statistical analyses were done by SPSS 25, and the first and second order CFAs were done by JASP version 0.14.1. Acceptable type 1 error was considered as 0.05 in all statistical analyses.

The study has been approved by the Ethical Committee of Manisa Celal Bayar University (Approval date: 06/01/2021 File number: 20.478.486). Written informed consent was obtained from all participants.

RESULTS

The coverage rate of the eligible respondents was 86%. The sociodemographic and the illness-specific characteristics of the study samples presented in Table 1. The mean age of the participants is 10.84 ± 2.77 . Gender distribution is almost in balance. About three of four respondents were living in rural districts of the province and 74.2% need family support. Most of the mothers were primary school graduates. About 30% of the respondents perceived their families as poor. More than half of the children were diagnosed at age 7 and higher and two-third had epilepsy history since less than four years. Three quarter of the children have focal Epilepsy and about 79% experience seizures more frequently than one-month interval. The duration of seizures is generally longer than one minute. When the healthcare utilization of children was examined, approximately half of them have been hospitalized, 84% of them have visited outpatient neurology clinic 4 or more times per year, and about 70% have received monotherapy (Table 1).

The mean domain scores of the KINDL Epilepsy Module is presented in Table 2. Distribution properties revealed good skewness, kurtosis, floor, and ceiling effects except for the treatment domain that have borderline acceptable ceiling effect of 15%.

Internal consistency figures of the KINDL Epilepsy module are presented in Table 3. Overall scale alpha value is very good (0.90) and all the domains except for the Treatment domain showed alpha values in acceptable

Table 1. Sociodemographic and the illness-specific characteristics of the study sample (n=159)

Variable	Number	%
Gender		
Male	75	47.2
Female	84	52.8
Age		
7-9 years old	56	35.2
10-13 years old	75	47.2
14-18 years old	28	17.6
House hold members		
Living with mother and father	81	50.9
Having a sibling	53	33.3
Having two siblings and more	25	15.7
Residency		
Rural	121	76.1
Urban	38	23.9
Family support need		
No	118	74.2
Yes	41	25.8
Mother's education		
Just read and write (no diploma)	25	15.7
Primary school graduate	89	56.0
Secondary school and higher graduate	45	28.3
Income perception		
Income, equal or higher than expenses	112	70.4
Income, less than expenses (poor)	47	29.6
Age of onset of the disease		
1-2 years old	29	18.2
3-6 years old	36	22.6
Seven years and older	94	59.1
Duration of epilepsy		
Four years and above	57	35.8
Up to 3 years	102	64.2
Epilepsy type		
Generalized	42	26.4
Focal	117	73.6
Seizure frequency		
Less frequent than once a month	125	78.6
Once a month or more	34	21.4
Duration of seizure		
Shorter than one minute	41	25.8
One minute and longer	118	74.2
Hospitalization		
No	81	50.9
Yes	78	49.1
Neurology outpatient visit frequency		
1-3 times/year	26	16.4
Four times and more/year	133	83.6
Treatment type		
Monotherapy	109	68.6
Other	50	31.4

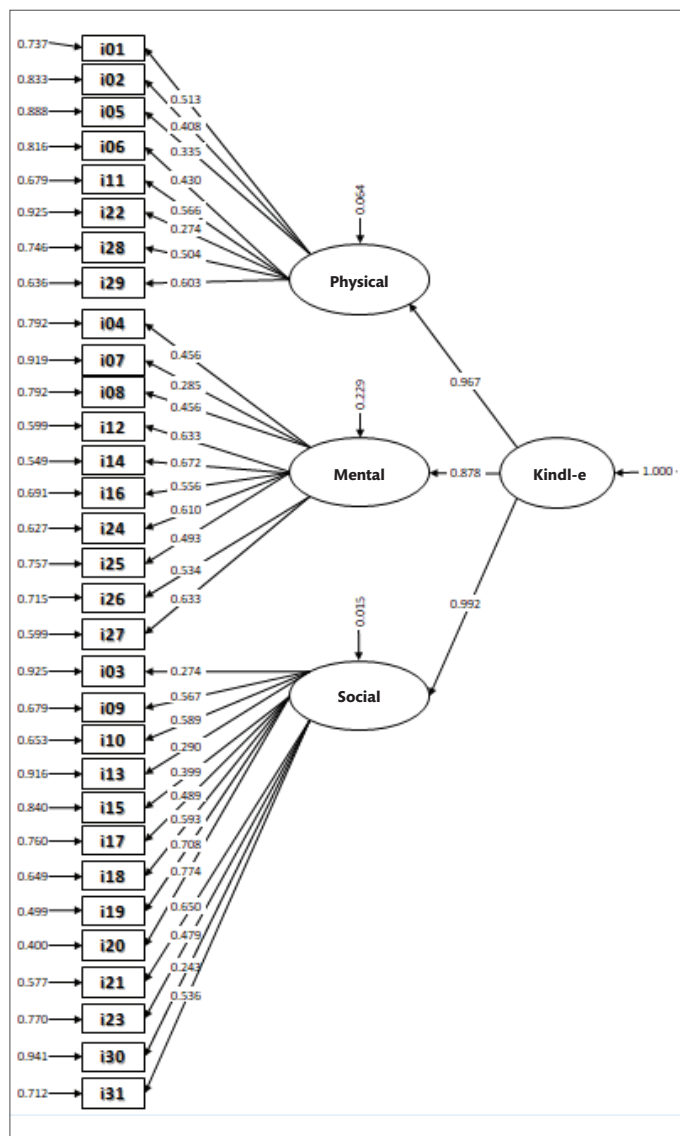


Figure 1. Confirmatory factor analysis results of 3 sub-dimension construct of the KINDL Epilepsy module.

limits. Item-Scale correlations and if item deleted Cronbach's α values indicated no problematic items for the Physical Wellbeing domain. Item-Total Correlation coefficients are greater than 0.30 and "if item deleted alpha values" are less than the alpha value of the overall domain for each of the items in the Physical Wellbeing domain. There are problematic items in the Mental Wellbeing domain, Social Wellbeing domain and the Treatment domain according to these criteria mentioned above. The item no 7 of the Mental Wellbeing domain, the items no 3 and no 30 of the Social Wellbeing domains and the item no 32 of the Treatment domain are these potential problematic items (Table 3).

Table 2. Distribution properties of the KINDL-TR epilepsy module

Domains	Mean \pm SD	Min-Max	Skewness (SE)	Kurtosis (SE)	% at Floor	% Ceiling
KINDL-Epilepsy total	70.53 \pm 16.36	26.61-100.00	-0.652 (0.19)	-0.339 (0.38)	0.0	0.6
Physical wellbeing	66.33 \pm 18.28	0.00-100.00	-0.731 (0.19)	1.078 (0.38)	1.3	1.9
Mental wellbeing	68.39 \pm 19.89	12.50-100.00	-0.356 (0.19)	-0.790 (0.38)	0.0	3.1
Social wellbeing	74.77 \pm 17.19	28.85-100.00	-0.853 (0.19)	0.059 (0.38)	0.0	3.1
Treatment	77.28 \pm 16.53	20.00-100.00	-0.730 (0.19)	0.749 (0.38)	0.0	15.1

Table 3. Item-total correlations and internal consistency of the KINDL-TR epilepsy module

Domain/Item	Overall Cronbach's α	Item-total correlation (corrected for overlap)	Cronbach's α if Item deleted	Factor loading*
KINDL-Epilepsy total	0.904			
Physical wellbeing	0.690			
Item 1 (... as good at sports as the other children)		0.373	0.662	0.620
Item 2 (... annoyed that I wasn't allowed to swim)		0.364	0.664	0.520
Item 5 (... satisfied with my looks)		0.401	0.657	0.356
Item 6 (... needed a lot of help from other people)		0.320	0.674	0.555
Item 11 (... felt uncomfortable)		0.396	0.656	0.750
Item 22 (... able to do the same things as other children who do not have epilepsy)		0.335	0.670	0.335
Item 28 (... bothered me having to take medication)		0.387	0.659	0.761
Item 29 (... felt ill because of my medication)		0.466	0.638	0.868
Mental wellbeing	0.798			
Item 4 (... the feeling that other people didn't like me that much)		0.336	0.794	0.474
Item 7 (... being dependent on other people bothered me)		0.245	0.805	0.352
Item 8 (... afraid of having a fit/seizure)		0.431	0.786	0.699
Item 12 (... afraid that other people might see me when I had an epileptic fit)		0.524	0.774	1.033
Item 14 (... felt ashamed)		0.531	0.773	0.929
Item 16 (... dissatisfied with myself)		0.460	0.782	0.601
Item 24 (... afraid other people would think I was disabled)		0.546	0.772	0.816
Item 25 (... trouble concentrating paying attention in school)		0.509	0.776	0.643
Item 26 (... felt as though I couldn't think that quickly)		0.577	0.768	0.702
Item 27 (... forgot more than other children)		0.565	0.769	0.860
Social Wellbeing	0.808			
Item 3 (... invited less often than my classmates and friends)		0.222	0.815	0.363
Item 9 (... trouble at home)		0.428	0.797	0.764
Item 10 (... teased by other children)		0.601	0.788	0.448
Item 13 (... treated differently from my brothers and/or sisters)		0.301	0.809	0.408
Item 15 (... my parents forbade me things)		0.361	0.802	0.498
Item 17 (... felt my parents were demanding too much of me)		0.451	0.795	0.645
Item 18 (... got left out when other people did things together)		0.585	0.787	0.554
Item 19 (... worried that I would not get a job later)		0.605	0.781	0.902
Item 20 (... afraid that other children would find my illness creepy or frightening)		0.727	0.772	0.936
Item 21 (... worried that I would not find a steady boyfriend/girlfriend)		0.590	0.785	0.707
Item 23 (... hid the way I feel from my parents)		0.366	0.802	0.629
Item 30 (... failed to take my medication)		0.197	0.815	0.316
Item 31 (... have more contact with other children who have epilepsy)		0.531	0.787	0.803
Treatment	0.558			
Item 32 (... ask an experienced doctor for advice)		0.175	0.631	0.739
Item 33 (... found it hard to do what my doctor considers right)		0.390	0.469	0.657
Item 34 (... felt that my doctor showed too little interest in me)		0.425	0.444	0.050
Item 35 (... got on with the doctors)		0.378	0.478	0.132
Item 36 (... felt well enough informed about my illness)		0.326	0.499	0.620

*Confirmatory factor analysis.

Table 4. Convergent Validity results of the KINDL epilepsy module with KINDL generic scale

	KINDL-Epilepsy Total***	Physical Wellbeing	Mental Wellbeing	Social Wellbeing	Treatment
KINDL Generic	0.462**	0.478**	0.401**	0.379**	0.066
Physical	0.495**	0.466**	0.386**	0.466**	0.137
Mental	0.576**	0.494**	0.499**	0.529**	0.192*
Self-esteem	0.403**	0.404**	0.308**	0.370**	0.135
Family relations	0.401**	0.340**	0.340**	0.378**	0.217**
Friend relations	0.296**	0.253**	0.259**	0.270**	0.178*
School	0.153	0.251**	0.088	0.099	-0.014
Chronic illness module	0.502**	0.477**	0.456**	0.421**	0.154
KINDL-Epilepsy Total***	1	0.846**	0.884**	0.929**	0.286**
Physical wellbeing	0.846**	1	0.612**	0.721**	0.198*
Mental wellbeing	0.884**	0.612**	1	0.716**	0.250**
Social wellbeing	0.929**	0.721**	0.716**	1	0.296**
Treatment	0.286**	0.198*	0.250**	0.296**	1

*p<0.05; **p<0.001; *** The treatment domain was not included in the KINDL Epilepsy Module total.

Table 5. Known groups comparisons of the KINDL epilepsy module

Variable	Physical Wellbeing Mean ± SD (n)	Mental Wellbeing Mean ± SD (n)	Social Wellbeing Mean ± SD (n)	Treatment Mean ± SD (n)	KINDL-Epilepsy Total Mean ± SD (n)
Age ^b					
6-7 years	64.16±19.61 (15)	66.66±21.03 (15)	67.17±22.59 (15)	62.66±23.13 (15)	66.23±20.40 (15)
Over 7 years old	66.55±18.20 (144)	68.57±19.84 (144)	75.56±16.43 (144)	78.92±14.98 (144)	70.98±15.90 (144)
U, p	1023.000, p: 0.736	1015.000, p: 0.701	876.500, p: 0.230	644.000, p: 0.010**	966.000, p: 0.502
Family support need ^a					
Yes	55.01±19.36 (41)	61.40±17.98 (41)	65.96±19.95 (41)	74.26±14.81 (41)	62.19±16.80 (41)
No	69.57±16.79 (118)	70.82±20.02 (118)	77.81±15.05 (118)	78.47±17.01 (118)	73.43±15.24 (118)
t, p	3.960, p: 0.000**	2.663, p: 0.009**	3.967, p: 0.001**	1.408, p: 0.161	3.960, p: 0.000**
Mother's education ^a					
Just read and write (no diploma)	66.25±15.62 (25)	71.90±20.0 (25)	72.91±16.12 (25)	74.20±9.53 (25)	70.87±15.89 (25)
Primary school graduate	66.25±16.67 (89)	66.71±20.42 (89)	74.71±17.08 (89)	77.64±16.77 (89)	69.95±16.04 (89)
Secondary school and higher graduate	66.52±22.62 (45)	69.77±18.82 (45)	75.89±18.24 (45)	78.66±19.02 (45)	71.50±17.54 (45)
Z, p	0.817, p: 0.665	1.156, p: 0.450	1.109, p: 0.574	4.186, p: 0.123	0.521, p: 0.771
Social class ^a					
Low	70.23±19.76 (42)	69.40±22.40 (42)	76.28±19.51 (42)	84.52±13.87 (42)	72.50±19.22 (42)
High	64.93±17.60 (117)	68.03±19.00 (117)	74.22±16.33 (117)	74.82±16.71 (117)	69.83±15.24 (117)
t, p	1.622, p: 0.107	0.382, p: 0.703	0.663, p: 0.508	3.365, p: 0.001**	0.908, p: 0.336
Income perception ^c					
Income, equal or higher than expenses	68.77±17.37 (112)	72.05±18.82 (112)	77.48±15.82(112)	78.70±17.14 (112)	73.48±15.40 (112)
Income, less than expenses (poor)	60.50±19.26 (47)	59.68±19.85 (47)	68.28±18.71 (47)	74.25±14.66 (47)	63.50±16.59 (47)
t, p	2.652, p: 0.009**	3.721, p: 0.000**	3.165, p: 0.004**	1.556, p: 0.122	3.644, p: 0.000**
Duration of epilepsy ^a					
Four years and above	61.84±19.53 (57)	65.78±19.31 (57)	68.38±18.03 (57)	73.33±19.85 (57)	65.86±17.03 (57)
Up to 3 years	68.84±17.14 (102)	69.85±20.15 (102)	78.33±15.69 (102)	79.65±13.95 (102)	73.14±15.46 (102)
t, p	-2.347, p: 0.020*	-1.237, p: 0.218	-3.632, p: 0.000**	-2.345, p: 0.036*	-2.748, p: 0.007**
Duration of seizure ^a					
Shorter than one minute	66.84±21.28 (41)	71.40±18.05 (41)	75.70±17.29 (41)	78.17±14.17 (41)	72.02±16.02 (41)
One minute and longer	66.15±17.22 (118)	67.35±20.46 (118)	74.44±17.22 (118)	76.58±15.24 (118)	70.01±16.52 (118)
t, p	0.207, p: 0.836	1.124, p: 0.263	0.402, p: 0.688	0.350, p: 0.727	0.677, p: 0.499
Seizure frequency ^a					
Less frequent than once a month	67.35±17.15 (125)	67.92±20.69 (125)	74.58±17.81 (125)	76.76±17.03 (125)	70.56±16.72 (125)
Once a month or more	62.59±21.86 (34)	70.14±16.78 (34)	75.45±14.90 (34)	79.70±14.56 (34)	70.42±15.21 (34)
t, p	1.349, p: 0.179	-0.578, p: 0.564	-0.260, p: 0.795	-0.921, p: 0.359	0.046, p: 0.964
Treatment type ^a					
Monotherapy	68.14±17.10 (109)	68.89±20.61 (109)	76.55±16.91 (109)	76.97±15.56 (109)	71.91±16.19 (109)
Other	62.37±20.26 (50)	67.30±18.39 (50)	70.88±17.32 (50)	78.30±18.61 (50)	67.53±16.50 (50)
t, p	1.862, p: 0.064	0.469, p: 0.639	1.947, p: 0.053	-0.469, p: 0.640	1.575, p: 0.117

^aStudent's t test; ^bMann-Whitney U test; ^cKruskal-Wallis test; Levels of significance: *p<0.05; **p<0.001

Appendix**Table 1.** EFA* results of the main scale revealed three factor scale structure (structure matrix)

	Factor 1	Factor 2	Factor 3
Item 1 (I was as good at sports as the other children, in spite of my epilepsy)		0.537	
Item 2 (I was annoyed that I wasn't allowed to swim because of my epilepsy)		0.406	
Item 3 (I was invited less often than my classmates and friends because of my epilepsy)		0.323	
Item 4 (I had the feeling that other people didn't like me that much because of my epilepsy)		0.427	
Item 5 (I was satisfied with my looks)		0.544	
Item 6 (I needed a lot of help from other people)		0.342	
Item 7 (Being dependent on other people bothered me)	0.390		
Item 8 (I was afraid of having a fit/seizure)	0.561		
Item 9 (There was trouble at home because of my epilepsy)	0.502		
Item 10 (I was teased by other children because of my Epilepsy)		0.697	
Item 11 (I felt uncomfortable because of my epilepsy)	0.365	0.313	
Item 12 (I was afraid that other people might see me when I had an epileptic fit)	0.529	0.322	
Item 13 (I was treated differently from my brothers and/or sisters because of my epilepsy)			
Item 14 (I felt ashamed because of my epilepsy)	0.563	0.405	
Item 15 (My parents forbade me things because of my epilepsy)		0.503	
Item 16 (I was dissatisfied with myself because of my epilepsy)	0.305	0.373	
Item 17 (I felt my parents were demanding too much of me)	0.368	0.329	
Item 18 (I got left out when other people did things together, because of my epilepsy)		0.703	
Item 19 (I worried that I would not get a job later because of my epilepsy)	0.639		
Item 20 (I was afraid that other children would find my illness creepy or frightening)	0.632	0.525	
Item 21 (I worried that I would not find a steady boyfriend/girlfriend because of my epilepsy)	0.525	0.338	
Item 22 (I was able to do the same things as other children who do not have epilepsy)		0.481	
Item 23 (I hid the way I feel from my parents)		0.398	
Item 24 (I was afraid other people would think I was disabled)	0.671		
Item 25 (I had trouble concentrating paying attention in school because of my epilepsy)			0.830
Item 26 (I felt as though I couldn't think that quickly because of my epilepsy)			0.848
Item 27 (I forgot more than other children because of my epilepsy)			0.739
Item 28 (It bothered me having to take medication)	0.392		
Item 29 (I felt ill because of my medication)	0.406		0.336
Item 30 (I failed to take my medication)	0.392		
Item 31 (I would have liked to have more contact with other children who have epilepsy)	0.485		

*EFA: Exploratory factor analysis. Kaiser-Meyer-Olkin (KMO)= 0.804; Barlett's test: $\chi^2=2303.767$; $df=465$; $p<0.001$.

We tested the validity of the Turkish version of the KINDL Epilepsy Module by using both exploratory and confirmatory approaches. We first explored the scale structure of the instrument by Exploratory Factor Analysis (EFA). Bartlett's Sphericity test was significant at level $p<0.001$ and Kaiser-Meyer-Olkin value was found as 0.80, indicating the sample size adequacy. The factors having Eigen Values greater than 1.0 consisted of 70.2% of the overall scale variance. When we put the treatment domain aside, the EFA results of the main scale revealed three factor scale structure (see Appendix Table 1). The scale structure of the KINDL Epilepsy Module that we propose in this study is presented in Table 3. Then we tested the construct validity of the new proposed scale structure by using Confirmatory Factor Analysis (CFA), convergent-divergent validity analysis and the known groups validity analyses. CFA results are presented in Figure 1. The goodness of fit indices of the new three factor solution generated in the CFA were satisfactory. The results of CFA revealed $\chi^2=638.1$, $df=434$, $p=.001$, RMSEA=0.053 (95% CI=0.045–0.063), and CFI=0.95; GFI=0.92; TLI=0.94.

Convergent validity analyses presented in Table 4 revealed that all three domains of the KINDL Epilepsy Module was correlated with the related domains' scores and especially the Chronic illness module score of the KINDL generic scale except for the school domain of the generic KINDL. On the other hand, the "treatment domain" score of the KINDL-Epilepsy

module revealed only weak correlations ($r=0.198-0.296$) with the other domains of the Epilepsy module, and very poor correlations with the domains of the generic KINDL ($r=-0.014-0.217$) (Table 4).

Known groups validity results are shown in Table 5. Income perception, family support and duration of epilepsy ($p<0.01$) are found as the significant predictors of domain scores of the KINDL Epilepsy module for all three domains except for the treatment domain. The treatment domain is only sensitive to age ($p=0.010$), social class ($p=0.001$) of the family and the duration of epilepsy ($p=0.036$).

DISCUSSION

The outcome with primary importance in the management of epilepsy in children in Turkey is the reduction of the frequency of seizures. Valid and reliable QoL tools adapted to Turkish are needed for quality of life to be at least the secondary endpoint in the management of childhood epilepsy. Previous studies about QoL of epileptic children have mostly been focused on perception and/or attitudes towards epilepsy in Turkey (18–20). QOLIE scale 31 and 10 item versions are the only validated tools for Turkish which was developed only for adults (48 item version of the QOLIE only for adolescents) (21, 22). Until now, there is no quality of life scale developed or adapted for Turkish children with epilepsy. KINDL scale is one of the widely used generic HRQoL tools for children

and adolescents in Turkey. Its Epilepsy Module has been developed in German and English, by KINDL study group but psychometric properties of the original version of this module has not been published yet. This article is expected to contribute to the literature as being the first article globally examining the psychometric properties of the KINDL Epilepsy module, and also an adaptation study that will enable the evaluation of the quality of life in Turkish-speaking epileptic children.

The KINDL Epilepsy module and its dimensions revealed acceptable skewness and kurtosis figures which are all ≤ 1.0 and floor and ceiling effects which are all less than 5% except of the 15% ceiling effect of the treatment dimension.

The original KINDL Epilepsy module was proposed as having two dimensions named Epilepsy and Treatment dimensions. During the analyses of this study, we used both exploratory and confirmatory approaches and suggested three sub-dimensions for the epilepsy dimension, leaving aside the treatment dimension. We propose the epilepsy dimension in three sub-dimensions: Physical, Mental and Social Wellbeing sub-dimensions. Internal consistency of these dimensions was examined by item-total correlations and by Cronbach's alpha values. Alpha values for all the dimensions and the overall scale were in acceptable limits (≥ 0.70) except for the physical wellbeing dimension which is very close to 0.70.

Additionally, we used the findings of the item-scale correlations and the alpha values for the sake of determining any problematic items of the instrument. As a matter of fact, there is no problematic item of the Physical wellbeing sub-dimension, whereas the item no 7 of the Mental wellbeing dimension and the items no 3 and 30 of the Social wellbeing sub-dimension are the possible problematic items of the epilepsy dimension of the scale. It seems all three problematic items are culture related items which may be revised or removed in the short future versions of the module. Item 7 (being dependent on other people) is about the burden of the child to others. The study sample consists of patients residing in the Aegean region, which is one of the most developed region of the country, and in this region, the child is more valuable than the less developed regions of the country and so, culturally the child is never a burden for others. One of the problematic items of the Social wellbeing sub-dimension is the item no 3. The original wording of this item completely reads as "I was invited less often than my classmates and friends because of my epilepsy". This is a general and formal wording; however, children do not invite each other, but they take them among them. Item 30 is another statistically problematic item of Social wellbeing sub-dimension and reads as "I failed to take my medication". This is also a culture related item because, parents prefer to give medicines to their children with chronic diseases themselves and avoid giving this responsibility to their children in Turkey.

On the other hand, we must also draw attention to the low alpha value of the treatment dimension in which item loadings are generally low. Item 32 (I would have like to ask an experienced doctor for advice) appears to have the primary responsibility for the reduction of the alpha value of this dimension. The alpha value would increase to 0.63 if the item 32 is removed. If the translation and cognitive debriefing procedures used in this study were not internationally accepted standard methods, we might think that some items of these dimensions were misunderstood by children. The only possible logical explanation that remains is the habit of traditionally evaluating healthcare accessibility and patient-physician relationships by their parents and not by children in the country.

Construct validity of the Epilepsy module is tested by three types of analyses: Factor Analysis (CFA), Convergent validity and the Known group's validity analyses. CFA uses Structure Equation Modeling (SEM) approach that aims to test the goodness of fit of the proposed and obtained structure

of a questionnaire. The exploratory analysis directed us to develop a three-dimensional module structure. Despite some problematic items, the goodness of fit results of the second-order CFA showed the accuracy of the three-dimensional structure we proposed in this study.

Overall score of the Epilepsy dimension and its sub-dimension scores showed very good correlations with the overall score of the generic KINDL. The conceptually related dimensions between the generic scale and the Epilepsy scale showed acceptable convergence. Especially sub-dimensions of the epilepsy module have very good convergence with the generic Chronic illness module of the generic KINDL. The contradictory findings belong to the treatment dimension here as well. The treatment dimension score generated very weak convergence with both the dimensions of the generic KINDL and the dimensions of the Epilepsy module. These results can be explained by the dominance of parents, in the doctor-patient relationship, even if the sick person is a child in the country.

Known group comparisons yielded consistent or contradictory results with the literature in terms of variables affecting quality of life in epileptic children. We have found that age did not affect quality of life in our study, consistent with the literature findings (23, 24). Socioeconomic status of the family was found sensitive to the scale scores. There is a statistically significant relationship between family income and social class and the dimensions of the KINDL Epilepsy module. This is consistent with the findings of several studies in the literature (23–29). Family support also increases HRQoL in all the dimension scores which were also reported in the previous literature (24, 25, 28–30). Nevertheless, parent education was not found significantly important on HRQoL in this study in contrary with the literature findings (24, 27, 31). Homogeneous mother education levels of the study group may be the reason of this inconsistency.

Among the illness related variables, we found only duration of epilepsy and age of onset of epilepsy, significantly related to the scale dimension scores which were also reported in the previous studies (23, 27, 32). We expected to find a significant relationship with the scale dimension scores and the frequency and duration of seizures, but we did not find any relationships between these variables as it was shown by the previous studies (23, 24, 26–33). There was only one study consistent to our results that there is no relationship between duration of illness and the QOL (34). Both frequency and the duration of seizures can be regarded as proxy measures of uncontrolled treatment. As we mentioned above, this study sample consisted of patients living in the most developed region of the country and the children can easily access health service and the medicines without any obstacle. So, this homogeneity of the study population in terms of adequate health service accessibility can explain the absence of a relationship between HRQOL and the seizure frequency and duration.

There are several limitations of this study. First, the study sample represents the western residents of the country that may restrict the generalizability of the results to the entire population. What partially eliminates this limitation is that a common Turkish language is spoken in most of the of Turkey. Known groups analyses may be enlarged by using some other variables such as number of drugs taken, anxiety and depression of the parents and the children, parents' education and family composition which have been shown to be sensitive to QoL in the previous studies.

To conclude, the three sub-dimension structure of the epilepsy dimension of KINDL epilepsy module is a promising tool that can be used in the clinical context during patient management. Psychometric properties revealed that the treatment dimension of the scale was not sufficient. Therefore, it is recommended that the treatment dimension of the scale should be interpreted carefully in clinical practice and research.

Ethics Committee Approval: The study has been approved by the Ethical Committee of Manisa Celal Bayar University (Approval date: 06/01/2021 File number: 20.478.486).

Informed Consent: Written informed consent was obtained from all participants.

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