Original article / *Araştırma*

Reliability and validity study of the KIDSCREEN Health-Related Quality of Life Questionnaire in a Turkish child/adolescent population*

Hakan BAYDUR,[1] Dilek ERGİN,[1] Gül GERÇEKLİOĞLU,[2] Erhan ESER[3]

ABSTRACT

Objective: *The aim of this study is to adapt KIDSCREEN Health Related Quality of Life (HRQoL) questionnaire into Turkish and to analyze the psychometric properties of the scale.* ***Methods:*** *The study conducted in the city of Manisa located in western Turkey is a validity and reliability study and consisted of 662 children/adolescents between the ages of 8 and 18 and 552 parents. In the study, sociodemographic characteristics of the participants were identified, and KIDSCREEN-52 and KINDL QoL questionnaires were administered. The KIDSCREEN scale was adapted to Turkish and applied psychometric analyses.* ***Results:*** *Cronbach's alpha ranged between 0.69 and 0.95 for the child/adolescent version of the KIDSCREEN-52, KIDSCREEN-27 and KIDSCREEN-10 index and between 0.68 and 0.94 for the proxy version. The results of confirmatory factor analyses fit indices for KIDSCREEN were considered to be at a good level. Correlation coefficient between the dimensions of the KIDSCREEN and KINDL scales assessing similar constructs (ranging between 0.45 and 0.62) were higher than that of other dimensions. In addition, the KIDSCREEN yielded results to discriminate the physical well-being, psychological well-being and perception of insufficient income.* ***Conclusion:*** *Turkish version of the child/adolescent and proxy versions of KIDSCREEN is a valid and reliable measurement tool.* ***(Anatolian Journal of Psychiatry 2016; 17(6):496-505)***

Keywords: *KIDSCREEN, quality of life, psychometric properties*

Türk çocuk/ergenlerde KIDSCREEN Sağlıkla İlişkili Yaşam Kalitesi Ölçeğinin geçerlilik ve güvenilirliği

ÖZ

Amaç: *Bu çalışmanın amacı, çocuklar ve gençler için geliştirilmiş Sağlıkla İlişkili Yaşam Kalitesi Ölçeği KIDSCREEN'i Türkçeye uyarlamak ve psikometrik özelliklerini çözümlemektir.* ***Yöntem:*** *Araştırma Türkiye'nin batısında yer alan Manisa ilinde 8-18 yaşları arasındaki 662 çocuk ve onların anne-babaları (s=552) üzerinde yapılmış geçerlilik ve güvenirlilik çalışmasıdır. Katılımcıların sosyodemografik özellikleri belirlenmiş, KIDSCREEN-52 ve KINDL Yaşam Kalitesi Ölçeği uygulanmıştır. Araştırmada KIDSCREEN ölçeği Türkçeye uyarlanmış ve psikometrik özellikleri belirlenmiştir.* ***Bulgular:*** *KIDSCREEN-52, KIDSCREEN-27 ve KIDSCREEN-10 indeks çocuk sürümünde Cronbach alfa dağılımı 0.69-0.95 arasındadır. Anne-baba sürümünde ise Cronbach alfa 0.68-0.94 arasında değişmektedir. KIDSCREEN-52 doğrulayıcı faktör analizi uyum indeksi sonuçları iyi düzeyde bulunmuştur. KIDSCREEN ile KINDL ölçeklerinin birbirine benzer yapıları arasındaki korelasyon katsayısı (r=0.45-0.62 arasında) diğer boyutlardan daha yüksek düzeydedir. Ayrıca KIDSCREEN bedensel, ruhsal iyilik ve yetersiz gelir algısını ayırt edebilecek sonuçlar vermiştir.* ***Sonuç:*** *Türkçeye uyarlanmış KIDSCREEN Yaşam Kalitesi Ölçeği çocuk/ergen ve anne-baba*

* This article was presented on 15th Congress of National Public Health.

[1] Assist. Prof. Dr., Celal Bayar University, School of Health, Manisa, Turkey
[2] Assist. Prof. Dr., Celal Bayar University, Vocational School of Health Services, Manisa, Turkey
[3] Prof.Dr. Celal Bayar University, School of Medicine, Department of Public Health, Manisa, Turkey
Correspondence address *I Yazışma adresi:*
Assist. Prof. Dr. Hakan Baydur Celal Bayar University, School of Health, Manisa, Turkey
E-mail: hakan.baydur@gmail.com
Received: January 08th 2016, Accepted: February 08th 2016, doi: 10.5455/apd.214559
Anatolian Journal of Psychiatry 2016; 17(6):496-505

sürümleri geçerli ve güvenilir bir ölçüm aracıdır. ***(Anadolu Psikiyatri Derg 2016; 17(6):496-505)***

Anahtar sözcükler: *KIDSCREEN, yaşam kalitesi, çocuk, psikometrik özellikler*

INTRODUCTION

A large number of general or disease-specific Health Related Quality of Life (HRQoL) scales have been developed (30 generic and 64 disease-specific) for children and they have increased over the years.[1-3]

There has been a recent movement of using HRQoL measures in the assessment of health service quality and the effectiveness of medical interventions in the clinical context of pediatrics in Turkey. Based on this need, a number of HRQoL measures -either generic or disease specific- were culturally adopted to Turkish such as PedsQol and Kindl which has widely been used in clinical context. KIDSCREEN has been recently introduced to child mental health research circles with its comprehensive structure of involving a wider range of variables such as autonomy, bullying and financial aspects. So KIDSCREEN -as a generic tool of quality of life- has currently been used in mental health, well-being, wellness and brain development of children in the newly published papers in the literature.[4-6]

The KIDSCREEN was developed by a multicenter project that consists of 13 countries in Europe[7-9] for the purpose of using in both community settings and clinical context. The KIDSCREEN[9, 10] has been then adapted to 38 languages and has been used in more than 50 clinical and epidemiological studies.[11]

This present study aims to adapt the KIDSCREEN questionnaire developed for children and adolescents into Turkish and to analyze the psychometric properties of the Turkish versions: KIDSCREEN 52, 27 and version 10.

METHODS

Sample and data collection

The study sample was comprised of 662 representative cross-sectional sample of children/ adolescents attending six state schools of Manisa province (Turkey), aged between 8 and 18 years old. A proxy (parent) assessment was also employed for 552 of these children. Sample selection was done by multistage stratified random sampling method. This study was carried out in randomly selected three secondary and three high schools of Manisa city center Turkey, one from each strata of rural, urban and sub-urban. One class was randomly selected from each of the grades (3rd to 12th grades) of the selected schools. So study sample consisted of all children educating in 30 randomly selected classes. Forty of the randomly recruited students and their parents were administered a retest following 15 days after the first administration. Ethical approval were taken from the Celal Bayar University Ethics Committee.

The questionnaire battery consists of three questionnaires: 1. Sociodemographic Form, 2. Turkish version of the KIDSCREEN-52 Scale, 3. KINDL Scale.

Instruments

KIDSCREEN: The KIDSCREEN-52 is a 52-item generic scale developed for children and adolescents. There are 27 item and 10 item self-report short versions of the KIDSCREEN as well in addition to proxy versions. The 52 item and 27 item versions consist of ten and five dimensions respectively. The dimensions of 52 item version are as follows: physical well-being (5 items), psychological well-being (6 items), moods and emotions (7 items), self-perception (5 items), autonomy (5 items), parent relationships and home life (6 items), financial resources (3 items), social support and peer (6 items), school environment (6 items), social acceptance/bullying (3 items). A 10-item one-dimension index version of the KIDSCREEN is also available. The scoring of the KIDSCREEN dimensions are calculated via Rash scores for each scale and transformed into t values with a mean of 50 and a standard deviation of 10, in which the details of scoring was published elsewhere.[12] Higher scores indicate better HRQOL.

Adaptation of the KIDSCREEN scale into Turkish language was performed by implementing standardized international methods mentioned elsewhere.[13-16]

KINDL: KINDL is another generic scale that has been developed globally and validated for using on Turkish children and adolescents.[17] KINDL is a 24 items and 6 dimension that has three different age versions: Kiddy (4-7 age); Kid (8-12 age) and Kiddo (13-16 age) and parent versions.[18]

The statistical and psychometric analyses

The statistical and psychometric analyses of this

study were carried out by using confirmatory approach in both reliability and validity analyses.

Scale descriptions

Distribution properties of the Turkish KIDSCREEN were presented as mean±sd and floor and ceiling effects. A 15% were considered a threshold percentage for floor and ceiling effects of the scales.[19]

Reliability analysis: Internal consistency and test-retest correlations were employed for the reliability analyses of this study. The internal consistency were assessed by Cronbach's alpha coefficient[20,21] and item success (item-scale correlations corrected for overlap) analyses. 'Item success rate' refers to the correlation between an item and the dimension it belongs to and item success value as closer to 100% as possible is expected. Intra-class Correlation Coefficient (ICC) were examined for test-retest correlations and values over 0.75 were considered to indicate that the scale was consistent.[22]

Validity: Construct validity testing was done by confirmatory factor analysis; convergent-discriminant validity and known groups validity testing.

Confirmatory factor analysis: Confirmatory factor analysis was performed for testing the structural fit of the Turkish version by the original scale structure of the KIDSCREEN. Summary statistics of fit indices and their acceptable limits presented in this are as follows:[23]

Chi-square/degrees of freedom χ^2/df=0.0-3.0, root mean square error of approximation (RMSEA) <0.08, comparative fit index (CFI) >0.95, standardized root mean residual (SRMR) <0.08.

Convergent-discriminant validity: KIDSCREEN and KINDL scales were examined for testing convergent and discriminant validity. Convergence indicates the two dimensions believed to reflect the same underlying concept highly correlated each other, whereas discriminant validity indicates low correlations between dimensions that are believed to assess different characteristics.[22] The resulting correlation coefficients between 0.10 and 0.30 were considered as low, between 0.31 and 0.50 as medium and over 0.51 as high.[24]

Known groups' validity: Three dichotomous variables (existence of any physical and psychological problem and family income) were used known groups comparisons of the scales scores. Student's t-tests, effect size (ES) statistics were used in these comparisons. A value obtained for the ES between 0.20 and 0.50 was considered as low; 0.51-0.80 as medium and >0.80 as high.[24]

SPSS 21, Lisrel 9.1 and MAP statistical software packages were used in this study. A type 1 error of 0.05 were considered as the threshold of significance in the analyses.

RESULTS

Sample characteristics

The study included 662 children/adolescents and 552 parents. 49.4% of children/adolescents were males (mean age 13.1±2.4 years, range:8-18); 11.8% (n=78) had a chronic disease; 2.4% (n=16) perceived themselves as disabled; 26.7% had visited a physician due to a health problem in the last month and 11.6% perceived their family income as insufficient.

Psychometric properties

Scale description and reliability: The scores obtained from the social acceptance-bullying, self-perception, parent relationships and home life, and financial resources dimensions in terms of ceiling effect were around 25%. No floor effects were detected in any of the dimensions (Table 1).

Cronbach's alpha values of the child/adolescent versions ranged from 0.69 to 0.90 for KIDSCREEN-52 and 0.78 to 0.84 for KIDSCREEN-27; whereas proxy versions' alpha values ranged from 0.68 to 0.92 for KIDSCREEN-52 scale and 0.77 to 0.81 for KIDSCREEN-27 (Table 1).

The dimension-total correlation coefficients (corrected for overlap) ranged from 0.16 (social acceptance) to 0.80 (psychological well-being) for child/adolescent versions and 0.33 (social acceptance) to 0.76 (psychological well-being) for proxy version of the KIDSCREEN-52. These figures ranged from 0.63 (social support and peers) to 0.75 (psychological well-being) for child/adolescent versions and 0.53 (school environment) to 0.74 (psychological well-being) for proxy version of the KIDSCREEN-27. The lowest dimension-total correlations were obtained from the social acceptance-bullying dimension of both child/adolescent and proxy versions. The 'item success rates' were generally satisfactory.

The ICC values -that indicate consistency with test retest assessments of a group of respondents- resulted some weak ICC values for the 'self-perception' (0.242) and 'autonomy'

Table 1. Item descriptive statistics and reliability properties (Cronbach's alphas, correlation coefficients and ICCs)

Dimensions of the ccale	Child/adolescent (n=662) Mean±SD#	Floor%	Ceiling%	α	Corr.	ISR%	ICC	Proxy (n=552) Mean±SD#	Floor%	Ceiling%	α	Corr.	ISR%	ICC
KIDSCREEN-52														
Physical well-being	51.8±12.0	0.0	12.4	0.82	0.68	100	0.834	50.0±10.9	0.0	7.9	0.80	0.62	98	0.715
Psychological well-being	49.5±13.1	0.2	18.2	0.90	0.80	100	0.814	50.8±13.7	0.4	18.1	0.88	0.76	100	0.453
Moods & emotions	52.0±10.8	0.0	14.7	0.84	0.61	100	0.830	54.2±10.5	0.0	14.0	0.79	0.57	100	0.489
Self-perception	54.8±11.1	0.0	27.4	0.69	0.62	82	0.666	56.2±12.0	0.0	29.8	0.68	0.61	87	0.242
Autonomy	44.7±11.3	0.5	9.4	0.83	0.55	100	0.745	43.6±13.4	0.2	12.8	0.84	0.49	100	0.369
Parent relation & home life	50.9±11.6	0.3	25.6	0.86	0.72	100	0.830	53.8±13.3	0.0	27.5	0.86	0.71	100	0.579
Financial resources	49.3±10.8	2.4	27.5	0.88	0.52	100	0.894	50.3±12.3	2.8	29.8	0.92	0.47	100	0.072
Social support & peers	46.3±10.3	0.0	5.4	0.79	0.58	100	0.929	47.6±12.2	0.2	4.8	0.79	0.60	100	0.611
School environment	56.4±12.7	0.0	23.1	0.88	0.62	100	0.952	56.6±12.6	0.0	24.2	0.88	0.53	100	0.605
Social acceptance (bullying)	49.7±10.5	1.2	48.7	0.73	0.16	100	0.800	52.6±9.2	0.0	59.5	0.77	0.33	100	0.246
Overall				0.95		98					0.94		99	
KIDSCREEN-27														
Physical well-being	51.8±12.0	0.0	12.3	0.82	0.67	95	0.834	50.0±10.9	0.0	7.9	0.80	0.61	95	0.715
Psychological well-being	49.5±12.1	0.0	9.5	0.84	0.75	100	0.791	51.5±13.3	0.0	7.9	0.80	0.74	100	0.360
Autonomy & parent relation	48.5±11.7	0.2	8.9	0.80	0.68	100	0.749	49.5±14.2	0.0	9.4	0.79	0.63	100	0.434
Social support & peers	48.7±12.0	0.2	21.1	0.78	0.63	100	0.894	50.3±13.3	0.2	14.9	0.77	0.60	100	0.437
School environment	54.7±12.6	0.0	26.0	0.83	0.66	100	0.935	55.1±12.8	0.0	27.7	0.81	0.53	100	0.950
Overall				0.93		99					0.91		99	
KIDSCREEN-10	49.8±12.3	0.0	4.0	0.82			0.805	50.4±13.7	0.0	2.7	0.79			0.525

Mean values are calculated using global data t scores; α: Cronbach's alpha; Corr.: item-scale correlation for corrected overlap; ISR%: (Item Success Rate %) summary success percent for items discrimination (indicates significant correlation between items and scales); ICC: Intra-class Correlation Coefficient for test-retest comparisons.

(0.369) dimensions of the KIDSCREEN-52.

Validity

Confirmatory factor analysis: Results of confirmatory factor analyses (CFA) for the Child/ Adolescence and Proxy (parent) versions of the KIDSCREEN-52 were as follows: Child/Adolescence version: RMSEA=0.06, CFI=0.97; and Proxy version: RMSEA=0.06, CFI=0.95. On the other hand, CFA results for child/adolescent and Proxy (parent) versions of the KIDSCREEN-27 were RMSEA=0.07 and 0.08, CFI=0.96 and 0.94 respectively (Table 2).

Table 2. Summary reports of confirmatory factor analyses

Questionnaires	Child/Adolescent		Proxy	
Fit indices	KIDSCREEN-52	KIDSCREEN-27	KIDSCREEN-52	KIDSCREEN-27
RMSEA	0.06	0.07	0.06	0.08
CFI	0.97	0.96	0.95	0.94
χ^2/df	2.85	4.02	2.35	3.94
Stand. RMR	0.07	0.05	0.07	0.06

Convergent-discriminant validity: A moderate to high level of correlations between the KINDL and KIDSCREEN dimensions were determined between the dimensions of the scales questioning similar dimensions (Table 3).

Known groups validity: In known groups validity testing, the relationship between most of the dimensions of the KIDSCREEN and experiencing health problems in the last month; feeling psychologically unwell; and perception of insufficient family income were considered statistically significant ($p<0.05$) (Table 4).

On the other hand, the level of agreement (ICC) between self-report and proxy assessment of children's KIDSCREEN dimensions were found acceptable (Table 3).

DISCUSSION

We followed three consecutive steps in the psychometric analyses, to show the scale distribution, reliability and validity findings of the Turkish KIDSCREEN 52, 27 and 10 items versions. The psychological wellbeing, autonomy and social support dimension scores of our study sample are obviously less than those Serbian, Netherland's, Japanese and Swedish studies' results[25-28] whereas Turkish children and adolescents had better score for self-perception dimension of KIDSCREEN-52 than those country samples' scores. The discrepancy of the psychological wellbeing, autonomy, social support dimension and self-perception scores between our sample and some international study samples may be attributed to the cultural contexts of these communities.

As for the distribution properties of the Turkish KIDSCREEN, none of the dimensions revealed any floor effects whereas five of the ten dimensions scores of our study showed ceiling effects higher than 15%: Psychological wellbeing, Self-perception, Parent relations, Financial wellbeing and bullying consistent with the literature results[11,26,27,29,30] There is also a consensus among literature findings with ours, on the very high ceiling effect of bullying dimension.[11,26,27,29,30]

Similar results were obtained for the proxy versions in regard to floor and ceiling effects. The dimensions of the Turkish child/adolescent version having high ceiling effects are the ones in the proxy version as well.[9,11,27,30-32]

Internal consistency was tested by Cronbach's alpha coefficient and item success analyses. Alpha coefficient for the child/adolescent and proxy versions of the KIDSCREEN-52 and KIDSCREEN-27 were found quite satisfactory for all the dimensions except for self-perception (0.69),[33-36] hence, self-perception dimension showed insufficient alpha values in Serbian (0.58) and Iranian (0.60)[27,32] studies as well. Self-perception may be regarded as a very culturally relevant concept shared by some related cultures such as western Turkey, Serbia and more or less Iran.

The item-total success rate results obtained in this present study were consistent with the results obtained in other studies.[32,37] Low correlation coefficient between the social acceptance-bullying dimension and the overall score in this

present study was similar to that obtained in the multicenter European study.[38,39]

Test-retest comparison were quite acceptable (ICC=0.67-0.95) for child/adolescent version and relatively low (ICC=0.07-0.72) for proxy version. ICC values were less than 0.5 in seven of the ten dimensions of the proxy versions of the KIDSCREEN-52 and three of the five dimensions of the proxy versions of the KIDSCREEN-27. The European multicenter study also found lower ICC values for similar dimensions of proxy versions but their ICC values were better than (between 0.45 and 0.62) our results.[9,11,31]

Construct validity analyses of the adopted Turkish versions of the KISCREEN consisted of confirmatory factor analyses, convergent-discriminant validity and known groups' comparisons. Comparative fit index (CFI) values of the child/adolescent and proxy versions of the KIDSCREEN-52 and KIDSCREEN-27 well satisfy the criteria (>0.95) proposed in the literature. In addition to CFI values, very satisfactory figures were obtained for RMSEA (0.06-0.08); chi-square/DF (2.35-4.02) and SRMR (0.05-0.07).[40,41]

The convergent and discriminant validity analyses showed good results for the child/adolescent version of KIDSCREEN-52 and 27 with parallel scales, consistent with the previous published literature.[8,9,42,43] High correlations were obtained between the dimensions measuring similar structures of KINDL and KIDSCREEN-52 and KIDSCREEN-27. Almost all of the dimensions of the KIDSCREEN and the KINDL revealed very satisfactory convergence (>0.05). The lowest convergence was obtained between self-esteem dimension of KINDL and the self-perception dimension of KIDSCREEN (r=0.41). As for the discriminant validity, best performances were obtained for the physical well-being, parent relation and home life, social support and peers and school environment dimensions of the KIDSCREEN-52 and all of the dimensions of the KIDSCREEN-27. Autonomy dimension of the KINSCREEN-52 showed higher correlations with the conceptually closer dimensions of the KINDL (i.e. self-esteem and friends dimensions) of the KINDL.

The results of a Norwegian study[44] who used KINDL, confirmed our results for the convergence of all dimensions of KIDSCREEN-52 and the good divergence capacities of the physical well-being, parent relation and home life, social support and peers and school environment dimensions. The only minor discordance was found in self-esteem dimension (0.41 vs 0.57).

Good convergent/discriminant properties for all dimensions except for self-perception and autonomy dimensions. Best performances were obtained for the psychological wellbeing, moods and emotions, parent relation and home life, social support and peers and school environment dimensions of the KIDSCREEN 52.

Cohen's d was used for the known groups validity analyses. All of the scales of the child/adolescent versions of the KIDSCREEN-52 and 27 and short version 10, were found sensitive to family income and existence of any morbidity except for social acceptance and bullying dimension for child/adolescent versions and School environment dimension for proxy version, regardless of gender of the child. This finding may indicate a homogenous perception of social acceptance and bullying regardless of family income level, as a proxy indicator of social class. Previous multicenter validation studies' results confirmed our findings.[8,9,11,31,43,45-47]

The level of agreement between self-report and proxy versions were found acceptable (ICC>0.50) except for social acceptance-bullying dimension in all versions of the KIDSCREEN. Literature findings are inconsistent on this issue: A European study by Robitail et al.[37] reported very satisfactory figures on self and proxy ratings and also a recent Serbian study[27] found very consistent results. On the other hand agreement figures on self and proxy ratings were found very low in Cremeens et al. study.[48]

Our study has some weaknesses and strengths. Cross sectional design of this study would not allow us to assess changes thoroughly in children's QoL over time. So, a longitudinal study design would overcome this restriction. Nevertheless, this cross sectional sample also gives us an advantage to show the validity of this instrument on a representative study sample. The mode of application of the questionnaires especially to parents (proxy versions) would result some bias in our results since families might probably seek help from their children when filling in the questionnaires or answer the questions unanimously with their family members.

CONCLUSION

The child/adolescent and proxy (parent) Turkish versions of the KIDSCREEN-52, KIDSCREEN-27 and KIDSCREEN-Index-10 are valid and reliable measurement tools for use in both commu-

Table 3. Correlation between KIDSCREEN and KINDL scales for convergent-discriminant validity

Dimensions	KINDL-Physical Child	KINDL-Physical Proxy	KINDL-Emotional Child	KINDL-Emotional Proxy	KINDL-Self-esteem Child	KINDL-Self-esteem Proxy	KINDL-Family Child	KINDL-Family Proxy	KINDL-Friend Child	KINDL-Friend Proxy	KINDL-School Child	KINDL-School Proxy	Child/ Proxy ICC[1]
KIDSCREEN-52													
Physical well-being	0.563**	0.423**	0.455**	0.343**	0.448**	0.396**	0.402**	0.317**	0.421**	0.297**	0.416**	0.325**	0.684
Psychological well-being	0.487**	0.409**	0.578**	0.505**	0.538**	0.445**	0.507**	0.456**	0.452**	0.405**	0.417**	0.353**	0.611
Moods & emotions	0.470**	0.376**	0.587**	0.538**	0.422**	0.305**	0.504**	0.501**	0.355**	0.286**	0.424**	0.490**	0.532
Self-perception	0.417**	0.348**	0.450**	0.380**	0.411**	0.334**	0.438**	0.406**	0.376**	0.314**	0.411**	0.413**	0.481
Autonomy	0.290**	0.248**	0.325**	0.269**	0.347**	0.268**	0.309**	0.274**	0.350**	0.237**	0.274**	0.208**	0.591
Parent relation & home life	0.407**	0.328**	0.456**	0.415**	0.471**	0.437**	0.621**	0.559**	0.370**	0.338**	0.411**	0.375**	0.565
Financial resources	0.276**	0.219**	0.336**	0.323**	0.248**	0.205**	0.340**	0.269**	0.329**	0.274**	0.247**	0.212**	0.541
Social support & peers	0.309**	0.328**	0.392**	0.395**	0.383**	0.298**	0.269**	0.311**	0.515**	0.499**	0.278**	0.313**	0.627
School environment	0.436**	0.272**	0.404**	0.315**	0.478**	0.367**	0.483**	0.374**	0.403**	0.302**	0.561**	0.484**	0.649
Social acceptance (bullying)	0.215**	0.245**	0.300**	0.449**	0.116**	0.194**	0.130**	0.332**	0.263**	0.319**	0.086*	0.256**	0.427
KIDSCREEN-27													
Physical well-being	0.563**	0.423**	0.455**	0.343**	0.448**	0.396**	0.402**	0.317**	0.421**	0.297**	0.416**	0.325**	0.684
Psychological well-being	0.523**	0.443**	0.609**	0.555**	0.517**	0.419**	0.515**	0.495**	0.451**	0.363**	0.433**	0.433**	0.621
Autonomy & parent relation	0.386**	0.348**	0.414**	0.403**	0.404**	0.384**	0.479**	0.428**	0.400**	0.311**	0.386**	0.351**	0.548
Social support & peers	0.367**	0.314**	0.441**	0.428**	0.396**	0.314**	0.341**	0.387**	0.568**	0.471**	0.318**	0.310**	0.616
School environment	0.447**	0.285**	0.430**	0.343**	0.463**	0.350**	0.486**	0.382**	0.414**	0.305**	0.555**	0.488**	0.623
KIDSCREEN-10	0.541**	0.459**	0.520**	0.491**	0.514**	0.477**	0.497**	0.475**	0.488**	0.358**	0.529**	0.504**	0.634

**: p<0.05; **: p<0.01; ICC[1]: Intra-class Correlation Coefficient for child-parent comparisons.*

Table 4. Differences in KIDSCREEN dimension scores by physical health conditions, mental health status and perception of family income

Dimensions of the scales	Experiencing physical health problems in the last month				Experiencing psychological health problems				Insufficient family income			
	Child		Proxy		Child		Proxy		Child		Proxy	
	Δ	d	Δ	d	Δ	d	Δ	d	Δ	d	Δ	d
KIDSCREEN-52												
Physical well-being	-8.7	0.56***	-4.8	0.34***	-7.6	0.47***	-6.3	1.04***	-6.0	0.52***	-5.5	0.50***
Psychological well-being	-12.2	1.59***	-7.0	0.39***	-10.8	0.63***	-8.0	0.43***	-7.3	0.58***	-6.0	0.49***
Moods & emotions	-9.9	1.58***	-4.6	0.34***	-8.2	0.57***	-4.2	0.29**	-5.1	0.49***	-3.6	0.34***
Self-perception	-7.4	1.09***	-5.1	0.31**	-8.8	0.61***	-4.3	0.25*	-5.4	0.50***	-5.8	0.49***
Autonomy	-6.6	0.99***	-5.8	0.32***	-4.4	0.29***	-3.8	0.20	-5.8	0.54***	-3.2	0.23**
Parent relation & home life	-8.5	0.57***	-7.5	0.41***	-6.8	0.44***	-5.6	0.29**	-6.8	0.61***	-4.9	0.37***
Financial resources	-3.2	0.22**	-3.3	0.20*	-3.1	0.21**	-2.2	0.13	-9.7	1.02***	-10.2	0.98***
Social support & peers	-4.1	0.30***	-5.4	0.32**	-5.6	0.41***	-6.8	0.39***	-4.3	0.43***	-2.7	0.22*
School environment	-8.4	1.09***	-6.7	0.78***	-5.8	0.75***	-4.8	0.27**	-3.9	0.31***	-1.9	0.15
Social acceptance (bullying)	-2.2	0.16*	0.0	0.00	-5.1	0.36***	-0.1	0.01	-1.0	0.10	-2.8	0.34***
KIDSCREEN-27												
Physical well-being	-8.7	0.56***	-4.8	0.34***	-7.6	0.47***	-6.3	1.04***	-6.0	0.52***	-5.5	0.50***
Psychological well-being	-11.7	1.74***	-6.4	0.37***	-10.2	0.64***	-7.8	0.43***	-6.7	0.57***	-6.6	0.50***
Autonomy & parent relation	-6.3	0.92***	-6.6	0.33***	-5.5	0.35***	-3.8	0.18	-8.7	0.82***	-8.9	0.64***
Social support & peers	-5.2	0.33***	-6.6	0.75***	-7.4	0.46***	-7.2	0.40***	-5.2	0.44***	-2.5	0.18*
School environment	-8.7	1.15***	-5.9	0.69**	-6.2	0.81***	-4.6	0.26*	-4.7	0.38***	-2.8	0.21*
KIDSCREEN-10	-10.0	1.44***	-7.4	0.39***	-8.5	1.17***	-6.3	0.32**	-7.6	0.67***	-6.9	0.50***

*Δ: Mean differences; d: Cohen's d (Effect Size) 0.3 low, 0.5 medium, 0.8 large; *: p<0.05; **: p<0.01; ***: p<0.001*

nity and clinical contexts. However, there are some important points to mention: The autonomy and financial resources of the self-report version of the KIDSCREEN-52 have relatively poor psychometric results compared to other dimensions. Additionally, proxy assessments of social acceptance-bullying dimension were not found satisfactory having very poor psychometric properties. Consequently, the autonomy and financial resources of the self-report version and the proxy version of the social acceptance-bullying dimension should be interpreted with caution.

Authors' contributions: *H.B.: Study design, collecting data, screening the literatüre, writing the manuscript, statistical analysis; D.E.: Collecting data; reviewing manuscript; G.G.: Study design, collecting data; reviewing manuscript; E.E.: Study design, coordination of the study team, writing the manuscript and final review.*

REFERENCES

1. *Eiser C, Morse R. A review of measures of quality of life for children with chronic illness. Arch Dis Child 2001; 84:205-211.*
2. *Solans M, Pane S, Estrada M-D, Serra-Sutton V, Berra S, Herdman M, et al. Health-related quality of life measurement in children and adolescents: a systematic review of generic and disease-specific instruments. Value in Health 2008; 11:742-764.*
3. *Davis E, Waters E, Mackinnon A, Reddihough D, Graham HK, Mehmet-Radji O, et al. Paediatric quality of life instruments: a review of the impact of the conceptual framework on outcomes. Dev Med Child Neurol 2006; 48:311-318.*
4. *Waenerlund AK, Stenmark H, Bergstrom E, Hagglof B, Ohman A, Petersen S. School experi-ences may be important determinants of mental health problems in middle childhood - a Swedish longitudinal population-based study. Acta Paediatr 2016 Apr;105(4):407-415.*
5. *Tymms PB, Curtis SE, Routen AC, Thomson KH, Bolden DS, Bock S, et al. Clustered randomised controlled trial of two education interventions designed to increase physical activity and well-being of secondary school students: the MOVE Project. BMJ Open 2016; 6:e009318.*
6. *Sharpe H, Patalay P, Fink E, Vostanis P, Deighton J, Wolpert M. Exploring the relationship between quality of life and mental health problems in chil-dren: implications for measurement and practice. Eur Child Adolesc Psychiatry 2016 ;25(6):659-667.*
7. *Keenaghan C, Kilroe J, The KIDSCREEN Group Europe. A study on quality of life tool KIDSCREEN for children and adolescents in Ireland. Results of the KIDSCREEN National Survey 2005. Published by The Stationery Office, Dublin: Office of the Minister for Children, Department of Health and Children, 2008.*
8. *Ravens-Sieberer U, Gosch A, Rajmil L, Erhart M, Bruil J, Duer W, et al. KIDSCREEN-52 quality-of-life measure for children and adolescents. Expert Rev Pharmacoecon Outcomes Res 2005; 5:353-364.*
9. *Ravens-Sieberer U, Gosch A, Rajmil L, Erhart M, Bruil J, Power M, et al. The KIDSCREEN-52 Quality of Life Measure for Children and Adolescents: psychometric results from a cross-cultural survey in 13 European countries. Value in Health 2008; 11:645-658.*
10. *Kourkoutas E, Georgiadi M, Plexousakis S. Quality of life of children with chronic illnesses: a review of the literature. Procedia Soc Behav Sci 2010; 2:4763-4767.*
11. *Ravens-Sieberer U, Herdman M, Devine J, Otto C, Bullinger M, Rose M, et al. The European KIDSCREEN approach to measure quality of life and well-being in children: development, current application, and future advances. Quality of Life Research 2014; 23:791-803.*
12. *Europe TKG. The KIDSCREEN Questionnaires - Quality of life questionnaires for children and adolescents. Lengerich: Pabst Science Publishers, 2006.*
13. *Herdman M, Fox-Rushby J, Badia X. 'Equivalence' and the translation and adaptation of Health -Related Quality of Life Questionnaires. Quality of Life Research 1997; 6:237-247.*
14. *Herdman M, Fox-Rushby J, Badia X. A model of equivalence in the cultural adaptation of HRQoL Instruments: The Universalist Approach. Quality of Life Research 1998; 7:323-335.*
15. *Guyatt GH. The philosophy of health-related quality of life translation. Quality of Life Research 1993; 2:461-465.*
16. *Kidscreen Group E. Translation & Validation Procedure. Guidelines and Documentation Form. www.kidscreen.org; 2004.*
17. *Eser E, Yuksel H, Baydur H, Erhart M, Saatli G, Cengiz Ozyurt B, et al. [The psychometric properties of the new Turkish generic health-related quality of life questionnaire for children (Kid-KINDL)]. Turk Psikiyatri Derg 2008; 19:409-417.*
18. *Ravens-Sieberer U, Bullinger M. Assessing health-related quality of life in chronically ill children with the German KINDL: first psychometric and content analytical results. Quality of Life Research 1998; 7:399-407.*
19. *Terwee CB, Bot SDM, de Boer MR, van der Windt DAWM, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007; 60:34-42.*
20. *Loewenthal K, Lewis CA. An Introduction to Psychological Tests and Scales. Cornwall: Psychology Press, 2001.*
21. *Nunnally JC, Bernstein IH. Psychometric theory New York: McGraw-Hill, 1994.*
22. *Portney LG, Watkins MP. Foundations of Clinical Research: Applications to Practice. East Northwalk, Connecticut: Appleton & Lange, 1993. 23. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. MPR-online 2003; 8:23-74.*
24. *Cohen J. Statistical Power Analysis for the Behavioral Sciences. Second ed., Hillsdale, New Jersey: Lawrence Erlbaum, 1988.*

25. *Radhakishun NN, de Wit M, van Vliet M, von Rosenstiel IA, Beijnen JH, Brandjes DP, et al. Impaired quality of life in treatment-seeking obese children of Dutch, Moroccan, Turkish and Surinamese descent. Public Health Nutr 2015:1-8.*
26. *Nezu S, Iwasaka H, Saeki K, Ishizuka R, Goma H, Okamoto N, et al. Reliability and validity of the Japanese version of the KIDSCREEN-52 health-related quality of life questionnaire for children/adolescents and parents/proxies. Environ Health Prev Med 2015; 20:44-52.*
27. *Stevanovic D, Tadic I, Novakovic T, Kisic-Tepavcevic D, Ravens-Sieberer U. Evaluating the Serbian version of the KIDSCREEN quality-of-life questionnaires: reliability, validity, and agreement between children's and parents' ratings. Quality of Life Research 2013; 22:1729-1737.*
28. *Svedberg P, Eriksson M, Boman E. Associations between scores of psychosomatic health symptoms and health-related quality of life in children and adolescents. Health Qual Life Outcomes 2013; 11:176.*
29. *Ng JY, Burnett A, Ha AS, Sum KW. Psychometric properties of the Chinese (Cantonese) versions of the KIDSCREEN health-related quality of life questionnaire. Quality of Life Research 2015; 24:2415-2421.*
30. *Berra S, Tebe C, Esandi ME, Carignano C. Reliability and validity of the KIDSCREEN-52 questionnaire to measure health related quality of life in the 8 to 18 year-old Argentinean population. Arch Argent Pediatr 2013; 111:29-35.*
31. *Ravens-Sieberer U, Auquier P, Erhart M, Gosch A, Rajmil L, Bruil J, et al. The KIDSCREEN-27 quality of life measure for children and adolescents: psychometric results from a cross-cultural survey in 13 European countries. Quality of Life Research 2007; 16:1347-1356.*
32. *Parizi AS, Garmaroudi G, Fazel M, Omidvari S, Azin S, Montazeri A, et al. Psychometric properties of KIDSCREEN health-related quality of life questionnaire in Iranian adolescents. Quality of Life Research 2014; 23:1-6.*
33. *Cronbach L. Coefficient alpha and the internal structure of tests. Psychometrika 1951; 16:297-334.*
34. *Bland JM, Altman DG. Statistics notes: Cronbach's alpha. BMJ 1997; 314:572.*
35. *Slavec A, Drnovšek M. A perspective on scale development in entrepreneurship research. Econ Bus Rev 2012; 14:39-62.*
36. *Tavakol M, Dennick R. Making sense of Cronbach's alpha. Int J Med Educ 2011; 2:53-55.*
37. *Robitail S, Simeoni M-C, Erhart M, Ravens-Sieberer U, Bruil J, Auquier P. Validation of the European Proxy KIDSCREEN-52 Pilot Test Health-Related Quality of Life Questionnaire: first results. J Adolesc Health 2006; 39:596.e1-.e10.*
38. *DeVellis RF. Scale Development. Theory and Applications. Third ed., SAGE Publications, 2003.*
39. *Robitail S, Ravens-Sieberer U, Simeoni M-C, Rajmil L, Bruil J, Power M, et al. Testing the structural and cross-cultural validity of the KIDSCREEN-27 quality of life questionnaire. Quality of Life Research 2007; 16:1335-1345.*
40. *Hooper D, Coughlan J, Mullen MR. Structural Equation Modelling: Guidelines for Determining Model Fit. EJBRM 2008; 6:53-59.*
41. *Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Modelıng 1999; 6:1-55.*
42. *Hong SD, Yang JW, Jang WS, Byun H, Lee MS, Kim HS, et al. The KIDSCREEN-52 Quality of Life Measure for Children and Adolescents (KIDSCREEN-52-HRQOL): Reliability and Validity of the Korean Version. J Korean Med Sci 2007; 22:446-452.*
43. *Tzavara C, Tzonou A, Zervas I, Ravens-Sieberer U, Dimitrakaki C, Tountas Y. Reliability and validity of the KIDSCREEN-52 health-related quality of life questionnaire in a Greek adolescent population. Ann Gen Psychiatry 2012; 11:3.*
44. *Haraldstad K, Christophersen K-A, Eide H, Nativg GK, Helseth S. Health related quality of life in children and adolescents: Reliability and validity of the Norwegian version of KIDSCREEN-52 questionnaire, a cross sectional study. Int J Nurs Stud 2011; 48:573-581.*
45. *Erhart M, Ottova V, Gaspar T, Jericek H, Schnohr C, Alikasifoglu M, et al. Measuring mental health and well-being of school-children in 15 European countries using the KIDSCREEN-10 Index. International Journal of Public Health 2009; 54:160-166.*
46. *Ravens-Sieberer U, Schmidt S, Gosch A, Erhart M, Petersen C, Bullinger M. Me asuring subjective health in children and adolescents: results of the European KIDSCREEN/DISABKIDS Project. Psychosoc Med 2007; 4:Doc08.*
47. *Ravens-Sieberer U, Erhart M, Rajmil L, Herdman M, Auquier P, Bruil J, et al. Reliability, construct and criterion validity of the KIDSCREEN-10 score: a short measure for children and adolescents' well-being and health-related quality of life. Quality of Life Research 2010; 19:1487-1500.*
48. *Cremeens J, Eiser C, Blades M. Factors influencing agreement between child self-report and parent proxy-reports on the Pediatric Quality of Life Inventory 4.0 (PedsQL) generic core scales. Health Qual Life Outcomes 2006; 4:58.*