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The Health-Related Quality of Life Index KIDSCREEN-10: Confirmatory Factor Analysis, Convergent Validity and Reliability in a Sample of Iranian Students

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Abstract The aim of the present study was to evaluate validity and reliability of the Health Related Quality of Life Index KIDSCREEN-10 in a sample of Iranian school students. Using multistage sampling, 551 middle and high school students were selected in Yazd and answered to KIDSCREEN-10 index. Each 100 students also completed one more questionnaire (included in research tools). To verify the reliability of the questionnaire, Cronbach's alpha measure and test-retest reliability (intraclass correlation coefficient) were used and Confirmatory factor analysis and correlation analysis methods were employed to assess the construct validity and convergent validity of the questionnaire. Cronbach's alpha (0.80) and intraclass correlation coefficient (0.85) confirmed reliability of the questionnaire, and Confirmatory Factor Analysis indicated a unidimensional structure for the questionnaire. Moreover, obtained a high correlation between the total score of the KIDSCREEN-10 index and the total scores obtained from other indices was an indicative of convergent validity for the scale. However, the correlations obtained for the KIDSCREEN-10 index with the dimensions in the other questionnaires varied from low (for Multidimensional Students' Life Satisfaction Scales) to moderate and high (for KIDSCREEN-52, Pediatric Quality of Life Inventory, General Health Questionnaire-28, Personal Well-Being Index—School Children, and Coopersmith Self Esteem Inventory). Significant differences in quality of life scores were found between male and female students of 11 to 15 and 16 to 19 year old, whereas such a difference was absent in psychological and socio-economic status. Overall, the KIDSCREEN-10 has an acceptable validity and reliability in Iranian students and can be used for health care polices and research projects here in this country.

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1 Introduction

Quality of life (QOL) is a concept for which no generally accepted comprehensive definition has been yet offered. However, multi-dimensionality, subjectivity and reliability of quality of life over time have been almost unanimously emphasized by the so far provided definitions for this concept (Spieth and Harris 1996). According to different studies, quality of life covers a variety of domains and most of these studies do agree on the three common domains of physical, mental and social health (Lubetkin et al. 2005). In general, there are two conceptual models for assessment of quality of life: the Utility Model, the purpose of which is an appropriate allocation of medical funds for health care programs, and the Health Status Measurement Model, with a multidimensional construct in which physical health and functional level stand central (Ware Jr 1984).

1.1 Health Related Quality of Life Questionnaires

There are too many measures used for the assessment of child general health-related quality of life including Child Health Questionnaire (CHQ) (Landgraf and Abetz 1998), Child Health and Illness Profile (CHIP) (Starfield et al. 1993), Munich Quality of Life Questionnaire for Children (KINDL) (Ravens-Sieberer and Bullinger 1998), Paediatric QOL Inventory (PedsQOL) (Varni et al. 2006), Youth Quality of Life-Research Form (YQOL-R) (Edwards et al. 2002), and KIDSCREEN health-related quality of life group instruments.

1.2 The KIDSCREEN Health Related Quality of Life Instruments

These instruments were made using the European Project “Screening and Promotion of Health-Related Quality of Life in Children and Adolescents” in which 22,296 children from 13 European countries were subject to study. These self-assessment instruments which are accommodated with proxy scales for parents or other caretakers are applicable to healthy and chronically ill children and youths of 8 to 18 year old and can be used in hospitals, medical centres, and schools. Presently, there are three forms of such instruments available with 52 (Ravens-Sieberer et al. 2005), 27 (Ravens-Sieberer et al. 2007), and 10 (Erhart et al. 2009) questions. The KIDSCREEN-52 comprises 10 dimensions (domains): Physical Wellbeing, Psychological Wellbeing, Moods and Emotions, Self-Perception, Autonomy, Parents Relations and Home Life, Social Support and Peers, School Environment, Social Acceptance (Bullying), and Financial Resources. Psychometric properties of this questionnaire have been examined in the studies conducted in different countries, including 13 European countries (Ravens-Sieberer et al. 2008), Spain (Tebe et al. 2008), South Korea (Hong et al. 2007), Norway (Haraldstad et al. 2011) and Argentina (Berra et al. 2009). Internal consistency for 10 dimensions of KIDSCREEN-52 reported between 0.77 and 0.89 (Ravens-Sieberer et al. 2008) and 0.77 to 0.95 (Hong et al. 2007). Also convergent validity of KIDSCREEN-52 with Munich Quality of Life Questionnaire for Children (KINDL) (Ravens-Sieberer and Bullinger 1998) and Paediatric QOL Inventory (PedsQOL) were acceptable (Ravens-Sieberer et al. 2008; Hong et al. 2007). Cross-cultural

adaptation, semantic equivalence, and 10-dimension construct of the questionnaire was evaluated in various countries (Berra et al. 2009; Haraldstad et al. 2011). This results show that the KIDSCREEN-52 is a cross-cultural questionnaire with acceptable psychometric properties.

The KIDSCREEN-10 is a unidimensional generic HRQoL index consisting of 10 items which sufficiently represents the longer KIDSCREEN profiles. KIDSCREEN-10 covers physical, emotional, mental, social and behavioural components of well-being and functioning. A Cronbach's alpha of 0.82 and a test-retest coefficient of 0.70 are reported for the internal consistency reliability of the self-report form. In addition, through correlation with the health-related quality of life questionnaires, a convergent validity of 0.43 to 0.63 has been reported for this form. A significant correlation is found between psychosomatic complaints and KIDSCREEN-10 scores in children and youth. Further, significant differences were found between quality of life for physically and psychologically healthy and ill children. The KIDSCREEN-10 Index also revealed significant differences in terms of socio-economic status, age and gender (Erhart et al. 2009; Ravens-Sieberer et al. 2010). In another study, Davis et al. (2010) demonstrate that the KIDSCREEN-10 Index and the Cerebral Palsy Quality of Life Questionnaire for Children (CP QOL-Child) are psychometrically and conceptually more suitable relative to CHQ for children suffering from cerebral palsy. In addition, the evidence supports suitability of features in the 10-question psychometrical index (Davis et al. 2010; Erhart et al. 2009). The overall results suggested that the KIDSCREEN-10 is a short instrument to evaluate HRQOL in both general and ill population with acceptable psychometric features.

1.3 The Aim of the Present Study

There are a few questionnaires to evaluate Iranian youth quality of life and well-being. Recently Persian versions have been appeared for Personal Wellbeing Index-School Children (PWI-SC) (Naeinian et al. 2011) and Paediatric Quality of Life Inventory (PedsQL) with acceptable psychometric properties in Iranian adolescents (Amiri et al. 2010; Jafari et al. 2011; Naeinian et al. 2011). While it is mentioned that the PedsQL did not demonstrate valid psychometric properties for measuring HRQOL in children with life-threatening conditions (Huang et al. 2011), advantages of the KIDSCREEN instruments are mentioned as their cross-cultural adaption, available psychometric properties for the three present forms in several countries, different translations and multidimensional structures of the instruments. However to provide researchers with more elaborated tools in this field based on cultural, social and economic parameters to support local and national projects, warrants the conductance of present research. Therefore, the current study is chiefly concerned with the question as whether the KIDSCREEN-10 Index will meet a desirable validity and reliability in a sample of Iranian youth or not.

2 Methods

2.1 Subjects and Settings

First, the total number of students at middle- and high schools of Yazd per gender (23,395 male and 24,020 female students) and per district (22,492 students in District

1 and 24,923 students in District 2) in the school year of 2010–2011 was obtained. Next, using multi-stage sampling method, the required number of sample per gender, per school (Middle or High school) and finally per grade level in each district was selected. Final sample came to 551 students (276 male and 275 female), where 288 middle school students were within the age range of 11–15 years and 263 high school students were within the age range of 16–19 years. Mean (standard deviation) age for middle school students was 13.25 (1.03) and for high school was 16.49 (1.13).

2.2 Measures

The Health Related Quality of Life Index KIDSCREEN-10 The quality of life questionnaire concerning general health of healthy and ill persons between age of 8 and 18 years old comprises 10 questions which are answered in Likert Scale, indicating specific behaviour or feeling (1 = never; 2 = almost never; 3 = sometimes; 4 = almost always; and 5 = always) or intensity of attitudes (1 = not at all; 2 = slightly; 3 = moderately, 4 = very; and 5 = extremely). The questions are 1- Have you physically felt fit and well? 2- Have you felt full of energy? 3- Have you felt sad? 4- Have you felt lonely? 5- Have you had enough time for yourself? 6- Have you been able to do the things that you want to do in your free time? 7- Have your parent(s) treated you fairly? 8- Have you had fun with your friends? 9- Have you got on well at school? 10- Have you been able to pay attention? The timeframe refers to the last week. The required responding time is 5 min. Next, the scores are linearly converted into 0–100 scale in which higher scores represent better quality of life. Psychometric properties of this questionnaire were noted in part 1.2.

The Health-Related Quality of Life Questionnaire KIDSCREEN-52 Self-Report Version (Ravens-Sieberer et al. 2005) The KIDSCREEN-52 questionnaire is based on a multidimensional HRQOL construct and assesses several aspects of children's and adolescents' health and well-being. The instrument includes 52 items, which were rated by each individual on a five-point Likert scale. The scale indicates either the frequency of certain behaviours or feelings (1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = always) or the intensity of an attitude (1 = not at all, 2 = slightly, 3 = moderately, 4 = very, 5 = extremely). The time frame refers to the previous week. The 52 items are distributed into the following 10 aspects or dimensions: physical well-being (five items), psychological wellbeing (six items), moods and emotions (seven items), self-perception (five items), autonomy (five items), parent relation and home life (six items), social support and peers (six items), school environment (six items), social acceptance/bullying (three items), and financial resources (three items). Psychometric properties of this questionnaire were noted in part 1.2.

Paediatric Quality of Life Inventory (PedsQL) Version 4.0 Generic Core Scales of The Self-Report Form (Varni et al. 2006) The 23-question General Health-Related Quality of Life questionnaire for age group of 8 to 18 years old, covers the domains of physical function, emotional function, social function and school function. The responses to the multi-choice questions in Likert Scale (range from 0 = never to 4 = almost always). The scores are later on converted into 0–100 score scale (i.e. 0=100; 1=75; 2=50; and 4=0). To obtain the total score, like the scale scores, total scores of all questions are divided by number of the answered questions. Validity and reliability

of this measure has been confirmed in different researches (Engelen et al. 2009) also in Iranian population (Jafari et al. 2011; Amiri et al. 2010).

The General Health Questionnaire (GHQ-28) (Goldberg and Hillier 1979) present study utilizes the 28-question version of the questionnaire which includes 4 sub-scales of Somatic symptoms, Anxiety, Depression and Social Dysfunction and all the 4 sub-scales contain 7 questions. Validity and reliability of this instrument in different studies on children and adolescents have been investigated (Iwata and Saito 1992).

Personal Well-Being Index—School Children (PWI-SC) (Cummins and Lau 2005) This instrument is specifically applied children and adolescents (12 to 18 years old) and includes 7 items of satisfaction each of which concerns a domain of quality of life, plus an extra question which assesses quality of life in general. The questions are scored in Likert Scale ranging from 0 to 10.

Multidimensional Students' Life Satisfaction Scale (MSLSS) (Huebner 1994) This scale is a self-report instrument with 40 multiple-choice questions in Likert Scale. This questionnaire can be applied both on groups and individuals to assess the dimensions such as: Family (7 questions), Friends (9 questions), School (8 questions), Self (7 questions), and Living Environment (9 questions) and to calculate the perceived quality of life general assessment using the combination of all choices with each other. This scale is designed for the age group of 8 to 18 years old, the validity and reliability of which have been investigated inside and outside Iran (Gilman et al. 2000; Zaki 2007).

Coopersmith Self Esteem Inventory (CSEI) (Coopersmith 1981) This test contains 58 questions, 8 items of which are the lie detectors and the other 50 items are specified for Personal, Social, Academic, and Family sub-scales. The points in the questionnaire are recorded as 0 and 1. The scores range from 0 to 50. Earlier studies (over 300 studies) on the questionnaire's psychometric features—School Form—confirm its validity and reliability (Lane et al. 2002).

The Strengths and Difficulties Questionnaire (SDQ) for Children and the Youth (Goodman 2001) This questionnaire is a brief behavioural screening questionnaire aimed at 3- to 16-year-olds, which asks about children's and teenagers' symptoms and positive attitudes. Responses for items are summed to generate a total difficulties score and the examinee's status in three areas of normal (0 to 15), borderline (16 to 19), and abnormal (20 to 40) is specified. Validity and reliability of this instrument is acceptable (Goodman 2001). In the present study, the questionnaire's total score is used to assess discriminate validity of KIDSCREEN -10 Index. It is assumed that the children and the youth classified as abnormal in the SDQ relative to normal children and adolescents will score lower in KIDSCREEN-10 Index (Erhart et al. 2009).

Socio-Economic Status Inventory (Garmaroodi and Moradi 2010) This questionnaire covers four domains of Education and Occupation of Head of the Family husbands and Spouse, Household Expenses and Income, Housing and Facilities, and Leisure Time (one question for each dimension). To divide people into two groups of high and low

socio-economic status, the 10 and 90 percentage points of the inventory were calculated and the people who were positioned below 10- percentage point were considered of low socio-economic status and those above 90- percentage point of high socio-economic status. The children and adolescents at low socio-economic status were expected to score lower in KIDSCREEN-10 Index (Erhart et al. 2009).

2.3 Translation and Pilot Study

A research Collaboration Form was sent to the KIDSCREEN group to receive the Persian Form of the KIDSCREEN Index. Comparisons done between the original form of the scale with the version had been translated by the authors and the necessary changes were made accordingly. Initially, the scale was performed on 30 male middle- and high school students who had been selected using convenience sampling method. Next, based on the instructions of the scale, a cognitive interview was conducted with one student from each grade. At this stage, using General Probing Method the examinees were asked “if the questions were generally intelligible and clear”, and “whether they were difficult to answer or not?” In addition, using Think Loud method, the questions were read for the examinee one by one and then immediately the examinee was asked to recite the question using one’s own words. This technique allows the researcher to make sure that the examinees have understood the questions and have correctly interpreted them. Finally, the examinees were asked to specify the words they didn’t understand the meaning of. Results of this preliminary study indicated that the middle school students (11 years old and below) have difficulty in understanding some of the questions. Therefore, the scale was not administered on children below 11 years old (primary school students). Finally, in order to avoid respondent fatigue in the process of study, KIDSCREEN-10 was administered for the entire sample along with one more and different questionnaire (included in research tools).

2.4 Statistical Analysis

Using Cronbach’s alpha and test-retest reliability (with 2 weeks interval), internal consistency of the KIDSCREEN-10 was investigated. An alpha coefficient of 0.70 and higher was considered acceptable (Cronbach 1951), and a coefficient of 0.6 or higher was considered as an evidence for adequate test–retest stability (Nunnally and Bernstein 1991). To verify the validity, construct validity assessment methods (Confirmatory Factor Analysis and Discriminate Validity) and Convergent Validity method were employed. To examine the model’s Global Goodness of Fit Index (GFI), chi-square fit index (χ^2), ratio of chi-square to degrees of freedom (χ^2 df), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI) (Bentler 1990), and Root Mean Square Error of Approximation (RMSEA) (Browne and Cudeck 1993) were applied. A ratio of chi-square to degrees of freedom (χ^2 df) smaller than 3, a GFI above 0.80–0.90, AGFI greater than 0.80, a CFI greater than 0.90–0.95, and a RMSEA between 0.05 and 0.08 indicates an acceptable fit, between 0.08 and 0.1 represents a moderate fit, and greater than 0.1 signifies a poor fit (Hu and Bentler 1999; Mulaik et al. 1989). To examine the convergent validity, Pearson correlation analysis was performed. The correlations were classified as low and weak (0.10 to 0.29), moderate (0.30 to 0.49), and high and strong (greater than 0.50).

Finally, *t*-test and one-way ANOVA were performed to compare the groups based on gender, age, and socio-economic status and to compare them in terms of psychological (mental) status, respectively.

3 Results

3.1 Features of the Study Population and Reliability

The cronbach's alpha coefficients are as follow: total sample (0.80), male students (0.79), female students (0.81), adolescents of 11 to 15 years old (0.80), and adolescents of 16 to 19 years old (0.77). Test-retest coefficient of 0.86 was found with 2 weeks interval for 50 students. Ceiling Effect was observed in 0.7 % of the examinees (Table 1).

3.2 Convergent and Discriminate Validity

Results depicted in Table 2 show that, the Moods and Emotions dimension of KIDSCREEN-52 had the greatest correlation with KIDSCREEN-10, while the correlations for the dimensions of Physical Well-being, Psychological Well-being, Moods and Emotions, Self-Perception, Autonomy, Parents Relations and Home Life, and School Environment, was relatively strong, and the correlations for Social Support and Peers, Social Acceptance (Bullying), and Financial Resources dimensions were moderate. A moderate correlation was found between PedsQOL Inventory and KIDSCREEN-10. A relatively strong (except somatic symptoms) and negative correlation was found between KIDSCREEN-10 Index and GHQ-28 domains. The correlation coefficients between KIDSCREEN-10 and MSLSS dimensions were not significant, except for Perceived qol dimension of MSLSS in which the correlation coefficient obtained was significant and correlation was strong. The correlation coefficients between KIDSCREEN-10 and SEI-58 dimensions varied from 0.39 to 0.63, indicating a moderate to strong correlation. Finally, the obtained correlation coefficient between KIDSCREEN-10 and PWI-SC (0.73) indicated a significant and strong correlation between the two indices.

Those students who were classified as abnormal group according to the S&D questionnaire, compared to the borderline and normal groups scored lower for quality of life, but, the differences between the three groups were not significant. In addition, mean (st.dev) score of

Table 1 Features of the sample studied and Cronbach's alpha coefficients for KIDSCREEN-10 index

	Mean	SD	Skewness	Kurtosis	%ceiling	% floor	Cronb. alpha
Total	69.12	13.67	-0.11	-0.36	0.7	0	0.80
Gender							
Boys	71.43	13.21	-0.19	-0.04	1.1	0	0.79
Girls	66.81	13.76	-0.2	-0.56	0.4	0	0.81
Age							
11 to 15 years	73.30	13.92	-0.49	-0.12	0.8	0	0.80
16 to 19 years	65.52	12.39	0.07	0.01	0.7	0	0.77

Table 2 Correlation coefficients between KIDSCREEN - 10 Index and other instruments assessing similar construct

Measures	The subscales	N	Kidscreen-10 (correlation coefficient)
The health-related quality of life questionnaire KIDSCREEN-52 Self-report version	Physical well-being	551	0.69
	Psychological-well being	551	0.76
	Mood & emotions	551	0.79
	Self-perception	551	0.63
	Autonomy	551	0.70
	Parent relation & home life	551	0.73
	Social support & peers	551	0.46
	School environment	551	0.66
	Social acceptance & bullying	551	0.32
	Financial resources	551	0.47
Paediatric Quality of Life Inventory (PedsQL)	Physical function	88	0.46
	Emotional function	88	0.35
	Social function	88	0.43
	School function	88	0.48
	PedsQOL total score	88	0.59
The General Health Questionnaire (GHQ-28)	Somatic symptoms	88	-0.49
	Anxiety & insomnia	88	-0.53
	Depression	88	-0.54
	Social dysfunction	88	-0.56
	General health (Total score)	88	-0.65
Multidimensional Students' Life Satisfaction Scale (MSLSS)	Family	93	0.06 ^{ns}
	Friends	93	0.02 ^{ns}
	School	93	0.06 ^{ns}
	Self	93	0.14 ^{ns}
	Living environment	93	0.04 ^{ns}
	Perceived QOL (Total score)	93	0.61
Coopersmith Self Esteem Inventory	Personal	89	0.39
	Social	89	0.44
	Academic	89	0.51
	Family	89	0.60
	Total SE score	89	0.63
Personal Well-Being Index – School Children (PWI-SC)	Total score	92	0.73

ns correlation coefficient is not significant

All the correlation coefficients obtained are statistically significant at $P < 0.01$ except correlation coefficients signed by “*ns*”

the quality of life for the students with high socio-economic status (68.35 (14.09)) was higher compared to students with low socio-economic status (63.97 (14.90)), yet statistically no significant difference was found between the two groups. Finally, in terms of gender and

age, significant differences were found. Comparison of the mean scores indicated that the boys relative to girls and the students within the age of 11 to 15 years as a group relative to the those students of 16 to 19 years old have scored higher in subscale of quality of life in KIDSCREEN-10 index (Table 3).

3.3 Confirmatory Factor Analysis

Obtained χ^2 value through factor analysis was 174.84 ($p < 0.01$); it means the ratio of χ^2 to df is 4.99, which falls outside the acceptable range. Goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and comparative fitness index (CFI) were 0.94, 0.91, and 0.94, respectively, all of which are within the acceptable range. Finally, root mean square error of approximation (RMSEA) was 0.08, suggesting the model's acceptable fit.

Results depicted in Table 4 shows that the correlation between the questions varied from 0.47 (correlation between the first and second question) to 0.11 (correlation between the eighth question and the third and ninth questions). Moreover, it is seen that the fourth question (loneliness) within the domain of Moods and Emotions had the greatest factor loading (0.72) and the eighth questions (fun with friends) within the domain of Social Support and Peers had the least factor loading (0.42) with total score of the KIDSCREEN-10.

4 Discussion

The present research attempted to determine validity and reliability of the KIDSCREEN-10 Index in a group of Iranian students. KIDSCREEN-10 is introduced as an instrument for a brief assessment of health-related quality of life in clinical and non-clinical populations. Questions included KIDSCREEN-10 have been extracted from KIDSCREEN-52 and KIDSCREEN-27 indices. Results obtained from our pilot study showed that the children below 11 years old were not able to understand some of the questions, so therefore, this age group were excluded from our main investigation. Ceiling effect was the case with 0.7 % of the examinees, but no floor effect was observed. In an investigation on internal consistency reliability, a Cronbach's alpha of 0.80 and test-retest reliability coefficient of 0.86 (with 2 weeks interval) were obtained. Results obtained suggested that KIDSCREEN-10 cannot be considered as a suitable scale for Iranian children in an age range from 8 to 11. However considering acceptable reliability of KIDSCREEN-10 for students over 11 years old, it can be decided to use the index as a reliable scale for evaluating quality of life in Iranian youth student population. Consistent with the results obtained in this study, Cronbach's alpha and test-retest coefficient of 0.82 and 0.70, reported in Ravens-Sieberer et al. (2008) investigation respectively, and Erhart et al. (2009) reported a Cronbach's alpha of 0.81 for the scale. In another study on children suffering from cerebral palsy disorder, the Cronbach's alpha reported was 0.85 (Davis et al. 2010).

Results obtained through Confirmatory Factor Analysis suggest a moderate fit for the single-factor KIDSCREEN-10 model, and examination of correlation among the questions indicate that the domains of Moods and Emotions and Psychological Well-Being are better predictors of index total score (i.e., health-related quality of life measure). Additionally, low factor loading of question 8 (Fun with Friends) on the index total score and its weak correlation with other questions indicates that this question is somewhat different from other questions in the index studied.

Table 3 Comparison of mental health position, socioeconomic status, sex, and age differences in respect to Kidscreen-10 scores

	S&DQ			F(2, 92)	Socioeconomic statue		t(121)	Sex		t(549)	Age		t(459)
	Normal (n=61)	Borderline (n=22)	Abnormal (n=10)		Low (n=66)	High (n=57)		Boys (n=276)	Girl (n=275)		11 to 15 years (n=255)	16 to 19 years (290)	
	Mean (SD)	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Kid-10	71.14 (12.23)	67.63 (14.47)	63.40 (16.99)	1.73	63.97 (14.90)	68.35 (14.09)	1.67	71.43 (12.21)	66.81 (13.76)	4.02**	73.31 (13.92)	65.52 (12.39)	6.95**

** $P < 0.01$

Table 4 Zero-order Pearson correlations among questions of Kidscreen-10

Kidscreen-10 questions*	1	2	3	4	5	6	7	8	9	10	KID-10 total score	
											B	T-value**
1 Felt fit and well	1										0.61	14.49
2 Felt full of energy	0.47	1									0.60	14.27
3 Felt sad	0.37	0.39	1								0.68	16.79
4 Felt lonely	0.40	0.38	0.63	1							0.72	18.07
5 Enough time for yourself	0.33	0.31	0.35	0.37	1						0.55	12.08
6 Do things in free time	0.29	0.37	0.32	0.36	0.40	1					0.53	12.26
7 Treated fairly	0.34	0.28	0.35	0.41	0.33	0.23	1				0.53	12.25
8 Fun with friends	0.15	0.18	0.11	0.13	0.20	0.27	0.16	1			0.26	5.71
9 Well at school	0.31	0.30	0.22	0.23	0.25	0.20	0.25	0.11	1		0.42	9.59
10 Able to pay attention	0.32	0.28	0.30	0.37	0.25	0.24	0.25	0.13	0.38	1	0.50	11.45

*All correlations are statistically significant at $P < 0.01$

**All t -values are statistically significant at $P < 0.01$

Convergent validity of the index indicates a moderate to strong correlation between KIDSCREEN-10 and KIDSCREEN-52 dimensions. The highest correlation was found with Moods and Emotions dimension and the lowest correlation found with Social Support and Peers. These results are consistent with findings of Ravens-Sieberer et al. (2008), in which the highest correlation between KIDSCREEN-10 and KIDSCREEN-52 in adolescents of 12 to 18 year old was found for Psychological Well-being (0.72) and Moods and Emotions (0.72) and the lowest correlation found for Social Support and Peers (0.26). These findings imply that KIDSCREEN-10 Index is rather an indicator of quality of life subjective and psychological domains (such as psychological and emotional well-being) than a pointer of quality of life objective domains (such as financial resources and social acceptance or bullying) (Engelen et al. 2009).

Results obtained were also indicative of stronger and higher correlations among KIDSCREEN-10 and PedsQOL, MSLSS, SEI-58, and PWI-SC total score compared to KIDSCREEN-10 correlation with the dimensions of the same questionnaires. These findings support single-dimensionality of the KIDSCREEN-10 Index in representing a total score for general well-being of the individual. Additionally the low correlation between KIDSCREEN-10 and the Multidimensional Students' Life Satisfaction Scale domains (MSLSS) implies that this instrument cannot be applied as a tool to measure some specific satisfaction axis (such as satisfaction with family, school, and self). Consistent with the present research, previous research reported strong convergent validity for KIDSCREEN-10 with PedsQOL, Youth Quality of Life Instrument-Surveillance Version (YQOL-S), PedsQOL total score, Children with Special Health Care Needs Screener (CSHCN) for Satisfaction domain, and in the clinical population, with child-reported scores on the Cerebral Palsy Quality of Life Questionnaire for Children (Ravens-Sieberer et al. 2008; Davis et al. 2010).

Comparisons done showed a difference in quality of life degree in terms of gender and age variable in the population studied. Present findings were also approved in some previous studies (Ravens-Sieberer et al. 2005; Tebe et al. 2008; Analitis et al. 2009), however, such difference was not the case with psychological and socio-economic status. The students of 11 to 15 years old as a group, as same as the boys had a better quality of life relative to the youth of 16 to 19 years old and the girls.

In contrast to earlier research done on European samples (Ravens-Sieberer et al. 2008; Engelen et al. 2009), KIDSCREEN-10 is found unable to discriminate between normal, borderline and abnormal Iranian youths as same as youths with different socio-economic status (high and low). However, while some relationship between family socioeconomic status and children well-being has been observed in some studies, it was not high enough to contribute “significantly” to the prediction of children well being (Goswami 2013; Shahabudin and Low 2013).

4.1 Limitations and Suggestions

Among the limitations for the present research could be the exclusion of the age group below 11 years old (primary school students) from the study, since the authors believed that the primary school children had difficulty in understanding some of the questions and to answer them. Considering that the present sample is collected only from one city in Iran i.e. Yazd, final suggestion regarding the application of this instrument to all Iranian children and youth cannot be provided. Finally, lack of a clinical sample (children and adolescents with chronic physical and psychological illness) and fewer numbers of second grade high school students relative to other grades are the other limitations in the current study.

Given the limitations mentioned, in addition to reckoning with the issues noted, to investigate an adequate representative sample from different cities here in Iran is suggested in which normative information and cut-off points for KIDSCREEN-10 can be provided and quality of life of Iranian children and adolescents can be compared with that of children and adolescents from Europe and other countries. In addition, in future research on quality of life, psychometric features of parents form and checking for resemblance of responses given by children and adolescents with those of parents should be taken into consideration.

5 Conclusions

Results of the present research suggest adequate validity and reliability of the KIDSCREEN-10 Index in a sample of Iranian students and the questionnaire if necessary caution is taken could be employed in research and policy making programs in which youths are concerned.

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