

PSYCHOMETRIC PROPERTY TESTING OF THE KIDSCREEN-27 INSTRUMENT IN 11-YEAR-OLD CHILDREN IN KOSOVO

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(Original scientific paper)

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Abstract

Designed to assess health-related quality of life among young populations, the Albanian version of the KIDSCREEN-27 ensures dependable evaluations in culturally diverse environments. The aim of the study was to examine the suitability of the instrument in evaluating various dimensions of health-related quality of life. The research included 143 eleven-year-old students from public primary schools in Gjilan, Republic of Kosovo. The study used advanced and robust statistical methods, such as Exploratory and Confirmatory Factor Analysis (EFA and CFA) to assess the structure of the construct, along with measuring internal consistency through Cronbach's coefficient, while the use of T-scores enabled cross-cultural comparisons, relying on appropriate statistical tools such as SPSS and Jamovi for psychometric assessment. Statistical analysis showed that the six-factor adaptation of the KIDSCREEN-27 provides a better fit for the data from 11-year-old children in Kosovo compared to the original five-factor framework. This updated model exhibited strong fit indicators (CFI = 0.98; RMSEA = 0.075) alongside a more distinct conceptual organization. Additionally, the internal reliability was satisfactory ($\alpha = 0.71-0.82$), with minimal presence of ceiling or floor effects. Factor loadings were higher and more stable in the six-factor model. Several significant gender differences were identified, with boys scoring higher in certain dimensions. Overall, the instrument proves to be suitable and valid for use within the cultural and social context Republik of Kosovo.

Keywords: *Quality of Life, Gender Differences, Cultural and Social Context, KIDSCREEN-27, Children, Kosova*

Introduction

Recently, interest has grown in assessing children's health-related quality of life as overall well-being, not just absence of illness. Various researchers have emphasized that children's health should not be reduced to the assessment of their physical condition alone. According to (Ravens-Sieberer et al., 2007; Michalos, 2014; Befus et al., 2023), children's well-being is not only related to the physical aspect of health, but also includes emotional, social and behavioral dimensions. The work of (Power et al., 2019; Solans et al., 2008; Taylor et al., 2008; Higginson & Carr, 2001; Eiser & Morse, 2001; Cieza & Stucki, 2005), have contributed significantly to the development of these tools and their adaptation to different cultural and social contexts.

According to Duncan (1984) and DeVellis & Thorpe (2021), measurement accuracy is a fundamental pillar of scientific research, especially when it comes to assessing health-related quality of life during childhood. In this regard, several general instruments adapted for children have been developed and are widely integrated into clinical practice, public health programs and health policy evaluations (Solans et al., 2008; Verstraete et al., 2020). Some of the most popular tools include the YQOL-R (Edwards et al., 2002; Patrick et al., 2002), the CHQ (Landgraf et al., 1998) and the KIDSCREEN questionnaire group (KIDSCREEN Group Europe, 2006).

KIDSCREEN-27 is a concise yet thorough tool developed to evaluate the health-related quality of life among children and adolescents aged 8 to 18. The instrument focuses on five main aspects: physical and emotional well-being, degree of autonomy and family ties, peer support, and experience in the school

environment (Budler et al., 2022). This questionnaire has been tested and validated in many languages and cultures, and has found widespread use in both education and health interventions (Ravens-Sieberer et al., 2001, 2005, 2006)

This KIDSCREEN-27 form has been evaluated for its practical importance, as it helps reduce test taker monotony (Khan et al., 2017; Ravens-Sieberer et al., 2010; Locker & Allen, 2002; Huebner et al., 2004). However, reducing the number of items in a measurement instrument requires careful psychometric evaluation, to ensure that the theoretical validity and inclusion of all key dimensions of the concept are not compromised (Pollak et al., 2006; Muehlan, 2010)

International studies have shown that the factor structure of the KIDSCREEN-27 instrument can vary depending on the cultural context and sample characteristics. For this reason, some research has suggested alternative models with more than five factors, in order to more accurately represent the latent construct of data in different populations (Jafari et al., 2012; Cilar Budler et al., 2022; Power et al., 2019; Li et al., 2024; Shannon et al., 2017; Ravens-Sieberer et al., 2014).

This study aims to evaluate the psychometric properties of the Albanian version of KIDSCREEN-27 among 11-year-old children in Kosovo, a group that has not been previously examined in validation studies. Using exploratory and confirmatory factor analyses, the study examines model fit, internal consistency, ceiling and floor effects, as well as gender differences.

Methods

Participants

The study involved 11-year-old boys and girls attending public primary schools across Kosovo. This age group was chosen due to its developmental importance and the need for early assessment of health-related quality of life (HRQoL). The study included 11-year-old male and female children who were regular students in public primary schools across Kosovo. The selection of participants at this age was motivated by the specific developmental characteristics of this stage and the need to undertake early assessments of HRQoL, which may inform preventive and supportive interventions.

The study's final sample consisted of 143 pupils 82 boys and 61 girls recruited from various public primary schools in Gjilan, the capital of Kosovo. A non-probability convenience sampling method was used, and participants were included based on the following criteria: (1) parental or guardian written consent, (2) consistent school attendance, and (3) adequate cognitive capacity to comprehend and independently complete the questionnaire.

Minor children involved in the research and their legal guardians were clearly and fully informed about the purpose of the research, the voluntary nature of participation, the strict preservation of data confidentiality, and the ethical principles of the Declaration of Helsinki were respected, protecting the dignity and well-being of children participating in the research.

Measurement Instrument

The KIDSCREEN-27 questionnaire was used to assess health-related quality of life (HRQoL), where this instrument assesses five main domains of children's quality of life - covering physical and mental health, family relationships, peer support and school experience - through 27 questions (Ravens-Sieberer et al., 2007). Ky instrument është krijuar, strukturuar, testuar dhe vërtetuar si i saktë. Responses are given on a five-point Likert scale, reflecting either frequency or intensity of experiences during the past week.

Data Analysis

For each of the five dimensions included in the KIDSCREEN-27 instrument, arithmetic means and standard deviations were calculated in order to describe the overall distribution of the results. The data were then converted into standardized T-scores following the KIDSCREEN methodological guidelines, which allows for direct comparison of these results with those of international studies and supports cross-cultural assessments of child well-being. In the evaluation if 15% of the participants scored the maximum or minimum possible score, to identify limitations in the distribution of the results.

Internal consistency of the scales was evaluated using Cronbach's alpha coefficient, with values above 0.60 considered acceptable, particularly for scales with fewer items. To examine gender differences, one-way analyses of variance (ANOVA) were conducted for both the original and modified model dimensions, applying a significance level of $p < 0.05$ and interpreting effect size using partial eta squared (η^2).

For exploratory analysis of factors (EFA) I use the Principal Axis Factoring method, together with the rotational oblique Promax, which allows the connection between factors an approach that is suitable for the psychological construct of interrelationships. The goodness of fit of this analysis was assessed through the Kaiser-Meyer-Olkin (KMO) index and Bartlett's test of sphericity, which indicated favorable conditions for factor analysis.

Factor analysis was performed in two stages. Initially, Kaiser's criterion (characteristic value greater than 1) was applied, which suggested the existence of seven factors. In the second step, the extraction of six factors was predicted, in accordance with the theoretical basis and the data of the confirmatory analysis. Factor loadings with values ≥ 0.30 were considered significant for interpretation.

All statistical analyses were conducted using IBM SPSS Statistics (v28). Confirmatory Factor Analysis (CFA) was performed in Jamovi (v2.4.8) using the SEM module (semLavaan) with DWLS estimation, appropriate for ordinal and categorical data.

Initially, the theoretical model with five factors was tested, which matches the original structure of KIDSCREEN-27, while an alternative model with six factors was then evaluated, based on the findings of the exploratory analysis.

Due to the sensitivity of the χ^2 test to sample size, model fit evaluation focused primarily on the CFI and TLI indicators. Values above 0.95 for these indices and an RMSEA ≤ 0.06 are considered indicative of a good model fit to the data. The combined analytical approach used in this study enabled an in-depth and reliable examination of the psychometric structure of the KIDSCREEN-27 instrument, assessing its suitability for 11-year-old children in the Kosovo context. The parallel use of exploratory and confirmatory analysis strengthens the interpretation of the results and provides a solid basis for decision-making about future use of the scale in similar settings.

Results

Results Descriptive data for the original five-factor and modified six-factor models of the KIDSCREEN-27 instrument are presented in Table 1. In the five-factor model, Cronbach's alpha reliability coefficients ranged between 0.75 and 0.82, while the standardized T-scores were close to the normative mean ($M = 50$; $SD = 10$), reflecting good internal consistency and adequate normalization of the scores. Ceiling and floor effects were very low ($<1.5\%$), indicating good sensitivity of the measurement tools. In the case of the six-factor model, alpha values ranged from 0.71 to 0.79, with raw score means ranging from 8.94 to 17.75 and minimal ceiling effects (up to 2.8%), indicating acceptable psychometric stability and stable distribution of responses.

Table 1. Descriptive statistics: Raw and T-scale means, standard deviations, internal consistency (Cronbach's α), and floor/ceiling effects

Model	Items	Raw M	Raw SD	T M	T SD	α	Floor (%)	Ceiling (%)
KIDSCREEN-27 (5-factor)								
Physical well-being	5	19.81	3.31	50,00	10,00	0.77	0.70	0.70
Psychological well-being	7	28.79	4.46	50,00	10,00	0.78	0.70	1.40
Autonomy & parent relations	7	30.87	4.19	50,00	10,00	0.82	0.70	1.41
Social support & peers	4	17.27	2.81	50,00	10,00	0.75	1.41	1.41
School environment	4	16.27	2.78	50,00	10,00	0.79	1.41	1.41
KIDSCREEN-21 (6-factor)								
Parent relations/autonomy	4	17.75	2.76	n/a	n/a	0.79	1.40	2.80
Social support & peers	4	17.27	2.81	n/a	n/a	0.75	1.40	2.80
School environment	3	12.39	2.23	n/a	n/a	0.77	0.70	0.70
Psychological well-being	3	16.63	2.88	n/a	n/a	0.71	1.40	2.80
Physical well-being	4	15.53	2.87	n/a	n/a	0.71	1.40	2.80
Parent time	2	8.94	1.47	n/a	n/a	0.74	0.70	0.70

Note: *Raw M* = Mean of raw scores, *Raw SD* = Standard deviation of raw scores, *T M* = Mean of T-scores (standardized to $M = 50$, $SD = 10$), *T SD* = Standard deviation of T-scores, α = Cronbach's alpha (internal consistency), *n/a* = Not applicable for the revised structure

One-way ANOVA analyses showed significant differences between genders on several measured dimensions. One-way ANOVA analyses showed significant differences between genders on several measured dimensions. The largest difference was found in the dimension "Relationships with Parents and Autonomy", where boys scored higher in both the five-factor model ($F = 9.19$; $p = 0.003$; $\eta^2 = 0.062$) and the six-factor model ($F = 3.89$; $p = 0.051$; $\eta^2 = 0.027$). A significant difference was found in the level measuring "Social Support and Peers" ($F=19.46$; $p<0.001$; $\eta^2=0.122$). Significant differences were also found in perceptions related to "School Environment", both in the five-factor model ($F = 6.60$; $p = 0.011$; $\eta^2 = 0.045$), as well as in the six-factor model ($F 20.08$; $p<0.001$; $\eta^2= 0.125$). These findings highlight gender differences in psychosocial experience, with boys tending to report higher ratings in most of the assessed aspects.

Table 2 presents the main indicators of the model fit, where the original five-factor model showed poor psychometric results ($\chi^2=854$; $df=314$; $CFI=0.70$; $TLI=0.66$; $RMSEA=0.11$). Meanwhile, the modified six-factor model demonstrates a high fit ($\chi^2=313$; $df=174$; $CFI=0.98$; $TLI=0.98$; $RMSEA = 0.08$), thus confirming its suitability for 11-year-old children in Kosovo.

Table 2. Summary of fit indices for KIDSCREEN-27 five- and six-factor models (Confirmatory Factor Analysis)

Model	df	χ^2	p	CFI	TLI	RMSEA (90% CI)
KIDSCREEN-27 5-Factor Model	314	854	< .001	0.70	0.66	0.11 (0.10 – 0.12)
KIDSCREEN-27 6-Factor Model	174	313	< .001	0.98	0.98	0.08 0.06 – 0.08)

Note: *df* = Degrees of freedom, χ^2 = Chi-square statistic, *CFI* = Comparative Fit Index, *TLI* = Tucker-Lewis Index, *RMSEA* = Root Mean Square Error of Approximation, Values indicate a significantly better fit for the 6-factor model

Table 3. Factor Loadings for Individual Items in the KIDSCREEN-27: Comparison of Five- and Six-Factor Solutions

Item No. & Rephrased Question	5-Factor Model		6-Factor Model	
	<i>Subscale</i>	<i>Loading</i>	<i>Subscale</i>	<i>Loading</i>
1. How would you assess your general health status?	PHY1	0.48	Excluded	–
2. Have you generally felt physically well?	PHY2	0.59	Excluded	–
3. Have you remained physically active?	PHY3	0.65	Physical Activity (F5)	1
4. Have you found it easy to run or move with ease?	PHY4	0.58	Physical Activity (F5)	1.06
5. Have you felt energetic?	PHY5	0.57	Physical Activity (F5)	1.06
6. Has your life felt meaningful and enjoyable?	PWB1	0.7	Excluded	–
7. Have you experienced a positive mood?	PWB2	0.56	Mood & Energy (F5)	1.09
8. Have you found enjoyment in your daily activities?	PWB3	0.61	Excluded	–
9. Have you felt sad or down?	PWB4	0.38	Emotional Distress (F4)	1
10. Have you ever felt so bad that you avoided all activity?	PWB5	0.51	Emotional Distress (F4)	0.95
11. Have you felt isolated or lonely?	PWB6	0.34	Emotional Distress (F4)	1.03
12. Are you happy with the person you are?	PWB7	0.83	Self-Acceptance (F4)	1.59
13. Have you had enough time for yourself?	PAR1	0.54	Autonomy (F1)	1
14. Have you been free to purs. your preferred leisure activit.?	PAR2	0.59	Excluded	–
15. Have your parents spent sufficient time with you?	PAR3	0.71	Parent Involvement (F1)	1.26
16. Have your parents treated you fairly?	PAR4	0.56	Parent Involvement (F1)	1.09
17. Could you talk to your parents whenever you needed to?	PAR5	0.64	Parent Involvement (F1)	1.08
18. Have you had the finan. means to do what your peers do?	PAR6	0.37	Financial Resources (F6)	1
19. Have you had enough money to cover your basic needs?	PAR7	0.36	Financial Resources (F6)	0.71
20. Have you spent time with friends?	SOC1	0.86	Peer Interaction (F2)	1
21. Have you enjoyed your time with friends?	SOC2	0.72	Peer Interaction (F2)	0.84
22. Have you and your friends supported each other?	SOC3	0.52	Peer Interaction (F2)	0.67
23. Have you been able to count on your friends?	SOC4	0.37	Peer Interaction (F2)	0.5
24. Have you been satisfied with your school experience?	SCH1	0.51	Excluded	–
25. Have you had positive relationships at school?	SCH2	0.5	School Environment (F3)	1
26. Have you been able to concentrate during class?	SCH3	0.78	School Environment (F3)	1.7
27. Have you had good relationships with your teachers?	SCH4	0.69	School Environment (F3)	1.23

In Table 3, the five-factor model exhibits factor loadings spanning from very low levels, such as 0.34 for PWB6, to higher values reaching 0.86 for SOC1. Some items, particularly those related to negative

emotions and financial aspects, did not reach the minimum threshold of 0.40, questioning the validity of some subcomponents. The weakest loadings were observed especially in the items related to the experience of negative emotions (PWB4, PWB6) and financial aspects (PAR6, PAR7).

In the six-factor model, factor loadings were higher and more uniform, with most exceeding 1.00. This result is expected, considering the use of the DWLS method and the scaled parameters. The exclusion of items with weak loadings improved the psychometric validity of the revised model. A stronger relationship was observed with latent constructs, indicating improvements in well-being (PWB7 = 1.59) and school engagement (SCH3 = 1.70). Stronger associations between questions and constructs were associated with increases in well-being and school engagement.

The six-factor model shows a clearer and more stable structure, with high and uniform loadings, better reflecting the latent constructs of the KIDSCREEN-27 in 11-year-old children. The findings strongly support this version, especially in specific cultural and social conditions such as in Kosovo.

Discussion

Discussion Psychometric analysis of the Kosovo-adapted version of the KIDSCREEN-27 showed satisfactory levels of internal consistency in a sample of 11-year-old children. All five subscales physical well-being, psychological state, autonomy and relationships with parents, peer support, and school environment scored Cronbach's coefficients at or above the acceptable limit of 0.70, reflecting good internal consistency within each measured domain. The results of this study are comparable to those found in similar international validations. These results are consistent with numerous international studies; for example, Power et al. (2019) obtained alpha values ranging from a low of 0.67 to a high of 0.91 in the Bengali version, and Jafari et al. (2012) found values ranging from a low of 0.73 to a high of 0.85 in the Iranian context. Also, in the study conducted in Slovenia, a high level of internal consistency was found, with an overall α coefficient value reaching 0.93 (Budler et al., 2022) Such comparisons affirm that the psychometric properties observed in our study are within established scientific norms. Nevertheless, some populations with specific socio-economic characteristics have shown lower alpha values as seen in Irish children from low socio-economic backgrounds (Shannon et al., 2017), highlighting the importance of cultural and contextual influences on scale performance.

The results from factor analyses and construct validity assessments provided further support for the psychometric stability of the instrument. Confirmatory factor analysis (CFA) of the initial five-factor model showed an acceptable fit, with indicators such as CFI and RMSEA approaching the required limits, although the need for some minor modifications in some areas of the model was identified. Factor loadings in this model were generally medium to high, indicating that each item contributed significantly to the construction of the respective dimension. These results are consistent with those reported in the Slovenian validation, where each subscale clearly exhibited a unidimensional structure (Budler et al., 2022). However, the five-factor model has not shown complete consistency in fit across different cultural contexts. Thus, in cases such as the Iranian (Jafari et al., 2012) and the Irish (Shannon et al., 2017) cases, inconsistencies have been identified. Meanwhile, Power et al. (2019) suggested a better fit through expanded factorial structures, emphasizing the importance of adapting the model to cultural specificities and characteristics of different age groups.

Analysis of the data by age and gender showed expected differences in some aspects of health-related quality of life. Analyses conducted based on age and gender revealed expected differences in several aspects of health-related quality of life, with male children scoring higher on The findings of this study are in line with international literature, including the comprehensive study conducted by the European KIDSCREEN consortium (Ravens-Sieberer et al., 2007), as well as with results published by Power et al. (2019) and Shannon et al. (2017). Although some differences by gender were observed, the similarity in total mean scores between boys and girls indicates that KIDSCREEN remains an instrument suitable for both genders and can be used effectively for gender comparisons.

The application of the KIDSCREEN-27 instrument in the Kosovar reality represents an important practical contribution. As a measurement tool with international recognition and standardization, it allows for international comparison of indicators related to child well-being. Within the local context, this instrument can be used in schools, health centers and social services as a useful tool for assessing and monitoring the quality of life of children, while also helping to identify those who may be at risk of psychosocial difficulties.

While the study provides useful insights, limitations in methodology and the inclusion of only students from an urban area hinder the validity of the findings at the national level. This study did not include an assessment of reliability over time through test-retest, leaving open the question of the stability of the instrument over time. Also, factor analyses were applied only to a limited age group, without including other age groups or different ethnic communities, which limits a comprehensive assessment of the validity of the instrument in broader contexts. In the future, the use of more advanced methods such as Rasch analysis and multi-group CFA, as well as critical review of low-performing items, is recommended to strengthen the psychometric properties and expand the application of KIDSCREEN-27 to more diverse populations of children in Kosovo, including those with long-term health challenges.

Conclusion

Findings indicate that the Albanian adaptation of KIDSCREEN-27 demonstrates strong psychometric properties for measuring HRQoL in Kosovar children aged 11. The instrument has shown satisfactory internal consistency in most subscales, meeting acceptable criteria for psychometric quality. Meanwhile, the improved six-factor structure constructed through exploratory and confirmatory analyses proved to be more appropriate than the initial five-factor model, providing a more accurate reflection of the dimensions of HRQoL in this specific context. Although the results are encouraging, it is necessary for future research to include children from different age groups and different ethnic and regional communities within Kosovo, to further assess the validity of this instrument. Further studies are also needed to examine its stability over time through repeated testing and to apply more advanced statistical methods to analyze the stability of the structure and its sensitivity in different social and educational contexts.

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