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Youth Quality of Life Instrument-Research version (YQOL-R): psychometric properties in a community sample

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Abstract

Objective: To test some psychometric properties of the Brazilian-Portuguese version of the Youth Quality of Life Instrument-Research (YQOL-R) in a community sample of Brazilian adolescents.

Methods: This is a cross-sectional community study conducted in six schools of the catchment area of a family health unit. From an original population of 2,754 students from 10 to 17 years old, we randomly selected 419 to answer the Brazilian-Portuguese version of the YQOL-R. We tested reliability, known group differences (using anxiety symptoms and bullying involvement), and factor structure.

Results: The YQOL-R showed a good internal consistency and had an adequate and expected known group differences with both bullying and anxiety. The factor structure of the conceptual model was partially supported by our analysis.

Conclusions: The Brazilian-Portuguese version of the YQOL-R showed sufficiently good psychometric properties. Further studies are needed in order to better investigate alternative configurations of the factor structure.

J Pediatr (Rio J). 2012;88(5):443-8: Health-related quality of life, patient reported outcome, quality of life, anxiety, bullying, validity.

Introduction

The validation of quality of life (QoL) and health-related quality of life (HRQoL) measures is being considered a research priority in child and adolescent mental health.[1] The Youth Quality of Life Instrument – Research Version (YQOL-R)[2] is an instrument that takes into consideration what adolescents themselves say that is important to their QoL. The instrument development has involved youth-centered models of qualitative research based upon subjective self-report and which are developmentally appropriate, using grounded theory approach.[2] In addition, quantitative validity data have shown preliminary psychometric properties encouraging further research,[3] and the instrument is already being used to measure HRQoL in pediatric samples.[4-6] In spite of that, there are no studies aiming to demonstrate its psychometric proprieties in Brazilian samples.

The main objective of this study was to test some psychometric properties of the Brazilian Portuguese version of the YQOL-R in a community sample of Brazilian adolescents.

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Methods

This is a cross-sectional community study conducted in six public schools from the catchment area of the family health unit of Hospital de Clínicas de Porto Alegre, Brazil. We invited all 10- to 17-year-old students to participate in the study. The inclusion criterion involved being a student from one of the included schools regularly attending classes at that school in the period of the research. The original population of these schools comprised 2,754 adolescents; 217 (7.9%) were not approached by the research team to answer the questionnaires due to school dropout, transference to another school or missing classes in the days when questionnaire responses were collected and when the rescue visit was performed, and 80 (3.2%) refused participation and/or signed a dissent form, which was distributed for all parents and adolescents 2 weeks before the administration of the questionnaires. From the remaining 2,457 students, 419 were randomly selected to participate in this research, and there were no additional refuses. Scales were administered in the classroom, with careful supervision of the research team. Further details about sampling procedures can be found elsewhere.[7] The study was approved by the Institutional Review Board and Ethics Committee of Hospital de Clínicas de Porto Alegre.

The YQOL-R is a self-rated 41-item scale developed to evaluate self-perceived QoL in adolescents and comprises four domains: self (14 items), relationships (14 items), environment (10 items), and general QoL (three items).[2,3] The response scale is an 11-point scale with anchors at zero ("Not at all") and 10 ("A great deal or completely"). Higher scores represent better QoL. All domains have shown good internal consistency (Cronbach's alpha 0.77-0.96) and test-retest reliability (intraclass correlation coefficients = 0.74-0.85).[3] Discriminant validity with measures of depression, disability and attention deficit/hyperactivity disorder has shown to be adequate.[5]

The SCARED is a 41-item self-report measure of child and adolescent anxiety during the past 3 months. Items are scored using a three-point scale. Final scores ranges from 0 to 82, and higher scores reflect higher levels of anxiety. This scale has shown good psychometric properties.[8]

As in previous studies,[9] the frequency of involvement in bullying and victimization during the last year was assessed after a previous definition of bullying,[9] followed by examples of behaviors that are considered bullying and by the question: "Taking that definition and those examples into consideration, have you ever felt like you are being bullied at school"?

Sample size was defined using a subject-to-variable ratio of approximately 10:1.[10] We used the Kaiser-Meyer-Olkin (KMO) to evaluate sampling adequacy and the Bartlett's test for sphericity to observe if the variables were highly correlated, in order to provide a reasonable basis for factor analysis. We tested internal consistency using the Cronbach's alpha, and the construct validity using known group validity across SCARED percentiles and frequencies of bullying involvement. Principal component analysis with varimax rotation was used for exploratory factor solution, using the scree plot to define graphically the number of factors. We also used confirmatory factor analysis (CFA) for the four-factor solution of the original conceptual scale, using chi-square goodness-of-fit, root mean square error of approximation (RMSEA) and one of the baseline fit measures, and the Tucker-Lewis Index (TLI)[11] as fit indices. A chi-square > 0.5, a RMSEA ≤ 0.6, and a TLI > 0.8-0.9 were suggested as cutoffs for these indices, indicating good model fit. The analysis of variance (ANOVA) was performed to compare YQOL-R scores between quartiles of anxiety symptoms according to SCARED and categories of bullying involvement. All tests were two-tailed, with an alpha value of 0.05 and a 95% confidence interval.

Results

From the 419 students, 209 (49.9%) were female. The mean age was 13.9 years (standard deviation = 2.45). Factor analysis with non-missing questions was available for 412 subjects. Frequencies and ranges indicated that all response choices were used and followed a normal distribution. Floor/ceiling effects were lesser than 50% for all items.

KMO and Bartlett's tests satisfied the assumption for factor analysis. Cronbach's alpha for the 41 items was 0.931 (0.803 for the self domain, 0.885 for the relationship domain, 0.851 for the environmental domain, and 0.779 for the general QoL domain of the YQOL-R scale). Principal component analysis with varimax rotation was conducted to assess the underlying structure of the 41 items of the YQOL-R. Four factors were requested, based on graphical analysis of the scree plot. Results of the factor loadings by item and variance explanation are depicted in Table 1.

CFA of the original scale reveals mixed results: whereas chi-square test indicated lack of fit (chi-square = 1,834.8, degrees of freedom = 768; $p < 0.001$), other indices seem to show an acceptable model (RMSEA = 0.058, TLI = 0.834).

In addition, a single factor principal component analysis was run on the four domain scores in order to assess whether the data supported the use of an overall score. The results of this analysis showed that a single factor explained 74.8% of the total variation in the domain scores with an eigenvalue of 2.99, hence supporting the use of an overall YQOL-R score.

Comparison between known groups of anxiety symptoms percentiles and bullying behaviors can be observed in Table 2. We can see a linear dose-response effect between both anxious symptoms and bullying involvement and YQOL-R scores in all domains evaluated.

Table 1 - Factor loading for items of YQOL-R

Item			Factor loading				Comunality
			I	II	III	IV	
REL13	-	adults treat me fairly	0.488*	0.226	0.370	0.028	0.427
REL14	-	attention from family	0.774*	0.213	0.192	0.036	0.682
REL15	-	understood by parents	0.775*	0.124	0.212	0.037	0.663
REL16	-	useful to family	0.702*	0.241	0.271	0.003	0.624
REL17	-	family cares	0.734*	0.230	0.083	0.053	0.602
REL18	-	family encourages	0.662*	0.341	0.104	0.009	0.565
REL19	-	get along with parents	0.817*	0.225	0.132	-0.010	0.735
REL20	-	participate in decisions	0.656*	0.144	0.217	-0.077	0.503
REL25	-	satisfied with social life	0.443*	0.365	0.290	0.255	0.479
GENQ	-	satisfied with life	0.542*	0.403	0.205	0.234†	0.552
ENV29	-	life is interesting	0.393	0.427*	0.343	-0.057	0.458
ENV30	-	try new things	0.184	0.689*	0.142	-0.141	0.549
ENV31	-	like neighborhood	0.172	0.496*	-0.015	0.220	0.324
ENV32	-	forward to future	0.108	0.659*	0.236	-0.169	0.531
ENV33	-	enough money	0.288	0.470*	0.156	0.107	0.339
ENV34	-	safe at home	0.438	0.501*	0.071	0.084	0.455
ENV35	-	good education	0.193	0.668*	0.088	-0.029	0.492
ENV36	-	get information	0.157	0.628*	0.280	0.010	0.498
ENV37	-	enjoy learning	0.165	0.681*	0.202	-0.126	0.548
ENV38	-	safe at school	0.098	0.575*	0.172	0.003	0.370
REL23	-	tell friends feelings	0.104†	0.336*	0.322	-0.061	0.231
REL24	-	happy with friends	0.164†	0.556*	0.152	0.278	0.436
REL26	-	take part in activities	0.310†	0.396*	0.301	0.052	0.346
REL27	-	respect from peers	0.210†	0.461*	0.388	0.057	0.410
GENQ	-	enjoy life	0.366	0.564*	0.149	0.130†	0.491
GENQ	-	life is worthwhile	0.412	0.517*	0.247	0.121†	0.513
SELF1	-	keep trying	-0.022	0.200	0.440*	-0.140	0.253
SELF2	-	handle difficulties	0.113	0.132	0.619*	-0.027	0.415
SELF3	-	able to do things well	0.067	0.221	0.568*	0.041	0.378
SELF4	-	good about self	0.330	0.345	0.480*	0.116	0.472
SELF5	-	important to others	0.212	0.143	0.628*	0.026	0.461
SELF6	-	comfortable with sexual feelings	0.188	0.026	0.670*	0.148	0.506
SELF7	-	enough energy	0.164	0.343	0.547*	-0.087	0.451
SELF8	-	pleased with looks	0.390	0.181	0.418*	0.035	0.361
SELF9	-	comfortable with stress	0.301	0.018	0.395*	0.273	0.322
SELF10	-	okay to make mistakes	0.131	-0.001	0.330*	0.272	0.200
SELF11	-	life has meaning	0.394	0.187	0.532*	0.034	0.474
SELF12	-	beliefs give strength	0.225	0.289	0.513*	-0.180	0.429
REL22	-	role model	0.082†	0.126	0.204	-0.590*	0.412
SELF21	-	alone in life	0.269	0.167	-0.043†	0.529*	0.382
SELF28	-	left out	-0.078	0.031	0.162†	0.596*	0.388
Eigenvalues			6.362	6.088	4.659	1.618	
% variance			15.518	14.850	11.364	3.948	

Items in the table are sorted by the four extracted factors (I – extracted relationship factor; II- extracted environmental factor; III – extracted self factor; IV – a non-previously described factor) and are named respecting their original domains in the original study (SELF, question from the original self domain; ENV, question from the original environmental domain; GENQ, question from the original general quality of file domain; REL, question from the original relationship domain).

* Factor loading that represents new extracted factors.

† Items that mark higher factor loadings in extracted factors other than their original domains.

Table 2 - Comparison of YQOL-R scores with SCARED percentiles and bullying victimization groups

				ANOVA				95%CI	
Groups	**n**	**Mean**	**SD**	**F**	**p**	**Post-hoc***	**MD**	**Lower**	**Upper**
SCARED percentile groups									
General quality of life domain score									
< P25	102	87.84	18.57			[Ref]	[Ref]		
P25-P50	102	83.55	20.34			0.130	4.30	-1.27	9.87
P50-P75	112	80.67	18.86			0.010	7.18	1.73	12.63
> P75	100	73.97	23.09			< 0.001	13.87	8.27	19.47
Total	416	81.52	20.78	8.356	< 0.001				
Self domain score									
< P25	102	73.14	16.06			[Ref]	[Ref]		
P25-P50	102	66.44	15.83			0.002	6.69	2.42	10.97
P50-P75	112	63.64	14.24			< 0.001	9.50	5.32	13.68
> P75	100	57.68	16.09			< 0.001	15.46	11.16	19.75
Total	416	65.22	16.43	17.272	< 0.001				
Relationship domain score									
< P25	102	75.14	13.86			[Ref]	[Ref]		
P25-P50	102	69.77	17.80			0.025	5.37	0.68	10.05
P50-P75	112	68.66	16.12			0.006	6.48	1.90	11.06
> P75	100	62.66	19.91			< 0.001	12.48	7.77	17.19
Total	416	69.08	17.52	9.118	< 0.001				
Environmental domain score									
< P25	102	83.38	17.23			[Ref]	[Ref]		
P25-P50	102	80.87	18.77			0.281	2.51	-2.06	7.09
P50-P75	112	79.73	14.92			0.109	3.65	-0.82	8.12
> P75	100	75.79	15.39			0.001	7.59	3.00	12.19
Total	416	79.96	16.77	3.652	0.013				
Total quality of life score									
< P25	102	79.87	14.14			[Ref]	[Ref]		
P25-P50	102	75.16	16.31			0.024	4.72	0.63	8.81
P50-P75	112	73.17	13.53			0.001	6.70	2.70	10.70
> P75	100	67.53	15.45			< 0.001	12.35	8.24	16.46
Total	416	73.95	15.44	11.957	< 0.001				
Bullying victimization groups									
General quality of life domain score									
Not bullied	243	83.15	21.57			[Ref]	[Ref]		
Sometimes bullied	158	79.27	19.74			0.071	3.88	-0.34	8.09
Frequently bullied	15	70.74	24.01			0.027	12.41	1.44	23.38
Total	416	81.23	21.11	3.579	0.029				
Self domain score									
Not bullied	243	67.66	16.59			[Ref]	[Ref]		
Sometimes bullied	158	62.80	15.94			0.003	4.86	1.61	8.10
Frequently bullied	15	50.86	10.43			< 0.001	16.81	8.35	25.26
Total	416	65.21	16.54	10.452	< 0.001				
Relationships domain score									
Not bullied	243	71.53	17.04			[Ref]	[Ref]		
Sometimes bullied	158	65.98	18.17			0.002	5.55	2.03	9.06
Frequently bullied	15	56.99	17.53			0.002	14.54	5.39	23.69
Total	416	68.90	17.81	8.419	< 0.001				
Environmental domain score									
Not bullied	243	81.94	17.85			[Ref]	[Ref]		
Sometimes bullied	158	76.83	15.91			0.003	5.11	1.71	8.51
Frequently bullied	15	77.64	10.26			0.340	4.30	-4.55	13.15
Total	416	79.85	17.07	4.491	0.012				
Total quality of life score									
Not bullied	243	76.07	15.97			[Ref]	[Ref]		
Sometimes bullied	158	71.22	14.92			0.002	4.85	1.74	7.95
Frequently bullied	15	64.06	11.98			0.004	12.01	3.93	20.10
Total	416	73.80	15.71	7.798	< 0.001				

[Ref] = reference category; MD = mean difference; SD = standard deviation; 95%CI = 95% confidence interval.
* Post hoc test performed using least significant differences.

Discussion

In the present study, we were able to investigate some psychometric properties of the YQOL-R in a community sample of 10- to 17-year-old adolescents. The YQOL-R has shown a good internal consistency and a linear dose-response effect with known group differences (for both anxiety and bullying). The factor structure has shown mixed results, and further studies with larger samples are needed.

There is a trend towards greater consideration of patient reported outcomes, including HRQoL. QoL measures can be used for several reasons: service planning, estimating cost-effectiveness of treatments, and measuring how well a healthcare system is meeting the health needs of a given population. They can also provide a better picture for service managers about the differences between patient groups, resulting in evidence-based resource allocation, and, for some researchers, are considered the gold standard of clinical decision making.[1]

Several instruments are being constructed to measure QoL in children and adolescents. A recent study has found at least 14 measures of general QoL for children and adolescents,[12] but very few are fully validated in different cultures, and there are few validated scales to measure the QoL of children and adolescents in Brazil.[13-15] We decided to use the YQOL-R and to validate it for Brazilian-Portuguese because of its well-conducted process of conceptual development[2] and quantitative research showing good psychometric properties.[3]

In our study, factor structure achieves only partial support for the original conceptual four-factor solution (environmental, self, relationship and general QoL domains). Both exploratory and confirmatory analysis demonstrated mixed results. Our exploratory analysis has shown that items related to friendship have higher loadings in the environmental domain rather than in the relationship domain. This misfit is reasonable for schoolchildren, since the environmental domain has a lot of items related to school environment. In addition, as expected, the general QoL domain did not load into a separate domain.

Regarding CFA, the lack of fit of the chi-square test may be discounted, since a significant chi-square itself is not a reason to modify the model.[11] Therefore, further research is needed to confirm factor structure and to investigate the use of CFA alternative proposed factors.

Our study has some limitations. First, we have assessed some psychometric properties of YQOL-R, but not all of them. Second, the lack of an independent sample did not allow us to evaluate a CFA model for our findings from the exploratory analysis. Finally, our age range is large compared to our sample size and therefore we were not able to evaluate if psychometric properties are stable over different age ranges.

The concept and measures of QoL in adolescents still needs further research. Studies investigating psychometric properties are needed in order to provide valid and reliable instruments to better integrate QoL data into clinical research. The YQOL-R has shown sufficiently good psychometric properties to encourage further research investigations and clinical use.

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