

Validation of WHO QOL-BREF Instrument in Indian Adolescents

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ABSTRACT

Objective. To test the psychometric properties of World Health Organization Quality of Life (WHO QOL-BREF) instrument in Indian adolescents.

Methods. Of 1900 schools in Lucknow city, 20 schools were invited to participate. To make WHO QOL-BREF instrument culturally appropriate for Indian adolescents, a minor modification was done by replacing one item in Social domain "Are you satisfied with your sex life?" with "Are you satisfied with the respect you receive from others?". The revised WHO QOL-BREF was administered to subjects in school after obtaining written parental consent.

Results. From August 2007 – January 2008, 525 adolescents were recruited (mean age 14.04±2.09 yr; 52.38 % males). Adolescents reported highest HRQoL in social relations and lowest in environment domain. The instrument showed good internal consistency (Cronbach's $\alpha=0.87$; p -value<0.01) as well as good content, construct and predictive validity (p -values<0.05). Psychological domain had best predictive validity, whereas, social relations domain had best content validity.

Conclusion. The study provides evidence that revised WHO QOL-BREF is a reliable and valid instrument and can be used in Indian adolescents. [Indian J Pediatr 2010; 77 (4) : 381-386] E-mail: sawasthi@sancharnet.in

Key words: WHO QOL-BREF; Adolescent; Health related quality of Life; Reliability; Validity

Health Related Quality of Life (HRQoL) represents a bio-physical-social orientation towards the concept of health¹ but there is no universal definition of HRQoL.^{2,3,4} World Health Organization (WHO), however, defines Quality of Life (QoL) as 'individual's perception of their position in life in context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns'.⁵ The terms QoL and HRQoL are often used interchangeably and since QoL is a broader construct encompassing HRQoL,⁶ therefore, global experts developed the WHO Quality of Life (WHO QOL) instrument that simultaneously assesses QoL and HRQoL.⁷

WHO QOL instruments (WHO QOL-100 and WHO QOL-BREF) are internationally validated and available in 30 languages, including Hindi, which makes them

generalizable to many populations.^{5,8} The instrument in Hindi has been validated in adults only⁹ and hence, cannot be extrapolated to adolescents. To fill this gap the present study was conducted to validate the instrument in adolescents by assessing its psychometric properties.

MATERIAL AND METHODS

This was a cross-sectional study conducted after approval by the Institutional Ethics Committee. As a pilot study, qualitative in-depth interviews were done from March 2007 to May 2007 on 60 adolescents for assessing the suitability of WHO QOL-BREF for adolescent population here. Of these, 20 were ill adolescents admitted in Pediatrics Department, Chhatrapati Shahuji Maharaj Medical University, Lucknow and 40 were healthy adolescent siblings/relatives accompanying ill admitted patients. Mean age of the pilot study sample was 14.6±0.26 yr and 50% were males. The interviews were stopped once responses became similar and repetitive. The instrument was largely found suitable with the

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exception of one question in Social domain "Are you satisfied with your sex life?" that was replaced by "Are you satisfied with the respect you receive from others?" as done for Taiwanese adolescents.⁸

A list of schools in Lucknow city was obtained from District Inspector of Schools, Department of Education, Lucknow. This included a list of public schools running exclusively or partially on government aid and a list of private schools functioning without any government aid. Out of a total 1900 recognized schools in Lucknow, 10 public and 10 private schools were selected through purposive sampling and invited for participation. Purposive selection was done to ensure equal representation of schools catering to different socio-economic groups.

Participating schools were requested to provide the list of students enrolled in classes VI-XII. The students aged between 10-19 yr were included in the study as this is the defined age of adolescents.¹⁰ About 5% subjects per school were randomly selected through lottery system, from the alphabetical roll-call list, and explained about the study. Informed consent forms, in Hindi or English as per the linguistic convenience of their parents, were distributed to students for taking to their homes for obtaining approval by either parent. Parents also provided socio-demographic data for following variables: (i) Child related – age (in completed years), gender, birth order, class in which enrolled; (ii) Parent related – educational status and occupation; (iii) Family related – number of siblings, type of family, family size, and gross monthly income. Those subjects, whose parents signed the consent form, filled the revised WHO QOL-BREF questionnaire in front of investigator (KA) at school.

WHO QOL-BREF instrument⁵ was used for the study. This instrument has 26 items that produce a generic HRQoL score across 4 domains: Physical (7 items), Psychological (6 items), Social Relationships (3 items) and Environment (8 items). There are two global scores: overall QoL (1 item) and overall satisfaction with health (1 item) and a third global score namely, global HRQoL was obtained by averaging the two global items.⁸ In the instrument, questions are dispersed and not arranged domain-wise. The responses to items were recorded on a 5-point Likert scale. Domain scores were scaled in a positive direction (higher scores denote better QoL), with a score range of 4-20 that were transformed to 0-100 scale according to the standard procedure defined in WHO QOL user manual.⁵

Assuming that number of adolescent students (age between 10-19 yr) in 20 schools of Lucknow is 12,000, to detect a mean HRQoL score of 50% at a desired precision of 10% and 95% confidence level, minimum sample size for the study was computed as 372.

Data was computerized and analysis was done using

SPSS ver 11.0 (SPSS. Inc., Chicago, IL, USA). We report the baseline characteristics of the study sample. A p-value of <0.05 was taken as statistically significant. Mean and standard deviation of items and domain scores were calculated. Internal consistency, a measure of reliability of an instrument, was defined as the degree to which the items of a domain or scale assess the same domain.^{3,5} Cronbach's alpha was calculated to evaluate the internal consistency of the instrument. The 'corrected item total correlations' *i.e.*, the correlation between each item and total score of the instrument as well as 'alpha if item deleted' *i.e.*, the values of the overall alpha if that item isn't included in the calculation, have also been reported.¹¹ To evaluate the effect of negatively scored items on internal consistency of the instrument, Cronbach's alpha was recalculated by dropping the negatively scored items.

Content validity¹², the extent to which a measurement reflects the specific intended domain of content, was assessed by calculating Item-domain correlations and Inter-domain correlations.⁸ Construct validity, the extent to which an instrument measures the intended construct³ was assessed by calculating the cross-domain correlations.²

For assessing the predictive validity of revised WHO QOL-BREF, correlations between three global scores namely, global QoL, global health and global HRQoL, were computed with the four aggregate domain scores.⁸ Linear regressions analysis was done to predict individual global score using those aggregate domain score with which it had the highest correlation coefficient.

RESULTS

The study was conducted from August 2007 to January 2008 in 20 schools of Lucknow. Out of 566 questionnaires distributed in these schools those 525 adolescents (92.75%), whose parents provided consent for participation, were included in the study. In our study, half of the schools were public. Included in study were 270 and 255 subjects from public and private schools, respectively. Mean age of the sample (n=525) was 14.04±2.09 years and 52.38% were males. The baseline characteristics of study sample are shown in table 1.

Descriptive analysis of the instrument showed that the mean of item scores (scored on 1-5 Likert scale) ranged from 3.33±1 to 4.14±0.83. Means and standard deviation of the four domain scores (score range 0-100) were: Physical domain (74.04±14.38), Psychological (72.9±15.04), social relations (78.04±17.03) and environment (69.48±16.38). Mean of global QoL was 4.06±0.72, global health was 3.86±0.88 and global HRQoL was 3.95±0.67.

Results of Internal Consistency of revised WHO QOL-BREF are presented in table 2 with Overall Cronbach's

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TABLE 1. Baseline Characteristics of Study Sample (n=525)

	Public schools (N=270) (n, %)		Private schools (N=255) (n, %)	
Age				
10-13 yrs	131	(48.5)	96	(37.6)
14-16 yrs	105	(38.8)	111	(43.5)
17-19 yrs	34	(12.6)	48	(18.8)
Gender				
Male	145	(53.7)	130	(50.9)
Number of siblings				
Nil	13	(4.8)	18	(7)
One	44	(16.3)	173	(67.8)
Two	82	(30.3)	54	(21.2)
Three	62	(23)	5	(1.9)
³ Four	69	(25.5)	5	(1.9)
Birth Order				
First	82	(30.3)	141	(55.3)
Second	86	(31.8)	84	(32.9)
Third	54	(20)	27	(10.6)
³ Fourth	48	(17.7)	3	(1.2)
Father's educational status				
Illiterate	4	(1.48)	-	
High school or less	110	(40.7)	7	(2.7)
Intermediate	64	(23.7)	13	(5.1)
Graduation	57	(21.1)	107	(41.9)
Post Graduation or more	35	(12.9)	128	(50.1)
Mother's educational status				
Illiterate	46	(17)	-	
High school or less	139	(51.4)	11	(4.3)
Intermediate	40	(14.8)	20	(7.8)
Graduation	23	(8.5)	101	(39.6)
Post Graduation or more	22	(8.1)	123	(48.2)
Father's occupation*				
Government service	81	(30)	117	(45.8)
Private job	76	(28.1)	49	(19.2)
Business	43	(15.9)	69	(27)
Laborer	26	(9.6)	-	
Agriculture	20	(7.4)	1	(0.39)
Consultant	15	(5.5)	13	(5.1)
Mother's occupation*				
Government service	8	(2.96)	32	(12.5)
Private job	44	(16.2)	21	(8.23)
Business	4	(1.48)	7	(2.74)
Laborer	3	(1.11)	-	
Agriculture	7	(2.59)	-	
Housewife	202	(74.8)	190	(74.5)
Consultant	-		4	(1.56)
Type of family				
Nuclear	202	(74.8)	161	(63)
Joint	68	(25.2)	94	(36.8)
Size of family (no. of family members)				
≤ 4	38	(14)	104	(40.7)
5-8	175	(64.8)	108	(42.3)
9-12	29	(10.7)	27	(10.5)
³ 13	28	(10.3)	16	(6.3)
Family's gross monthly income				
≤ 5000	205	(75.9)	6	(2.35)
5001-15000	59	(21.8)	105	(41.1)
15001-25000	4	(1.48)	69	(27)
³ 25001	2	(0.74)	75	(29.4)
Level of child's education				
Class VI-VIII	110	(40.7)	113	(44)
Class IX-X	78	(28.8)	73	(28.6)
Class XI-XII	82	(30.4)	69	(27)

* Father's occupation and mother's occupation has not been reported in 15 and 3 cases respectively where fathers or mothers had expired before the study.

alpha of 0.87. Overall item-wise 'corrected item-total correlation' ranged from 0.41-0.62. However, for the three negatively scored items namely, "To what extent do you feel that physical pain prevents you from doing what you need to do?", "How much do you need any medical treatment to function in your daily life?" and "How often do you have negative feelings such as blue mood, despair, anxiety, and depression?", the 'corrected item-total correlations' were negative (p-values<0.01).

Results for domain-wise internal consistency analysis are also shown in table 2. When the internal consistency analysis was repeated for physical domain by dropping the two negatively scored items, Cronbach's alpha rose substantially from 0.44 to 0.75. Similarly, when the analysis was repeated after dropping one negatively scored item in the psychological domain, its Cronbach's alpha increased from 0.57 to 0.73 (p-value<0.01). The Cronbach's alpha values for physical and psychological domains, including and excluding the negatively scored items, are shown in table 2. However, as there were no negatively scored items in social relation and environment domains, the internal consistency results for these have been reported without any exclusion of items.

The revised WHOQOL-BREF instrument was further tested for Content, Construct and Predictive validity. The instrument illustrated good content validity with item-domain correlations in the range of 0.5-0.77 (p-values<0.001). The range of domain-wise item-domain correlations were as follows: Physical (0.5-0.67), psychological (0.53-0.74), social relations (0.75-0.77), and environment (0.57-0.73).

The inter-domain correlations, for evaluating content validity, were 0.64 (physical-psychological), 0.51 (physical-social relation), 0.63 (physical-environment), 0.55 (psychological-social relations), 0.64 (psychological-environment) and 0.48 (social relation-environment) (p-values<0.001).

The analysis of construct validity showed that all cross-domain correlations were significantly lower than the item-domain correlations (data not given here). Thus, WHO QOL-BREF illustrated good construct validity as all items had substantially higher correlations with their intended domains rather with other domains of the instrument.

Results of correlations between the three global scores, i.e., global QoL, global health and global HRQoL, with the four domain scores showed that global HRQoL had highest correlations with all the four domain scores: physical (0.57), psychological (0.63), social relations (0.44) and environment (0.53). Therefore, Linear regressions were performed to evaluate the predicting effect of domain scores on global HRQoL only. Results (Table 3) show that all domains have a good standardized regression coefficient b with global HRQoL and were

TABLE 2. Results of Internal Consistency Analysis

Overall Cronbach's alpha for instrument = 0.87**						
Item	Facet	Corrected Item-total correlation		Alpha if item deleted		
		Including the negatively scored items	Excluding the negatively scored items	Including the negatively scored items	Excluding the negatively scored items	
Domain I: Physical						
3. To what extent do you feel that physical pain prevents you from doing what you need to do?*	Pain and discomfort	- 0.10		0.56		
4. How much do you need any medical treatment to function in your daily life?*	Medication required in everyday life	- 0.20		0.58		
10. Do you have enough energy for everyday life?	Energy and fatigue	0.38	0.54	0.32	0.69	
15. How well are you able to get around?	Mobility	0.23	0.35	0.39	0.77	
16. How satisfied are you with your sleep?	Sleep and rest	0.38	0.48	0.32	0.71	
17. How satisfied are you with your ability to perform your daily living activities?	Activities of daily living	0.47	0.62	0.29	0.67	
18. How satisfied are you with your capacity for work?	Work capacity	0.51	0.62	0.25	0.66	
<i>Cronbach's alpha**</i>		0.44	0.75			
Domain II: Psychological						
5. How much do you enjoy life?	Positive feelings	0.43	0.47	0.47	0.69	
6. To what extent do you feel your life to be meaningful?	Level of spirituality in life	0.53	0.59	0.42	0.65	
7. How well are you able to concentrate?	Ability to think	0.44	0.46	0.47	0.7	
11. Are you able to accept your bodily appearance?	Body image	0.38	0.42	0.49	0.71	
19. How satisfied are you with yourself?	Self esteem	0.47	0.53	0.45	0.67	
26. How often do you have negative feelings such as blue mood, despair, anxiety, and depression?*	Negative feelings	-0.30		0.73		
<i>Cronbach's alpha**</i>		0.57	0.73			
Domain III: Social Relations						
20. How satisfied are you with your personal relationships?	Personal relations	0.51		0.63		
21. How satisfied are you with the respect you receive by others?	Respected by others	0.56		0.56		
22. How satisfied are you with the support you get from friends?	Social support	0.49		0.64		
<i>Cronbach's alpha: 0.70**</i>						
Domain IV: Environment						
8. How safe do you feel in your daily life?	Feeling of safety	0.51		0.80		
9. How healthy is your physical environment?	Physical environment	0.57		0.80		
12. Have you enough money to meet your needs?	Financial resources	0.56		0.80		
13. How available to you is the information that you need in your day-to-day life?	Opportunities for new information	0.62		0.79		
14. To what extent do you have the opportunity for leisure activities?	Opportunities for leisurely activities	0.41		0.82		
23. How satisfied are you with the conditions of your living place?	Home environment	0.56		0.80		
24. How satisfied are you with your access to health services?	Availability of health services	0.59		0.79		
25. How satisfied are you with your transport?	Transportation facilities	0.54		0.80		
<i>Cronbach's alpha: 0.82**</i>						
<i>*Negatively scored items. **p-values <0.01.</i>						

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TABLE 3. Regression Results for Predictive Validity of Domain Scores on Global HRQoL

Variable Domain	Constant (Intercept)	Standardized coefficient b	R ²	Adjusted R ²	Std Error of estimate	F	t	p-value
Physical	1.88	0.598	0.357	0.356	0.53	290.4	15.25	0.000
Psychological	1.91	0.629	0.396	0.394	0.52	342.3	16.85	0.000
Social Relations	2.54	0.460	0.212	0.210	0.59	140.4	20.7	0.000
Environment	2.4	0.543	0.295	0.294	0.56	219.1	22.36	0.000

statistically significant.

DISCUSSION

The aim of our study was to validate the psychometric properties of WHOQOL-BREF in school-going healthy adolescents. We have found that revised WHOQOL-BREF has high internal consistency and good content, construct and predictive validity. In prior studies, the instrument has shown good psychometric properties in healthy as well as ill adult populations outside India.^{13,14} The instrument has also been validated in healthy Indian adults,⁹ and with some modifications, as a vision-specific instrument to assess HRQoL in adult ophthalmic patients.¹⁵ Previously this instrument, with slight revisions, has been used in adolescent population outside India^{8,16,17} but to the best of our knowledge, has not yet been validated in Indian adolescents.

Our results show that Indian adolescents perceived highest HRQoL in social relations domain. Adolescents have rated their HRQoL lowest in environment domain similar to the reports by Chinese adolescents,¹⁷ possibly due to their higher expectations from the environment in which they live. HRQoL is a subjective concept and its assessment actually represents the gap between individual's expectations and perception of realities, often referred to as *Calman's gap*^{4,18} which makes it obvious that reduction in this gap will result in enhanced HRQoL.

We found that the revised WHOQOL-BREF had high internal consistency, which is reassuring for a complex and diverse construct like HRQoL.¹¹ The three negatively-scored items measuring 'pain and discomfort', 'medication required in everyday life', and 'negative feelings like anxiety and depression' had negative 'corrected item total correlations'. However, when these negatively scored items were dropped during analysis, the dimension-wise Cronbach's alpha raised substantially showing a considerable rise in internal consistency of revised WHOQOL-BREF which has been reported previously.^{8,11} Literature suggests that the items with 'corrected item total correlations' below 0.3 should be dropped because such items tend to reduce the internal consistency of the instrument. We are of the opinion that since the present study was done on healthy school-going population; therefore, the subjects may be unaware of experiences

related to illness or negative feelings like despair, anxiety and depression. Therefore, we recommend dropping of these three negatively scored items when the instrument is being used in healthy population. There are several 'disease –specific' scales that can be used in ill populations.

Our results showed that social relations domain had highest content validity whereas physical domain had low content validity, possibly due to the presence of two problem items that are negatively scored and measure 'pain and discomfort', and 'medication required in everyday life'.² Similar to our findings, the high content validity for psychological-environment and physical-psychological domain pairs and high construct validity for the instrument has been reported previously in WHOQOL-BREF validation studies.^{2,16}

The results of predictive validity showed that global HRQoL had better predictive validity as compared to global QoL and global health for all four domains. This may probably be due to the fact that global HRQoL is a summation score of global QoL and global health and thus, captures the combined essence of global QoL as well as global health. This may indicate that, in HRQoL studies, global HRQoL should be considered, in addition to global QoL and global health, which is seldom done.² Hence, we recommend that future HRQoL studies using WHOQOL-BREF should compute the summation global HRQoL score and include it in the analysis.

The strength of our study is that we validated the psychometric properties of WHOQOL-BREF on healthy adolescents from 20 schools of Lucknow city. This showed that the instrument is suitable, with some modifications, for application in Indian adolescents. To make the instrument culturally appropriate, we have replaced one item in social relations domain. We have also identified the three negatively scored items, which if dropped, will enhance internal consistency as well as content validity of the instrument. Since the schools selected for the study were located in the urban or semi-urban locations of city, thus further validation work is needed in rural areas. Secondly, only school going adolescents were included in the study and there is no representation from those, who are either not admitted to schools or were absent. Hence, community validation of revised WHO QOL-BREF is also warranted.

CONCLUSION

Our study showed that revised WHOQOL-BREF is a reliable and valid instrument for application in school-going healthy Indian adolescents. The instrument can be made culturally appropriate for Indian adolescents by replacing the item on 'sexual activity'. Further, a briefer version of WHO QOL-BREF can be developed and validated by dropping the three negatively scored items that have been identified to impair the internal consistency and content validity of the instrument.

Contributions: KA, SA contributed to study design, data analysis, interpretation and manuscript writing. SA conceptualized the study. KA contributed to data collection. HC, US and ST contributed to interpretation. US also contributed to statistical analysis. KA currently employed as SRF (I.C.M.R.)

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