ORIGINAL ARTICLE

Psychometric Properties of the Chinese Version of the Kid-KINDL^R Questionnaire for Measuring the Health-related Quality of Life of School-aged Children

Phoebe L.C. Chan*, **Serena S.W. Ng, Dora Y.L. Chan**

Department of Occupational Therapy, Kowloon Hospital, Kowloon, Hong Kong Special Administrative Region, China

Summary   *Objective/Background:* The reliability and validity of the Chinese version of the Kid-KINDL^R questionnaire were examined with school-aged children in Hong Kong.
Methods: A total of 112 healthy children were selected by convenience sampling from two primary schools and 30 children with global developmental delay were selected from an outpatient occupational therapy department of a convalescent hospital. The Kid-KINDL^R questionnaire was translated using independent forward and backward translation. The content validity of the translated instrument was evaluated by four experts. Internal consistency, factor analysis, and construct validity were examined in the healthy children group, whereas known-group comparison was performed in the group with global developmental delay.
Results: The significance value of the Shapiro—Wilk test was greater than 0.05, indicating that the sample displayed a normal distribution. The total score had good internal consistency (Cronbach's alpha = .77); however, the consistency of the subscales varied (Cronbach's alpha ranged from .47 to .70). The children and parent questionnaires did not load onto the six factors originally hypothesized. Instead, seven factors were generated. Evidence supporting the questionnaire's validity included a lack of age and sex bias and positive known-group differentiation (Wilks' lambda = 0.906, *p* = .035).
Conclusion: The Chinese version of the Kid-KINDL^R questionnaire exhibited good psychometric properties, but the internal consistency of the translated instrument needs further improvement. It is recommended that practitioners focus on the Kid-KINDL^R total score

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 * Corresponding author. 1/F, Occupational Therapy Department, Kowloon Hospital Rehabilitation Building, 147A Argyle Street, Mongkok, Kowloon, Hong Kong SAR, China.
   E-mail address: clc271@ha.org.hk (P.L.C.Chan).

when interpreting the Kid-KINDL[R] data. Overall, the study findings indicate that the Chinese version of the Kid-KINDL[R] is an important tool for use in clinical practice.

Introduction

Health professionals are showing an increasing interest in the measurement of quality of life (QoL). QoL can be described in a broad multidimensional manner by incorporating objective and subjective accounts of factors such personal feelings, social relationships, the local environment, societal values, political institutions, economic conditions, and international relations (Colver, 2008).

Early attempts to rate children's QoL relied on data provided by mothers. Doctors and therapists often assume that the therapies and treatments they offer to children naturally correspond with what a child will want and will improve their QoL. However, children do not share the same views as adults about the causes, aetiology, and treatment of illness. They may interpret a doctor's questions differently, and adopt a different time perspective regarding the course of a disease. Accordingly, any comprehensive assessment of a child's health-related QoL (HRQoL) should include information from both the child and his or her caregiver. A number of tools have been designed to assess QoL in children and adolescents, such as the Child Health Questionnaire (CHQ; Landgraf, Abetz, & Ware, 1999), the Kid-KINDL[R] questionnaire (Ravens-Sieberer & Bullinger, 2000), and the Pediatric Quality of Life Inventory (PedsQL; Hu, Jiang, Hong, Cheng, Kong, & Ye, 2013).

A Chinese version of the PedsQL has been developed and psychometrically evaluated. The scoring of PedsQL is somewhat more complicated and difficult to interpret than that of the Kid-KINDL[R] because of the time factor. The PedsQL requires the child to self-report and the parent to proxy report how much of a problem each item has been during the past month on a 5-point Likert scale. The items are linearly transformed to a 0—100 scale and the scale scores are computed as the sum of the items divided by the number of items answered.

The CHQ consists of 87 items distributed across 14 subscales, whereas the 24 items of the Kid-KINDL[R] are divided into six subscales as well as a total scale. The Kid-KINDL[R] questionnaire is easy to administer, fill in, and score, and is completed within 10 minutes, whereas the administration, filling in, and scoring of the CHQ are somewhat more complicated, and the questionnaire requires between 25 minutes and 30 minutes to complete. All of the items of the CHQ are scored using 4- to 6-point Likert scales. Although the CHQ is an extensive instrument, a shorter questionnaire such as the Kid-KINDL[R] may be desirable for use in health research and clinical practice.

Overall, the Kid-KINDL[R] questionnaire is the preferred instrument because it includes both child and parent proxy reports and, most importantly, the child self-report has the least items and is relatively easy to complete. The Kid-KINDL[R] comprises 24 Likert-scaled items that are equally distributed into six subscales. In addition to the six subscale scores, the respondents are given a total scale score, which may be expressed in the original metric (1—5). Eiser and Morse (2001a, 2001b) recommend that the ideal QoL measurement for children should not contain >30 items. The psychometric properties of this instrument for children with and without chronic disorders have been well documented. Hence, we chose to translate the Kid-KINDL[R] questionnaire into Chinese and validate it for local application in Hong Kong.

A previous local study found that children in Hong Kong reported lower QoL under the same physical conditions (Yam et al., 2008). Societal and cultural attitudes play an important role in determining QoL. Hence, when adapting and translating QoL instruments for use in other cultural contexts, it is important to ensure that the psychometric properties of the original questionnaire are preserved in the new cultural setting. Therefore, the goal of this study was to validate a Chinese version of the Kid-KINDL[R] questionnaire. Specifically, the study focused on the following three psychometric areas: (a) content validity, (b) reliability (internal consistency), and (c) construct validity (i.e., sex bias and known-group comparison). The study was granted independent approval from the Hospital Authority Research Ethics Committee prior to commencement.

Methods

Participants

The participants were divided into two groups, namely, Group A and Group B. For Group A, the convenience sampling method was used to select participants from two primary schools. Invitation letters were sent to the school principals, and individual invitation letters and consent forms were delivered through the school to the children's parents or guardians. Prior oral permission to participate in the study was obtained from the principals of the primary schools. Children aged 7—13 years and their parents were selected to participate in the study by the teacher in charge of the school. The aim was to minimize the administrative burden to encourage participation. All selected participants were given an individual invitation letter and the consent form. Participation in the study was voluntary. The parent or guardian of each child signed and returned the consent form to the first author along with the completed QoL questionnaires. None of the participants in Group A had been diagnosed with physical, intellectual, or sensory impairment or had identified special educational needs. All were Cantonese-speaking individuals and attended mainstream schools. All of the children and their parents were able to read and write traditional Chinese.

The participants in Group B were recruited from the outpatient occupational therapy department of a

convalescent hospital and were diagnosed as having developmental delay. Purposive sampling was used to select this group of participants. All participants were required to fulfil the following selection criteria: (a) be of either sex and aged between 7 years and 13 years; (b) identified as having problems with fine motor skills, visual perceptual skills, and/or handwriting skills; (c) have difficulties in managing daily life activities such as school work and self-care tasks; (d) nil or corrected primary auditory and visual deficits; and (e) can follow the standard instructions and complete the questionnaire independently. The first author screened and recruited all of the participants, including patients who were currently being treated in the outpatient occupational therapy department. The data collection process was completed within 4 weeks.

Content validation

The generic Kid-KINDL[R] questionnaire for measuring HRQoL in children and adolescents is a German language measure (revised by Ravens-Sieberer & Bullinger, 1998). The Chinese version of the Kid-KINDL[R] questionnaire used in this study was cross-culturally adapted by the researchers from the original German and English versions (available with permission from the developers) using standard guidelines, including independent forward and backward translation. A Chinese rather than a Cantonese version was produced to make it applicable to the general Chinese population. The Kid-KINDL[R] questionnaire comprises 24 items (with 5 answer categories) yielding a general QoL score (total) and six subscale scores on physical health, emotion, family functioning, self-esteem, social functioning, and school functioning. The Kid-KINDL[R] questionnaire is available in three age versions: Kiddy-KINDL[R] (4−6 years), Kid-KINDL[R] (7−13 years), and Kiddo-KINDL[R] (14−17 years). Reverse scoring was applied to some items so that all higher item scores represent better QoL. In this study, we used the self-report version of the Kid-KINDL[R] (7−13 years).

According to Geisinger (1994), an expert panel review is an effective technique for evaluating content validity. A panel of four occupational therapists was recruited using purposive sampling to examine the content validity of the questionnaire. Each panel member had between 16 years and 21 years of experience working as an occupational therapist and all were familiar with the Kid-KINDL[R] questionnaire (English version).The purpose of the study was explained to the panel members prior to being invited to participate in the study. The panel members were asked to complete the questionnaires individually to ensure the independence of their opinions, and were requested to return the questionnaire within 4 weeks.

Data analysis

Content validity
The content validity, mean, and standard deviation were calculated from the experts' ratings on a 4-point scale. The comments of the panel members were also analysed qualitatively. The Shapiro−Wilk test was used (Abbasi, 2013) to examine whether all recruited cases (both Group A and Group B) were drawn from a normal population. A

significance value of >0.05 for the Shapiro−Wilk test indicates that the data are drawn from a normally distributed population.

Reliability
For internal consistency, Cronbach's alpha and item correlations were used to evaluate the homogeneity of the subtests. Acceptable alpha coefficients are between .70 and .90 (Portney & Watkins, 2000). To examine the effects of age and sex on the participants' Kid-KINDL[R] scores, descriptive statistics including the mean and standard deviation of each subscale among different age and sex groups and those of the group as a whole were completed to summarize the obtained results. Multiple analysis of variance (MANOVA) was used to examine the differences among different age and sex groups and their interaction.

Construct validity
The factor structures of the Kid-KINDL[R] questionnaires (children and parent) were evaluated using principal component analysis with varimax rotation. An eigen value >1 was used as the criterion to determine whether an extracted factor accounted for a reasonably large proportion of the total variance. Factor loadings of 0.7 or more were deemed acceptable (Doll, Raghunathan, Lim, & Gupta, 1995). There is no consensus on the minimum sample size for factor analysis, with recommendations ranging from 100 to 300.

Known-group comparison was examined in both groups. To compare the Kid-KINDL[R] scores of Group A and Group B, descriptive statistics including the mean and standard deviation of each subscale and those of the group as a whole were computed. Because age and sex bias are likely to affect the scores, we first used MANOVA to investigate the effects of age and sex on the Kid-KINDL[R] scores of Group B. MANOVA was then used again to analyse the statistical differences between the scores of the two groups.

Results

Demographics

Group A comprised 112 participants, 59.8% female and 40.2% male, with a mean age of 9.06 years (SD = 1.14). Group B comprised 30 participants, 93.3% male and 6.7% female, with a mean age of 8.80 years (SD = 0.89). All participants were aged between 8 years and 11 years. Internal consistency, factor analysis, and construct validity were examined in Group A and known-group comparison was examined in Group B.

Content validity

The panel members' mean ratings of the relevance and comprehensiveness of each of the six subscales ranged from 3 to 4 for both the children and parent questionnaires. All of the ratings were ≥3. The mean rating in terms of the representativeness of the subscales in both the children and parent questionnaires was 3.5, with all of the panel members again providing ratings of ≥3. The expert panel members agreed that there was no marked discrepancy

between the forward and backward translations. Most of the wordings in the backward translations were the same as the original version. Only one panel member recommended adding more items to each subscale. Therefore, modification of the translated questions was not needed.

Normal distribution of cases

The significance value of the Shapiro—Wilk test was >0.05, indicating that all cases of Group A and Group B followed a normal distribution trend.

Descriptive statistics

The means of the total QoL score were 86.29 (SD = 10.94) for the children questionnaire and 88.91 (SD = 9.76) for the parent questionnaire (Table 1).

Internal consistency

The internal consistency of the children's Kid-KINDL^R questionnaire was acceptable to good, with a Cronbach's alpha of .77 for the total score. The Cronbach's alphas for the six subscales ranged from .47 (school) to .70 (family and self-esteem), indicating poor to acceptable internal consistency. Most of the internal consistency values were lower than the alphas reported for the original German version (.63—.84). The corrected item—total correlations ranged from .39 (self-esteem) to .69 (emotion; Table 1).

The internal consistency of the parent Kid-KINDL^R questionnaire was acceptable to good with a Cronbach's alpha of .77 for the total score. The Cronbach's alphas for the six subscales ranged from .55 (school) to .79 (self-esteem), indicating poor to acceptable internal consistency. Most of the internal consistency values were lower than the alphas reported for the original German version (.62—.89). The corrected item—total correlations ranged from .53 (self-esteem) to .70 (family; Table 1).

Factor analysis

The Kid-KINDL^R questionnaire (children) items did not load onto the six factors originally hypothesized. Instead, seven factors were generated (Table 2). The cumulative

Table 2 Factor Structure of the Kid-KINDL^R Questionnaire (Children).

KINDL subscale	Factor loading						
	1	2	3	4	5	6	7
Physical Health 1						0.68	
Physical Health 2							
Physical Health 3							
Physical Health 4				0.67			
Emotion 1	0.67						
Emotion 2							
Emotion 3							
Emotion 4					0.67		
Self-esteem 1					0.75		
Self-esteem 2					0.81		
Self-esteem 3							0.76
Self-esteem 4							0.79
Family 1							
Family 2			0.66				
Family 3			0.68				
Family 4			0.73				
Social 1		0.82					
Social 2		0.76					
Social 3		0.74					
Social 4							
School 1							
School 2							
School 3				0.84			
School 4				0.77			

Note. Only factor loadings above 0.65 are shown.

percentage of total variance explained by the seven-factor solution was 65.58%, whereas factors five and seven were treated as similar as they carry the same loading and descriptive measures under the "self-esteem" category.

The Kid-KINDL^R questionnaire (parent) items also did not load onto the six factors originally hypothesized. Instead, seven factors were generated (Table 3). The cumulative percentage of total variance explained by the seven-factor solution was 67.49%, whereas factors one and seven were treated as similar as they carry the same loadings and descriptive measures under the "emotion" category.

Table 1 Score Distribution of the Mean, Standard Deviation, Internal Consistency, and Item—total Correlation of the Kid-KINDL^R Questionnaire.

Subscale	Children's questionnaire			Parent questionnaire		
	Mean (SD)	Internal consistency	Item—total correlation	Mean (SD)	Internal consistency	Item—total correlation
Total	86.29 (10.94)	.77	1	88.91 (9.76)	.77	1
Physical Health	15.84 (2.38)	.57	.63	15.60 (2.63)	.68	.53
Emotion	16.32 (2.51)	.69	.69	16.21 (2.29)	.69	.64
Family	15.53 (2.59)	.70	.59	15.68 (2.36)	.74	.70
Self-esteem	10.43 (2.93)	.70	.39	11.85 (2.54)	.79	.53
Social	15.21 (2.99)	.68	.67	14.74 (2.07)	.60	.69
School	12.96 (2.94)	.47	.60	14.84 (2.29)	.55	.63

SD = standard deviation.

Table 3 Factor Structure of the Kid-KINDL[R] Questionnaire (Parent).

KINDL subscale	Factor loading						
	1	2	3	4	5	6	7
Physical Health 1					0.78		
Physical Health 2					0.83		
Physical Health 3							
Physical Health 4							
Emotion 1							0.79
Emotion 2							
Emotion 3	0.78						
Emotion 4	0.81						
Self-esteem 1			0.75				
Self-esteem 2			0.83				
Self-esteem 3			0.81				
Self-esteem 4							
Family 1							
Family 2							
Family 3				0.74			
Family 4							
Social 1		0.67					
Social 2		0.73					
Social 3		0.77					
Social 4							
School 1							
School 2							
School 3						0.74	
School 4						0.73	

Note. Only factor loadings above 0.65 are shown.

Age and sex bias

The MANOVA results for the Kid-KINDL[R] scores (child) were not significant for either age or sex, suggesting that neither age (Wilks' lambda = 0.83, p = .392) nor sex (Wilks' lambda = 0.893, p = .075) had any effect on the scores. Moreover, no age and sex interaction was found, indicating that the interaction of age and sex did not have a significant effect on the Kid-KINDL[R] scores (Wilks' lambda = 0.902, p = .913). Overall, the MANOVA results indicate that the Kid-KINDL[R] scores were free of age and sex bias.

The MANOVA results for the Kid-KINDL[R] scores (parent) were not significant for either age or sex, suggesting that neither age (Wilks' lambda = 0.853, p = .578) nor sex (Wilks' lambda = 0.95, p = .518) had any effect on scores. Moreover, no age and sex interaction was found, indicating that the interaction of age and sex did not have a significant effect on the Kid-KINDL[R] scores (Wilks' lambda = 0.785, p = .135). Overall, the MANOVA results indicate that the Kid-KINDL[R] scores were free of age and sex bias.

Known-group comparison

The MANOVA results for Group B indicate that the Kid-KINDL[R] (child) scores were free of age and sex bias. The MANOVA results were not significant for either age or sex, indicating that neither age (Wilks' lambda = 0.377, p = .219) nor sex (Wilks' lambda = 0.944, p = .974) had any effect on the scores. The interaction of age and sex on the Kid-KINDL[R] scores was also not significant (Wilks' lambda = 1). Overall, these results indicate that age and sex had no effect on the Kid-KINDL[R] scores. As the results thus far suggested that Groups A and B had no age and sex differences, the two groups were combined to analyse the differences in their Kid-KINDL[R] scores. The MANOVA results indicated that the scores of Groups A and B were significantly different (Wilks' lambda = 0.906, p = .035). The F value of the effect of the difference in the group scores on the Kid-KINDL[R] total score was 9.595 with a significance level of <.005. This result indicates that the difference in the scores between the two groups was due to problems the participants in Group B had in the fine motor and handwriting skills as well as due to their difficulties in performing the daily living activities. We thus compared the descriptive statistics, including the mean and standard deviation of each subscale and those of the group as a whole for Groups A and B. The mean scores between the two groups showed significant differences, with the total scores being 86.29 (SD = 10.94) for Group A and 78.97 (SD = 13.42) for Group B. Based on the descriptive statistics of the two samples, the participants in Group A had better QoL than those in Group B (Table 4).

The MANOVA results for Group B indicate that the Kid-KINDL[R] scores (parent) were free of age and sex bias. The MANOVA results were not significant for either age or sex, indicating that neither age (Wilks' lambda = 0.239, p = .04) nor sex (Wilks' lambda = 0.687, p = .279) had any effect on the scores. The effect of the interaction of age

Table 4 Comparison of the Mean Scores of the Healthy Group and the Global Delay Group (Kid-KINDL[R] Questionnaire).

Subscale	Child questionnaire				Parent questionnaire			
	Healthy group		Global delay group		Healthy group		Global delay group	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Health (total)	15.84	2.38	14.37	3.42	15.60	2.63	14.90	2.73
Emotion (total)	16.32	2.51	14.93	3.11	16.21	2.29	14.47	2.05
Self-esteem (total)	10.43	2.93	9.77	3.00	11.85	2.54	11.10	2.23
Family (total)	15.53	2.59	13.67	2.73	15.68	2.36	14.37	2.47
Social (total)	15.21	2.99	14.27	3.74	14.74	2.07	13.83	2.49
School (total)	12.96	2.94	11.97	2.55	14.84	2.29	13.57	2.06
Total	86.29	10.94	78.97	13.42	88.91	9.76	82.23	9.71

SD = standard deviation.

and sex on the Kid-KINDL[R] scores was not significant (Wilks' lambda = 0.536, p = .392). Overall, the results indicated that age and sex had no effect on Kid-KINDL[R] scores. As the results thus far suggested that Groups A and B had no age and sex differences, the two groups were combined to analyse the difference in their Kid-KINDL[R] scores. The MANOVA results indicated that the scores of Group A and Group B were significantly different (Wilks' lambda = 0.981, p = .015). The F value of the effect of the difference in the group scores on the Kid-KINDL[R] total score was 11.102, with a significance level of .001. This result indicates that the differences in the scores between the two groups were due to the concerns of the parents about their children's problems with fine motor, handwriting, and daily living activities skills. Therefore, we compared the descriptive statistics, including the mean and standard deviation of each subscale and those of the group as a whole for Group A and Group B. The mean scores of the two groups showed significant differences. The total score for Group A was 88.91 (SD = 9.76), whereas that for Group B was 82.23 (SD = 9.71). Based on the descriptive statistics, the parents in Group A reported a better QoL for their children than those in Group B (Table 4).

Discussion

When adapting QoL questionnaires to different cultural contexts, it is important to ensure that the translated questionnaire has good psychometric properties and is suitable to the new cultural setting. On the whole, the expert panel judged the six subscales of the Chinese version of the Kid-KINDL[R] questionnaire to be sufficiently relevant, comprehensive, and representative to measure the HRQoL of Hong Kong children.

However, the internal consistency of the translated instrument needs improvement. In view of the less than satisfactory reliability in some of the subscales, the Kid-KINDL[R] total score should be focused on when interpreting Kid-KINDL[R] data. Our participants followed the normal distribution trend and our results show that the Kid-KINDL[R] questionnaire was free of age and sex bias. We also found that the Chinese version of the questionnaire was able to reflect the differences in the HRQoL of the healthy children group and the group with global developmental delay in terms of the total score.

The psychometric properties of the Chinese version of the Kid-KINDL[R] questionnaire need to be improved in several ways. First, the internal consistency of the school subscale needs to be improved by either eliminating items that do not contribute to the subscale or by developing new items with better psychometric properties and/or modifying the existing items. Second, the inferred meanings of the translated items in the Chinese version of the questionnaire need to be further examined either by modifying the existing items or adding new items so that the factor structure reflects and is comparable to that of the Kid-KINDL[R] (German). Children could also be included as panel members for user interpretation of the translation. Third, the potential cultural differences in self-esteem among children need further investigation. Factors five and seven of the Kid-KINDL[R] questionnaire (children) carry the same

loading and descriptive measures under the "self-esteem" category. The construct of self-esteem may have a different "meaning" in Chinese culture than in the prevailing Western cultures.

Developmental delay denotes that a child's development lags behind the established norms for his or her age. The results of this study indicate that children with developmental delay have lower QoL than children with good health. This finding concurs with a previous study on children with developmental disabilities, which found that children who exhibited a high risk of developing a developmental disability or were diagnosed with developmental delay had significantly lower overall well-being and psychological health as compared with typically developed children (Lau, Chow, & Lo, 2006; Lee et al., 2013).

However, our findings differ from another previous study, which found that children and adolescents with physical disabilities did not subjectively perceive themselves as having poor QoL in terms of health (Chow, Lo, & Cummins, 2005). It is interesting to note that the study by Chow et al. (2005) recruited participants with physical disabilities from special schools. The school setting can affect children's health, well-being, and self-efficacy. For example, the staff and health professionals in a special school can help children set realistic goals for tasks they are able to manage, thereby enabling the children to learn from earlier positive experiences and to master tasks in the future. However, the participants in our study were recruited from mainstream primary schools. Because Chinese culture is both collectivism oriented and highly competitive, children may compete to be the best in school work—related activities while being highly group oriented in social and athletic activities. Therefore, our results may reflect that children with developmental delay may have difficulty in coping with Hong Kong's highly competitive educational system. Our results indicate that adequate supportive interventions and programmes need to be developed to rehabilitate children and adolescents with developmental delay and other disabilities.

This study is important because it represents the first use of a Chinese translation of the Kid-KINDL[R] questionnaire in Hong Kong. The Chinese version of the Kid-KINDL[R] questionnaire exhibited acceptable psychometric properties and was found to be suitable for assessing the QoL of primary school children in Hong Kong. The Kid-KINDL[R] questionnaire is also an important tool for use in clinical practice and in research. Occupational therapy services should not only focus on the needs of children as patients but also on their personal development, QoL, and the needs of the family. HRQoL and clinical measures can provide a complete assessment of how diseases and their treatment affect the overall well-being of the children and their families. These comprehensive assessments can provide the basis for providing more suitable interventions that are capable of enhancing the physical and psychological well-being of disabled children and their parents. Empowerment programmes such as coping skills training, stress management, parent support groups, and life style redesign programmes should be organized for parents in need to help them relieve their stress and express their feelings. It is believed that if the QoL of parents is improved, better parental care will result, which will further enhance the

well-being of the children. In addition, effective comprehensive rehabilitation plans should always combine functional activities or exercises along with measures to reduce impairment to bring about real changes in day-to-day living and thus improve the overall QoL of the child. Moreover, intervention strategies to improve children's QoL are needed in schools. For example, school health services should implement interventions that aim to help children reach their goals and strengthen their self-efficacy. Previous research indicates that general self-efficacy may help increase the HRQoL of school-aged children (Kvarme, Haraldstad, Helseth, Sorum, & Natvig, 2009).

Limitations

This study had several limitations. First, the participants in Group B were recruited from a single local hospital, thereby limiting the generalizability of the results to all children suffering from global delay. In addition, the applicability of the results to other client groups who are not receiving occupational therapy requires further study. Second, we did not compare the QoL of children with different functioning levels. Third, we did not explore possible factors that might affect the parent—child score, such as the housing status of the family, health care usage, and the education and employment status of both parents. Finally, various cultural and societal factors may act independently or synergistically with some of the demographic differences in affecting the HRQoL of youth (Yam et al., 2008). All of these limitations are potential future research areas.

Conclusion

Today, the idea of achieving the highest possible standard of health is not only limited to improved survival, being free of disease, or the ability to perform daily activities but also includes well-being and QoL. Accordingly, QoL should be included as an outcome measure in daily clinical practice. The Chinese version of the Kid-KINDL[R] questionnaire provides an effective measurement tool for health care professionals to assess the QoL of Hong Kong children. Practitioners should focus on the Kid-KINDL[R] total score when interpreting the Kid-KINDL[R] results.

Acknowledgements

References

Abbasi, N. (2013). Shapiro-Wilks test in evaluation of asymptotic distribution on estimators of measure of kurtosis and skew. *International Mathematical Forum, 8*(12), 573—576.

Chow, S. M., Lo, S. K., & Cummins, R. A. (2005). Self-perceived quality of life of children and adolescents with physical disabilities in Hong Kong. *Quality of Life Research, 14*(2), 415—423.

Colver, A. (2008). Measuring quality of life in studies of disabled children. *Paediatrics and Child Health, 18*(9), 423—426.

Doll, W. J., Raghunathan, T. S., Lim, J., & Gupta, Y. P. (1995). A confirmatory factor analysis of the user information satisfaction instrument. *Information Systems Research, 6*(2), 177—188.

Eiser, C., & Morse, R. (2001a). Can parents rate their child's health-related quality of life? Results of a systematic review. *Quality of Life Research, 10*(4), 347—357.

Eiser, C., & Morse, R. (2001b). The measurement of quality of life in children: past and future perspectives. *Journal of Developmental & Behavioral Pediatrics, 22*(4), 248—256.

Geisinger, K. F. (1994). Cross-cultural normative assessment, translation and adaption issues influencing the normative interpretation of assessment instrument. *Psychological Assessment, 6*(4), 304—312.

Hu, J., Jiang, L., Hong, S., Cheng, L., Kong, M., & Ye, Y. (2013). Reliability and validity of the Chinese version of the Pediatric Quality of Life Inventory™ (PedsQL™) 3.0 neuromuscular module in children with Duchenne muscular dystrophy. *Health and Quality of Life Outcomes, 11*, 47.

Kvarme, L. G., Haraldstad, K., Helseth, S., Sorum, R., & Natvig, G. K. (2009). Association between general self-efficacy and health-related quality of life among 12—13-year-old school children: a cross-sectional survey. *Health and Quality of Life Outcomes, 7*, 85.

Landgraf, J. M., Abetz, L., & Ware, J. E. (1999). *Child Health Questionnaire (CHQ): A user's manual.* Boston, MA: HealthAct.

Lau, K. M., Chow, S. M., & Lo, S. K. (2006). Parents' perception of the quality of life of preschool children at risk or having developmental disabilities. *Quality of Life Research, 15*(7), 1133—1141.

Lee, S. L., Cheung, Y. F., Wong, H. S., Leung, T. H., & Lau, Y. L. (2013). Chronic health problems and health-related quality of life in Chinese children and adolescents: a population-based study in Hong Kong. *BMJ Open, 3*(1), e001183.

Ravens-Sieberer, U., & Bullinger, M. (1998). Assessing the health related quality of life in chronically ill children with the German KINDL: first psychometric and content analytical results. *Quality of Life Research, 7*(5), 399—407.

Ravens-Sieberer, U., & Bullinger, M. (2000). *Manual KINDL-R.* Hamburg, Germany.

Yam, W. K., Ronen, G. M., Cherk, S. W., Rosenbaum, P., Chan, K. Y., Streiner, D. L., et al. (2008). Health-related quality of life of children with epilepsy in Hong Kong: how does it compare with that of youth with epilepsy in Canada? *Epilepsy & Behavior, 12*(3), 419—426.