The Finnish version of the Childhood Health Assessment Questionnaire (CHAQ) and the Child Health Questionnaire (CHQ)

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ABSTRACT

We report herein the results of the cross-cultural adaptation and validation into the Finnish language of the parent's version of two health related quality of life instruments. The Childhood Health Assessment Questionnaire (CHAQ) is a disease specific health instrument that measures functional ability in daily living activities in children with juvenile idiopathic arthritis (JIA). The Child Health Questionnaire (CHQ) is a generic health instrument designed to capture the physical and psychosocial well-being of children independently from the underlying disease. The Finnish CHAQ-CHQ were validated with 3 forward and 1 backward translations. A total of 161 subjects were enrolled: 89 patients with JIA (9% systemic onset, 44% polyarticular onset, 26% extended oligoarticular subtype, and 21% persistent oligoarticular subtype) and 72 healthy children. The CHAQ clinically discriminated between healthy subjects and JIA patients, with the systemic, polyarticular and extended oligoarticular subtypes having a higher degree of disability, pain, and a lower overall well-being when compared to their healthy peers. Also the CHQ clinically discriminated between healthy subjects and JIA patients,with the systemic, polyarticular and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

In conclusion the Finnish version of the CHAQ-CHQ is a reliable and valid tool for the functional, physical and psychosocial assessment of children with JIA.

Introduction

The aim of this study was to cross-culturally adapt and validate the Finnish parent's version of the Childhood Health Assessment Questionnaire (1) and the Child Health Questionnaire (CHQ) (2) in a cohort of healthy children and in patients with juvenile idiopathic arthritis (JIA) being followed by the Finnish members of the Paediatric Rheumatology International Trials Organisation (PRINTO). This project formed a part of a larger international survey conducted by PRINTO and supported by the European Union (contract BMH4 983531 CA) (3-5), whose scope is to evaluate the health-related quality of life in children with JIA as compared to their healthy peers.

Patients and results

The methodology used is described in detail in the introductory paper of this supplement (6). The complete Finnish version of the CHAQ-CHQ, with the coresponding lines of the original American-English questionnaires marked in the left column,is reproduced at the end of this paper.

In brief, after obtaining ethics committees approval of the respective participating institutions and the consent of at least one parent per child, children were recruited into a prospective study performed from April 1998 to March 2000, by the Finnish members of PRINTO. Patients included children with JIA of either systemic onset, polyarticular onset, extended oligoarticular or persistent oligoarticular subtype (Durban criteria) (7). The controls consisted of healthy children (6 to 18 years of age) attending a local comprehensive school.

Demographic and clinical characteristics of the subjects (Table I)

A total of 161 subjects were enrolled: 89 patients with JIA (9% systemic onset, 44% polyarticular onset, 26% extended oligoarticular subtype, and 21% persistent oligoarticular subtype) and 72 healthy children. The CHAQ-CHQ were completed in 75% of the cases by the mother (mean age 42.0 ± 6.4), and in 25% of the cases by the father (mean age 41.8 ± 7.6).

Clinical discriminant validity

Table II reports the results (mean ± SD) for the 8 CHAQ domains, the disability index (DI) and the 2 VAS scores for parental assessment of pain and overall well-being. The CHAQ clinically discriminated between healthy subjects and JIA patients,with the systemic, polyarticular and extended oligoarticular subtypes having a higher degree of disability, pain, and a lower overall well-being when compared to their healthy peers.

Table III reports the CHQ results (mean ± SD) for the 15 health concepts (see table for abbreviation) and summary scores. The CHQ clinically discriminated between healthy subjects and JIApatients, with the systemic onset,polyarticular onset and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers. For the persistent oligoarticular patients the results for both CHAQ and CHQ were more similar to the healthy population.

Cross cultural adaptation

The Finnish CHAQ-CHQ were fully cross-culturally adapted with 3 forward and 1 back-

Table I. Demographic and clinical characteristics of the Finnish sample.

	Systemic onset n = 8	Polyarticular onset n = 39	Extended oligoart. n = 23	Persistent oligoart. n = 19	Healthy controls n = 72
Age of the children[1, 2]	8.4 ± 2.7	9.7 ± 4.5	10.5 ± 3.9	10.2 ± 3.9	12.1 ± 2.9
Disease duration[1]	3.9 ± 2.7	5.7 ± 4.4	6.3 ± 3.8	5.3 ± 2.8	
ESR[1, 2]	34.0 ± 34.2	26.7 ± 21.6	18.7 ± 14.5	10.4 ± 9.3	
MD VAS (0-10 cm)[1, 2]	3.1 ± 3.3	3.6 ± 2.5	2.3 ± 1.9	0.5 ± 0.6	
No. swollen joints[1, 2]	2.1 ± 2.9	4.8 ± 6.6	2.8 ± 2.7	0.4 ± 0.7	
No. joints with pain[1, 2]	1.6 ± 2.0	3.8 ± 5.1	2.1 ± 2.8	0.4 ± 0.8	
No. joints with limited range of motion[1, 2]	1.3 ± 2.2	7.0 ± 7.2	2.7 ± 2.8	0.7 ± 1.1	
No. active joints[1, 2]	2.3 ± 3.1	5.3 ± 6.7	3.3 ± 3.0	0.5 ± 0.8	
Female[3]	4 (50%)	33 (85%)	14 (61%)	13 (68%)	36 (50%)
Persistent systemic features[3]	4 (57%)	0	0	0	
Antinuclear antibody[3]	2 (25%)	12 (31%)	9 (39%)	3 (18%)	
Rheumatoid factor[3]	0	1 (3%)	0	0	
Chronic iritis[3]	1 (13%)	11 (29%)	7 (30%)	3 (17%)	

[1]Mean ± SD; [2]ANOVA $p < 0.05$; [3]number and percentage.

Table II. The 8 CHAQ domains (range 0-3), the disability index (DI) (range 0-3), and the 2 VAS scores (range 0-10 cm) for pain and parent assessment of the child's overall well-being. Lower scores indicate better functional ability. Values are expressed as means ± SD.

	Systemic onset n = 8	Polyarticular onset n = 39	Extended oligoart. n = 23	Persistent oligoart. n = 19	Healthy controls n = 72
Dressing	0.8 ± 0.9	0.5 ± 0.8	0.7 ± 0.9	0.4 ± 0.7	0.1 ± 0.5
Arising	0.8 ± 1.0	0.4 ± 0.7	0.3 ± 0.6	0.2 ± 0.6	0.0 ± 0.0
Eating	1.1 ± 1.1	0.8 ± 1.0	0.7 ± 0.8	0.4 ± 0.7	0.0 ± 0.2
Walking	1.1 ± 1.0	0.5 ± 0.8	0.3 ± 0.7	0.0 ± 0.0	0.0 ± 0.0
Hygiene	0.4 ± 0.5	0.4 ± 0.7	0.3 ± 0.6	0.2 ± 0.5	0.0 ± 0.4
Reach	1.0 ± 0.9	0.7 ± 0.8	0.6 ± 0.7	0.1 ± 0.3	0.0 ± 0.0
Grip	0.9 ± 1.0	0.8 ± 0.9	0.6 ± 0.8	0.1 ± 0.3	0.0 ± 0.1
Activities	1.1 ± 0.8	0.8 ± 0.8	0.7 ± 0.6	0.3 ± 0.5	0.1 ± 0.3
Disability index	0.9 ± 0.7	0.6 ± 0.6	0.5 ± 0.5	0.2 ± 0.3	0.0 ± 0.1
Parent's evaluation of pain	3.0 ± 3.0	2.5 ± 2.2	2.6 ± 2.6	1.1 ± 2.0	0.1 ± 0.3
Parent's evaluation of overall well-being	1.9 ± 1.2	2.0 ± 1.7	2.2 ± 2.1	0.6 ± 1.2	0.0 ± 0.1

ANOVA $p < 0.05$ for all variables.

Table III. The 15 CHQ health concepts (and their abbreviations) and the 2 summary scores. Higher score indicates better physical or psychosocial well being (range 0-100). Values are expressed as means ± SD.

	Systemic onset n = 8	Polyarticular onset n = 39	Extended oligoart. n = 23	Persistent oligoart. n = 19	Healthy controls n = 72
Global health (GGH)	65.6 ± 27.7	58.3 ± 21.3	61.6 ± 22.3	73.1 ± 21.6	90.7 ± 13.4
Physical functioning (PF)	59.0 ± 29.8	65.9 ± 24.7	71.7 ± 20.4	84.2 ± 18.9	98.3 ± 6.5
Role/social limitations - Emotional/Behavioural (REB)	72.2 ± 23.8	76.6 ± 30.9	84.1 ± 22.9	93.6 ± 14.0	98.7 ± 4.5
Role/social limitations - Physical (RP)	43.8 ± 30.8	67.1 ± 29.8	71.7 ± 28.6	87.7 ± 16.5	98.8 ± 5.2
Bodily pain/discomfort (BP)	52.5 ± 14.9	54.6 ± 27.3	54.1 ± 20.4	72.6 ± 24.5	89.2 ± 15.5
Behaviour (BE)	68.1 ± 17.3	70.8 ± 13.9	66.7 ± 13.0	70.6 ± 10.3	78.6 ± 12.7
Global behaviour (GBE)	64.4 ± 20.6	73.7 ± 18.6	67.1 ± 23.5	73.9 ± 18.8	82.1 ± 16.7
Mental health (MH)	76.3 ± 12.5	78.6 ± 13.5	79.0 ± 13.5	84.3 ± 12.5	88.6 ± 7.9
Self esteem (SE)	64.9 ± 19.1	72.4 ± 16.0	70.2 ± 16.2	78.4 ± 15.3	78.7 ± 12.0
General health perceptions (GH)	41.7 ± 19.8	49.1 ± 16.3	48.5 ± 12.8	57.1 ± 14.8	80.8 ± 12.0
Change in health (CH)	67.9 ± 34.5	51.4 ± 32.2	48.9 ± 36.6	56.6 ± 27.4	54.6 ± 11.5
Parental impact - Emotional (PE)	58.3 ± 28.5	61.3 ± 22.2	62.1 ± 16.3	71.5 ± 17.0	82.2 ± 15.4
Parental impact - Time (PT)	69.4 ± 23.6	70.0 ± 22.7	77.3 ± 16.3	84.6 ± 19.1	92.4 ± 12.5
Family activities (FA)	66.1 ± 24.9	67.7 ± 21.9	75.0 ± 15.9	84.0 ± 13.0	87.0 ± 14.0
Family cohesion (FC)	68.1 ± 15.6	70.7 ± 19.5	68.0 ± 15.6	75.6 ± 15.0	75.1 ± 20.9
Physical summary score (PhS)	37.3 ± 9.6	42.7 ± 9.2	44.2 ± 8.4	50.5 ± 6.0	54.6 ± 1.8
Psychosocial summary score (PsS)	48.8 ± 7.6	48.7 ± 8.1	48.3 ± 5.8	50.8 ± 4.7	53.8 ± 5.4

ANOVA $p < 0.05$ except for CH ($p=0.45$) and FC ($p=0.44$).

ward translations.

Probe technique

For the 69 lines of the translated CHAQ, all the lines of translation were understood by more than 80% of the 20 parents tested (median = 100%; range:95-100%). Probe technique was not performed for the CHQ. No change in the text of the Finnish CHAQ-CHQ was necessary after the probe technique.

Psychometric issues

Descriptive statistics (first Likert assumption). For the CHAQ the total number of missing responses was 4.2% (range 0.3-8.7%) with dressing and activities having more missing values; the response pattern were skewed towards normal functional ability. For all domains of the CHAQ there were some response choices that were not used. The mean ± SD of the items within a scale were roughly equivalent except for dressing, and activities. The total number of missing responses on the CHQ was 3.4% (range:2.1-6.1%) with SE being the health concept with more missing values; the response pattern was most often skewed towards normal physical and psychosocial well-being. All response choices of the CHQ items have been used except for BP, BE, GBE, MH, SE, GH, and FC. The means ± SD of the items within a scale were roughly equivalent except for BE.

Equal items-scale correlation (second Likert assumption). Pearson items-scale correlations corrected for overlap were roughly equivalent for items within a scale for all of the CHAQ domains except for hygiene, and reach, and for all CHQ health concepts except for BE, MH, GH, PE, and PT.

Items internal consistency (third Likert assumption). Pearson items scale correlations were ≥ 0.4 for 93% of the CHAQ items (except reach), and for 85% of the CHQ items (except BE, MH, GH, PE, and PT).

Items discriminant validity. For the CHAQ, Pearson items correlations with its scale corrected for overlap were greater than at least 1 standard error (SE) of the correlation with other scales for 70% of the items (28% by 2 SE); scaling failure was observed for walking, hygiene, and reach where the items were better correlated with other domains. For the CHQ, Pearson items correlations with its scale were greater by at least 1 SE for 92% of the items (62% by 2 SE); scaling failure was observed only for BE, PE, and PT.

Floor and ceiling effect. The CHAQ floor effect had a median of 89% (range 74-95%) while for the CHQ the median was 0.0% (range 0.0-4.5%). The CHAQ ceiling effect had median of 0.0% (range 0.0-0.0) while the CHQ had a median of 22% (range 1-78%).

Cronbach's alpha internal consistency. Cronbach's alpha was ≥ 0.7 for 5/8 (63%) domains of the CHAQ (overall 0.94; range 0.65-0.84) with the exception being dressing (0.69), walking (0.65), and reach (0.58). Cronbach's alpha was ≥ 0.7 for 8/11 (73%) measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (overall 0.95; range 0.52-0.91) with the exception being MH (0.68), PE (0.52), and PT (0.54).

Inter scale correlation. The Pearson correlation of each domain with all other domains of the CHAQ-CHQ was lower than their Cronbach's alpha for most of the CHAQ domains except for dressing, and reach. For the CHQ most of the 11 measurable health concepts have correlation lower than their Cronbach's alpha except for PE, and PT.

Test-retest reliability. After a median of 7 days (range 7-8 days; number of JIA patients retested = 9) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility with a median of 0.8 (range 0.5-1.0) with a poor reproducibility only for grip (-0.1). Also the 15 CHQ health concepts showed a fair to good reproducibility with a median of 0.8 (range 0.4-1.00).

External validity. The Spearman correlation of the CHAQ with the JIA core set variables (8) showed a median of 0.3 (range 0.3 to 0.7), with the highest correlation being with the parent's assessment of overall well being (r = 0.7). For the CHQ the median correlation was for the PhS -0.4 (range -0.7 to -0.3) and for the PsS was -0.2 (range -0.4 to -0.1). The best correlation was with the parent's evaluation of overall well being for both the PhS (-0.7) and the PsS (-0.4).

Discussion

The results of the present study show that the Finnish versions of the CHAQ-CHQ have excellent psychometric properties.

In this study the Finnish CHAQ was fully cross-culturally adapted from the original American English version with 3 forward and 1 backward translations. This disease-specific questionnaire proved its ability to clinically discriminate between the JIA subtypes and healthy controls, with the systemic, polyarticular and extended oligoarticular subtypes having a higher degree of disability, pain, and a lower overall well-being when compared to their healthy peers. Minor statistical problems were found for dressing, walking, and reach, which showed an unequal item scale correlation, and problems for discriminant validity, and Cronbach's alpha.

In this study the Finnish CHQ was fully cross-culturally adapted from the original American English version with 3 forward and 1 backward translations. The generic CHQ questionnaire proved less able to clinically discriminate between the different JIA types than the CHAQ with the JIA patients with systemic, polyarticular onset or extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers. Some minor statistical problems were found for the equal item scale correlation, the item internal consistency, and the ceiling effect for BE, MH, GH, PE, and PT. In conclusion, the Finnish version of the CHAQ-CHQ is a reliable and valid tool for the functional, physical and psychosocial assessment of children with JIA.

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