The Dutch 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 Dutch 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 Dutch CHAQ was fully validated with 3 forward and 3 backward translations while the CHQ was already published and therefore it was revalidated. A total of 180 subjects were enrolled: 100 patients with JIA (17% systemic onset, 31% polyarticular onset, 18% extended oligoarticular subtype, and 34% persistent oligoarticular subtype) and 80 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 onset, polyarticular onset and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

In conclusion the Dutch 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 Dutch parent's version of the Childhood Health Assessment Questionnaire (CHAQ) (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 Dutch 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 Dutch version of the CHAQ-CHQ, with the corresponding 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 Dutch 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 local schools and/or healthy sibling(s) of the JIA participants.

Demographic and clinical characteristics of the subjects (Table I)

A total of 180 subjects were enrolled: 100 patients with JIA (17% systemic onset, 31% polyarticular onset, 18% extended oligoarticular subtype, and 34% persistent oligoarticular subtype) and 80 healthy children. The CHAQ-CHQ were completed in 76% of the cases by the mother (mean age 39.7 ± 4.5), and in 24% of the cases by the father (mean age 42.1 ± 3.8).

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 JIApatients,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 JIA patients, with the systemic onset, polyarticular onset and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

Cross cultural adaptation

The Dutch CHAQ was fully cross-culturally adapted with 3 forward and 3 backward translations; there was a concordance with the original American English version of the CHQ in at least 2 out of 3 back translations for 56/69

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

	Systemic onset n = 17	Polyarticular onset n = 31	Extended oligoart. n = 18	Persistent oligoart. n = 34	Healthy controls n =80
Age of the children[1, 2]	11.8 ± 3.8	9.1 ± 5.0	10.0 ± 4.5	10.7 ± 3.7	8.1 ± 3.6
Disease duration[1]	5.2 ± 3.0	4.2 ± 3.3	5.7 ± 3.0	5.1 ± 1.8	
ESR[1, 2]	49.4 ± 41.8	33.0 ± 30.5	22.3 ± 16.7	9.4 ± 8.6	
MD VAS (0-10 cm)[1, 2]	2.8 ± 2.8	3.4 ± 2.4	3.7 ± 2.1	1.2 ± 1.7	
No. swollen joints[1, 2]	5.9 ± 8.1	8.9 ± 7.1	6.0 ± 5.0	1.0 ± 1.2	
No. joints with pain[1, 2]	5.1 ± 8.3	4.6 ± 4.9	3.7 ± 6.0	0.7 ± 1.4	
No. joints with limited range of motion[1, 2]	8.0 ± 9.3	6.3 ± 5.0	4.9 ± 5.0	0.9 ± 1.6	
No. active joints[1, 2]	6.4 ± 8.2	9.5 ± 7.1	6.5 ± 5.7	1.1 ± 1.4	
Female[3]	14 (82%)	23 (74%)	15 (83%)	24 (71%)	33 (41%)
Persistent systemic features[3]	9 (60%)	0	0	0	
Antinuclear antibody[3]	0	12 (40%)	12 (75%)	18 (60%)	
Rheumatoid factor[3]	0	3 (11%)	1 (6%)	0	
Chronic iritis[3]	0	0	3 (18%)	0	

[1]Mean ± SD; [2]ANOVA $p < 0.01$ (except for disease duration where $p = 0.28$); [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 = 17	Polyarticular onset n = 31	Extended oligoart. n = 18	Persistent oligoart. n = 34	Healthy controls n =80
Dressing	1.2 ± 1.0	1.9 ± 1.0	1.0 ± 0.9	0.6 ± 0.9	0.5 ± 0.8
Arising	0.9 ± 1.1	1.6 ± 0.8	0.8 ± 0.8	0.4 ± 0.7	0.1 ± 0.3
Eating	1.0 ± 1.0	1.7 ± 0.9	0.8 ± 0.9	0.4 ± 0.6	0.4 ± 0.7
Walking	0.9 ± 0.9	1.4 ± 1.0	0.8 ± 0.9	0.4 ± 0.8	0.0 ± 0.1
Hygiene	1.0 ± 1.1	1.8 ± 1.0	0.7 ± 0.7	0.3 ± 0.5	0.3 ± 0.6
Reach	1.1 ± 1.0	1.6 ± 1.0	0.9 ± 0.7	0.4 ± 0.7	0.2 ± 0.5
Grip	1.1 ± 1.0	2.0 ± 0.9	0.7 ± 0.8	0.3 ± 0.6	0.2 ± 0.6
Active	1.6 ± 1.3	1.9 ± 0.8	1.3 ± 0.9	1.0 ± 1.1	0.2 ± 0.5
Disability index	1.1 ± 0.9	1.7 ± 0.6	0.9 ± 0.6	0.5 ± 0.5	0.2 ± 0.4
Parent's evaluation of pain	3.0 ± 2.8	3.4 ± 2.4	2.9 ± 2.1	2.0 ± 2.5	0.0 ± 0.2
Parent's evaluation of overall well-being	3.1 ± 2.9	4.3 ± 2.7	3.2 ± 2.3	1.8 ± 2.2	0.0 ± 0.1

ANOVA $p < 0.001$ for all variable.

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 = 17	Polyarticular onset n = 31	Extended oligoart. n = 18	Persistent oligoart. n = 34	Healthy controls n =80
Global health (GGH)	53.5 ± 24.9	45.0 ± 27.4	57.7 ± 26.3	68.4 ± 21.8	90.3 ± 15.9
Physical functioning (PF)	69.3 ± 26.4	53.4 ± 26.1	74.1 ± 27.0	83.3 ± 22.7	99.2 ± 3.2
Role/social limitations - Emotional/Behavioural (REB)	85.0 ± 28.9	69.9 ± 40.5	92.1 ± 18.2	93.1 ± 19.7	98.0 ± 10.5
Role/social limitations - Physical (RP)	66.7 ± 30.6	64.6 ± 35.9	85.7 ± 22.5	90.4 ± 22.4	99.8 ± 1.9
Bodily pain/discomfort (BP)	52.9 ± 27.6	49.2 ± 25.6	53.3 ± 25.5	67.9 ± 24.2	92.8 ± 12.5
Behaviour (BE)	84.1 ± 15.0	71.8 ± 22.1	77.3 ± 14.8	82.1 ± 12.8	79.4 ± 13.9
Global behaviour (GBE)	72.4 ± 25.7	67.6 ± 22.8	70.7 ± 19.6	77.7 ± 17.2	81.4 ± 17.2
Mental health (MH)	81.6 ± 15.5	72.0 ± 16.6	78.3 ± 12.1	81.8 ± 11.8	81.4 ± 13.1
Self esteem (SE)	66.6 ± 14.3	72.0 ± 17.1	69.2 ± 13.2	81.7 ± 14.2	82.3 ± 13.2
General health perceptions (GH)	48.5 ± 20.4	44.9 ± 18.6	52.1 ± 25.1	65.2 ± 19.5	82.6 ± 16.1
Change in health (CH)	59.4 ± 37.5	47.9 ± 34.5	39.3 ± 30.6	62.9 ± 28.7	53.3 ± 11.9
Parental impact - Emotional (PE)	72.5 ± 21.4	52.7 ± 25.2	55.4 ± 23.0	80.6 ± 18.7	89.2 ± 16.6
Parental impact - Time (PT)	82.4 ± 20.8	68.9 ± 29.0	73.9 ± 29.9	90.1 ± 21.2	94.8 ± 11.8
Family activities (FA)	75.8 ± 22.1	68.0 ± 24.5	71.8 ± 20.5	89.2 ± 16.4	88.1 ± 12.9
Family cohesion (FC)	65.0 ± 24.4	73.0 ± 22.8	62.9 ± 23.3	77.1 ± 15.9	74.3 ± 20.5
Physical summary score (PhS)	42.1 ± 10.3	40.0 ± 10.1	46.3 ± 8.9	50.1 ± 7.4	55.6 ± 1.9
Psychosocial summary score (PsS)	53.0 ± 7.3	48.1 ± 8.8	48.5 ± 6.4	53.1 ± 6.0	53.1 ± 6.7

ANOVA $p < 0.05$ except for BE ($p = 0.08$), FC ($p = 0.12$).

(81%) lines of the translations. The Dutch CHQ has already been published (2), and therefore it was revalidated in this study.

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%). For the 99 lines of the translated CHQ, all the lines of translation were understood by more than 80% of the parents (median = 100%; range: 80-100%). No change in the text of the Dutch 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 11.4% (range 5.6-18.5%) with dressing, eating, hygiene, grip, and activity having missing values higher than 10%; the response pattern was most often normally distributed. All response choices of the CHAQ items have been used except for eating, and grip. The mean ± SD of the items within a scale were roughly equivalent except for dressing, and eating. The total number of missing responses on the CHQ was 7.8 (range: 6-11%) with SE, and CH having more than 10% missing values; the response pattern was most often normally distributed except for REB, RP, and PT. All response choices of the CHQ items have been used except for BE, MH,SE,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, and for all CHQ health concepts except for BE, SE, and FA.

Items internal consistency (third Likert assumption). Pearson items scale correlations were ≥ 0.4 for 100% of the CHAQ items and for 96% of the items of the CHQ (except SE, and FA).

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 75% of the items (11% by 2 SE); scaling failure was observed for reach, and activity 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 95% of the items (71% by 2 SE); scaling failure was observed only for FA.

Floor and ceiling effect. The CHAQ floor effect had a median of 79% (range 58-89%) while for the CHQ the median was 0% (range 0-5.3%). The CHAQ ceiling effect had median of 0.0% (range 0.0-0.0) while the CHQ had a median of 27% (range 3.5-82.3%).

Cronbach's alpha internal consistency. Cronbach's alpha was ≥ 0.7 for 8/8 domains (100%) of the CHAQ (overall 0.97; range 0.78-0.9). Cronbach's alpha was ≥ 0.7 for 11/11 (100%) measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (overall 0.96; range 0.76-0.97).

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

Test-retest reliability. After a median of 7.5 days (range 5-24; number of JIA patients retested = 10) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility with a median of 0.45 (range 0.0-0.8) with a poor reproducibility for dressing (0), and hygiene (0.29). Also the 15 CHQ health concepts showed a fair to good reproducibility with a median of 0.8 (range 0.4-0.9).

External validity. The Spearman correlation of the CHAQ with the JIA core set variables (8) showed a median of 0.6 (range 0.4 to 0.7), with the highest correlation being with the parent's evaluation of overall well being (r = 0.7). For the CHQ the median correlation was for the PhS -0.4 (range -0.8 to -0.4) and for the PsS was -0.2 (range -0.3 to -0.1). The best correlation was with the parent's evaluation of overall well being for both the PhS (-0.8) and the PsS (-0.3).

Discussion

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

In this study the Dutch CHAQ was fully cross-culturally adapted from the original American English version with 3 forward and 3 backward translations. This disease-specific questionnaire proved its ability to clinically discriminate between the JIAsubtypes 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. The Dutch CHQ has already been published (2), and therefore it was revalidated in this study. 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 equality of means and SD, and discriminant validity for BE, SE, and FA.

In conclusion, the Dutch 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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