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

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ABSTRACT

We report the results of the cross-cultural adaptation and validation into the French language of two health status instruments. The Childhood Health Assessment Questionnaire (CHAQ) is a disease specific 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 related quality of life instrument designed to capture the physical and psychosocial well-being of children independently from the underlying disease. Five hundred children were enrolled including 306 patients with JIA classified into systemic (23%), polyarticular (22%), extended oligoarticular (25%), and persistent oligoarticular (30%) subtypes, and 194 healthy children. Both instruments were reliable with intra-class correlation (ICC) coefficients for the test-retest procedure of 0.91 for the CHAQ, and 0.87 and 0.89 for the physical and psychosocial summary scores of CHQ, respectively. Agreement between parents and children evaluated for the CHAQ was high with an ICC of 0.89 for the disability index; weighted kappa coefficients for the 8 domains ranged from 0.61 to 0.72. Convergent validity was demonstrated by significant correlations with the JIAcore set of variables (physician and parent global assessment,scores for active joints and joints with limited range of motion, erythrocyte sedimentation rate) for both instruments. Both CHAQ and CHQ discriminated between healthy and JIA children, but only the disease specific CHAQ questionnaire discriminated clearly between the 4 JIA subtypes.

In conclusion, the French versions of the CHAQ and the CHQ are reliable, and valid health assessment questionnaires to be used in children suffering from JIA.

Introduction

The objective of this study was to develop and validate a cross cultural French version of the Childhood Health Assessment Questionnaire (1) and to validate the French version of the Child Health Questionnaire (CHQ) (2) in a cohort of healthy children and in patients with juvenile idiopathic arthritis (JIA) followed by the French members of the Paediatric Rheumatology International Trials Organisation (PRINTO). This project formed a part of a larger international survey conducted by PRINTO and was 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.

Patients and methods

The methodology used is described in detail in the introductory paper of this supplement (6).

Cross cultural adaptation

The CHAQ was independently translated by 2 translators and a cross cultural version of the instrument was obtained during a consensus meeting associating bilingual individuals, linguists, pediatricians, rheumatologists, a parent of a child having JIA, and experts members of the French Study Group for 'Quality of Life in Rheumatology'. A few cultural adaptations of items and wordings were performed, *i.e.* 'cereal box' was replaced by 'pot de yaourt', 'five stairs' by 'quelques marches','run errands and shop' by 'aller chercher le pain', 'yardwork' by 'mettre la table'. A back translation was obtained to verify the conceptual equivalence of the French version with the original instrument. The French version of the CHQ developed by Leplège *et al.* (7) was used for the study. In addition to the cross cultural adaptation, the face validity of both the CHAQ and CHQ questionnaires was tested by a probe technique. Both questionnaires were clearly understood by more than 80% of the parents, and no further modifications of the French versions of the questionnaires were therefore necessary. The French versions of the CHAQ and the CHQ, with the corresponding lines of the original questionnaires marked in the left column, are reproduced at the end of this paper.

Patients

After obtaining the informed consent signed by at least one parent of the children, children were consecutively recruited from January 1999 to May 2000, by the French members of PRINTO. Children with JIA of either systemic, polyarticular, extended oligoarticular or persistent oligoarticular subtypes were includ-

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

	Systemic onset n = 70	Polyarticular onset n = 66	Extended oligoart. n = 77	Persistent oligoart. n = 93	Healthy controls n = 194
Age of the children[1, 2]	9.4 ± 5.0	11.1 ± 4.5	10.0 ± 4.2	7.6 ± 3.8	11.4 ± 3.9
Disease duration[1]	4.0 ± 3.8	4.9 ± 4.0	6.4 ± 3.9	3.7 ± 3.2	
ESR[1, 2]	37.7 ± 26.0	16.2 ± 14.2	26.1 ± 18.4	21.2 ± 17.2	
Physician VAS (0-10 cm)[1, 2]	3.1 ± 2.8	2.9 ± 2.8	2.7 ± 2.1	1.8 ± 1.6	
No. swollen joints[1, 2]	6.4 ± 9.4	5.5 ± 8.9	3.5 ± 4.5	1.2 ± 2.1	
No. joints with pain[1, 2]	3.7 ± 8.5	5.0 ± 9.4	2.2 ± 4.0	0.7 ± 1.0	
No. joints with limited range of motion[1, 2]	9.9 ± 13.0	10.8 ± 13.2	6.1 ± 7.1	1.5 ± 2.8	
No. active joints[1, 2]	7.3 ± 10.0	7.4 ± 10.2	3.9 ± 4.8	1.2 ± 2.1	
Female[3]	37 (53%)	54 (82%)	68 (88%)	79 (85%)	91 (47%)
Persistent systemic features[3]	34 (51%)				
Antinuclear antibody[3]	2 (3%)	25 (38%)	61 (79%)	72 (77%)	
Rheumatoid factor[3]	0	10 (15%)	4 (5%)	1 (1%)	
Chronic iritis[3]	0	4 (6%)	23 (30%)	24 (26%)	

[1]Mean ± SD; [2]ANOVA $p < 0.001$; [3]number and percentage; VAS: visual analogue scale.

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 = 70	Polyarticular onset n = 66	Extended oligoart. n = 77	Persistent oligoart. n = 93	Healthy controls n = 194
Dressing	1.3 ± 1.2	0.9 ± 1.1	1.1 ± 1.2	0.6 ± 0.9	0.3 ± 0.7
Arising	0.9 ± 1.0	0.7 ± 0.8	0.7 ± 0.9	0.3 ± 0.7	0.0 ± 0.1
Eating	0.9 ± 1.0	0.8 ± 1.0	0.6 ± 0.9	0.4 ± 0.7	0.1 ± 0.4
Walking	0.9 ± 1.0	0.6 ± 0.8	0.7 ± 0.9	0.5 ± 0.7	0.0 ± 0.0
Hygiene	1.1 ± 1.1	0.7 ± 0.9	0.8 ± 1.0	0.4 ± 0.7	0.0 ± 0.2
Reach	1.3 ± 1.1	0.9 ± 0.9	0.9 ± 0.9	0.5 ± 0.7	0.0 ± 0.2
Grip	1.0 ± 1.1	0.8 ± 0.8	0.7 ± 0.9	0.3 ± 0.6	0.0 ± 0.1
Activities	1.3 ± 1.1	0.9 ± 1.0	1.2 ± 1.1	0.7 ± 0.9	0.1 ± 0.5
Disability index	1.1 ± 0.9	0.8 ± 0.7	0.8 ± 0.7	0.4 ± 0.5	0.1 ± 0.2
Parent's evaluation of pain	2.8 ± 2.8	3.0 ± 2.8	2.8 ± 2.7	2.5 ± 2.6	0.1 ± 0.6
Parent's evaluation of overall well-being	2.8 ± 2.6	2.1 ± 2.2	2.0 ± 2.4	1.5 ± 2.1	0.0 ± 0.2

ANOVA $p < 0.001$ 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 = 70	Polyarticular onset n = 66	Extended oligoart. n = 77	Persistent oligoart. n = 93	Healthy controls n = 194
Global health (GGH)	53.9 ± 20.0	58.2 ± 20.5	57.4 ± 21.3	63.5 ± 21.7	88.8 ± 14.2
Physical functioning (PF)	54.8 ± 31.4	68.7 ± 28.7	61.9 ± 28.2	75.6 ± 25.1	98.6 ± 4.6
Role/social limitations - Emotional/Behavioural (REB)	66.7 ± 35.6	73.8 ± 34.5	73.9 ± 31.3	80.0 ± 28.9	97.2 ± 10.2
Role/social limitations - Physical (RP)	57.6 ± 35.2	68.3 ± 34.3	57.6 ± 36.5	75.2 ± 30.5	96.6 ± 12.4
Bodily pain/discomfort (BP)	51.0 ± 31.1	56.4 ± 27.2	51.2 ± 27.9	57.5 ± 27.8	85.1 ± 16.5
Behaviour (BE)	73.4 ± 16.2	76.1 ± 17.5	80.5 ± 12.9	75.3 ± 17.2	79.2 ± 12.2
Global behaviour (GBE)	65.0 ± 22.7	72.8 ± 20.1	76.8 ± 19.6	73.2 ± 20.5	80.3 ± 15.7
Mental health (MH)	61.5 ± 18.4	64.3 ± 20.0	69.7 ± 19.9	66.2 ± 20.0	74.9 ± 14.6
Self esteem (SE)	65.5 ± 17.7	73.1 ± 18.3	72.2 ± 16.5	73.7 ± 16.0	78.2 ± 13.9
General health perceptions (GH)	46.5 ± 15.6	49.7 ± 16.2	48.4 ± 18.1	57.8 ± 16.5	83.8 ± 12.7
Change in health (CH)	64.3 ± 30.9	67.7 ± 28.9	58.5 ± 31.6	56.5 ± 30.7	56.1 ± 14.0
Parental impact - Emotional (PE)	61.0 ± 24.2	64.5 ± 28.1	64.8 ± 22.7	61.5 ± 25.1	86.2 ± 14.1
Parental impact - Time (PT)	62.7 ± 31.1	75.9 ± 30.5	67.7 ± 31.2	73.3 ± 29.4	91.1 ± 12.4
Family activities (FA)	75.3 ± 22.3	84.6 ± 20.1	82.6 ± 19.2	86.1 ± 16.9	91.3 ± 10.9
Family cohesion (FC)	69.2 ± 25.7	71.3 ± 21.4	76.1 ± 18.2	76.8 ± 21.8	76.4 ± 17.9
Physical summary score (PhS)	40.0 ± 11.2	43.8 ± 10.7	40.6 ± 10.8	45.9 ± 9.4	55.2 ± 3.1
Psychosocial summary score (PsS)	45.6 ± 8.9	47.6 ± 9.6	49.9 ± 8.9	46.8 ± 9.3	51.3 ± 6.8

ANOVA $p < 0.001$ except for BE ($p=0.03$), CH ($p=0.03$), and FC ($p=0.14$).

ed (8). They were attending the outpatient clinics of 16 paediatric centres,and at the time of the consultation the French versions of the CHAQ and the CHQ were completed by one parent. The children who were 9 years old or more were also offered to complete a child self-report form of the French CHAQ. Parents were asked to complete again at home, 7 days later, the CHAQ and the CHQ. The controls consisted of healthy children (6 to 18 years of age) attending local schools or being healthy sibling(s) of the JIA participants.

Results

The demographic and clinical characteristics of the included subjects are presented in Table I. Five hundred subjects were enrolled including 306 patients with JIA (23% with systemic onset, 22% with polyarticular onset, 25% with an extended oligoarticular subtype, and 30% with a persistent oligoarticular subtype) and 194 healthy children. The CHAQ and the CHQ were completed in 85% of the cases by the mother (mean age 37.6 ± 6.2), and in the remaining 15% by the father (mean age 41.8 ± 5.1). Of the 306 children with JIA, 98 completed the self-report form of the French CHAQ (mean age 13.0 ± 2.8).

Clinical discriminant validity

The clinical discriminant validity as defined in the introductory paper (6) was studied. Table II reports the scores (mean ± SD) for the 8 CHAQ domains, the disability index (DI) and the 2 visual analogue scales (VAS) scores for parental assessment of pain and overall well-being. The CHAQ clearly discriminated between healthy subjects and JIA patients, with the systemic, polyarticular and extended oligoarticular subtypes having a higher degree of disability and pain, and a lower overall well-being when compared to their healthy peers.

Table III reports the CHQ scores (mean ± SD) for the 15 health concepts (see Table III for the abbreviations) and the 2 summary scores. The CHQ discriminated between healthy subjects and JIA patients, with the JIA subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

Psychometric properties of the questionnaires

Descriptive statistics. For the CHAQ the number of missing responses was very low as only 0.7% of the items were not answered (30 items and 306 JIA children). Because of the young age of many JIA children, not applicable answers were commonly provided especially in 2 areas (Dressing and Grooming [16%], and Activities [14%]). However, as for each functional area, there is at least one item that is relevant to children of all ages, missing scores were very low (0% to 3% for the 8 functional areas). The response patterns were skewed towards normal functional ability. All response choices of the CHAQ items have been used except for one item in the Grip area. Item means and standard deviations were usually not equivalent within a given functional areas. For the CHQ, 3% of the asked questions received no response (50 items and 500 children [all questionnaires were considered as the CHQ is a generic instrument]), and 92% of missing data originated from the JIA patients. The latter were younger than the healthy children and the parents may have had difficulty to answer some items especially pertaining to 3 health concepts (REB, RP, and SE). Nevertheless, on account of the recommended processing of missing data, missing scores were very low for the 15 health concepts (0.2% to 4%) and the 2 summary scores (8.6%). The response patterns to the items were most often skewed toward better health status. All response choices of the CHQ items were used except for one item each in BE and SE.

Item internal consistency. Pearson's correlation coefficients of items with their own scale, corrected for overlap were usually relatively close within a scale. The correlation coefficient range for each scale varied from 0 for Arising and Walking to 0.39 for Grip for the CHAQ, and from 0 for RP and BP to 0.69 for MH for the CHQ. Item-scale correlation coefficients corrected for overlap were ≥ 0.4 for 100% of the CHAQ items and 84% of the CHQ items.

Item discriminant validity. For the CHAQ, item correlations with own scale corrected for overlap were greater than at least 2 standard error (SE) of the correlation with other scales for 56% of the items; scaling failure was observed for Grip where one item was better correlated with other domains. For the CHQ, item correlations with its own scale were greater by at least 2 SE for 76% of the items; scaling failure was observed for MH, SE and GH where some of the items where significantly better correlated with other health concepts.

Floor and ceiling effect. The floor effect for the 8 areas of the CHAQ had a median of 58% (range 41-61%) while for the 15 health concepts of the CHQ the median was 0.8% (range 0-7%). The CHAQ ceiling effect had median of 5% (range 2-13%) while the CHQ had a median of 18% (range 4-64%).

Cronbach's alpha internal consistency. Cronbach's alpha was ≥ 0.7 for 7/8 domains of the CHAQ (median of 0.85; range 0.69-0.90; 0.69 for Arising). Cronbach's alpha was ≥ 0.7 for 9/11 measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (median of 0.81; range 0.67-0.94) with the exception being GH (0.67) and PE (0.69).

Inter scale correlation. The Pearson correlation of each domain of both the CHAQ (8 areas) and the CHQ (11 measurable health concepts) with all other domains of the respective questionnaire was always lower than their Cronbach's alpha.

Test-retest reliability. After a mean of 8.4 ± 4.1 days, 220 CHAQ and CHQ were completed again (response rate 92%). The intraclass correlation coefficients for the DI of the CHAQ was 0.91, ranged from 0.64 to 0.85 for the 15 health concepts of the CHQ, and were 0.87 and 0.89 for the physical and psychosocial summary scores of the CHQ. The weighted kappa coefficients for agreement for ordinal variables of the 8 areas of the CHAQ varied from 0.67 to 0.75.

External validity. The Spearman correlations of the DI of the CHAQ with the JIA core set variables (9) were all significant and ranged from 0.32 for erythrocyte sedimentation rate to 0.57 for the score of joints with limited range of motion. For the physical summary score of the CHQ, all correlations were also significant and ranged from -0.30 for the score for active joints to -0.50 for the physician evaluation of disease activity. The psychosocial summary score of the CHQ was significantly correlated only with the parent evaluation of overall well-being (r = -0.21).

Parents-children agreement. The parents-children agreement was evaluated only for the CHAQ in a subgroup of 98 children with JIA and in their respective parents, who completed separately the questionnaire on the same day. According to Landis and Koch (10) the kappa agreements for ordinal variables for the 8 CHAQ domains were moderate to substantial (range 0.61-0.72).

Discussion

The results of the present study show that the French versions of the CHAQ-CHQ have excellent psychometric properties. However, responsiveness of these instruments remains to be further evaluated.

The CHAQ as a disease-specific questionnaire proved its ability to discriminate between the JIA subtypes and healthy controls, with the systemic, polyarticular and extended oligoarticular subtypes having a higher degree of disability and pain, and a lower overall well-being when compared to their healthy peers. Substantial floor effect (normal functional activity) was noted for most of the CHAQ areas. The Grip area showed a less than desirable discriminant validity.

The generic CHQ questionnaire proved less able to discriminate between the different JIAtypes than the CHAQ, with the JIAsubtypes having a lower physical and psychosocial well being when compared to their healthy peers. Because of the usual young age of the children suffering form JIA, their

parents may have some difficulty to answer a few items of the CHQ, related to the REB, RP and SE health concepts. Some minor statistical problems were found for the equal item scale correlation, the item internal consistency, and the ceiling effect.

In conclusion, the French versions of the CHAQ and the CHQ are reliable and valid instruments to be used for health assessment in children suffering from JIA. The CHAQ is a disease specific instrument designed to measure functional disability while the generic health status CHQ instrument widens the assessment to other health concepts including psychosocial dimensions.

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