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

J. Nugent[1], N. Ruperto[2], J. Grainger[1], C. Machado[1], S. Sawhney[1], E. Baildam[3], J. Davidson[4], H. Foster[5], A. Hall[6], P. Hollingworth[7], J. Sills[4], H. Venning[8], J.E. Walsh[9], J.M. Landgraf[10], M. Roland[11], P. Woo[1], K.J. Murray[1], for the Paediatric Rheumatology International Trials Organisation (PRINTO)

[1]Institute of Child Health, University College, London, United Kingdom; [2]Laboratorio di Informatica Medica, IRCCS S. Matteo, Pavia, Italy; [3]Booth Hall Children's Hospital, Manchester; [4]Royal Liverpool Children's Hospital Alder Hey, Liverpool; [5]Freeman Hospital Musculoskeletal Unit, Newcastle; [6]Wexham Park Hospital, Slough; [7]Southmead Hospital, Bristol; [8]Queen's Medical Centre, Nottingham; [9]Yorkhill NHS Trust, Glasgow, United Kingdom; [10]HealthAct, Boston, MA, USA; [11]Department of General Practice, University of Manchester, Manchester, United Kingdom.

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Please address correspondence and requests for reprints to either: Kevin Murray, MBBS, FRACP, Great Ormond St Hospital for Sick Children, Rheumatology Unit, London WCIN 3JH, UK
E-mail: kevin.murray@gosh-tr.nthames.nhs.uk
or PRINTO, IRCCS Policlinico S. Matteo, Pediatria Generale e Reumatologia, Piazzale Golgi, 2, 27100 Pavia, Italy.
E-mail: nruperto@smatteo.pv.it
WWW: http://www.medit.it/printo/

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ABSTRACT

We report herein the results of the cross-cultural adaptation and validation into the British 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. A total of 440 subjects were enrolled:219 patients with JIA(17% systemic onset, 41% polyarticular onset, 33% extended oligoarticular subtype, and 9% persistent oligoarticular subtype) and 221 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 British 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 British 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 British 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 British 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 British 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 219 patients with JIA (17% systemic onset, 41% polyarticular onset, 33% extended oligoarticular subtype, and 9% persistent oligoarticular subtype) and 221 healthy children have been enrolled. The CHAQ-CHQ was completed in 88% of the cases by the mother (mean age 39.6 ± 5.7), and in 12% of the cases by the father (mean age 42.5 ± 6.3).

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 pain and parental assessment of global 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 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 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 CHAQ in at least 2 out of 3 back translations for 69/69 (100%) lines of the translations. The CHQ has already been published (2), and therefore it was revalidated in this study.

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

	Systemic onset n = 38	Polyarticular onset n = 89	Extended oligoart. n = 73	Persistent oligoart. n = 19	Healthy controls n =221
Age of the children[1, 2]	10.6 ± 6.0	8.9 ± 4.1	9.8 ± 4.2	9.2 ± 3.6	10.1 ± 3.1
Disease duration[1, 3]	4.0 ± 4.3	3.7 ± 3.4	5.9 ± 4.5	5.4 ± 2.8	
ESR[1, 3]	58.4 ± 36.5	38.6 ± 33.7	32.4 ± 25.9	23.5 ± 24.6	
MD VAS (0-10 cm)[1, 3]	4.8 ± 2.4	4.0 ± 2.1	3.6 ± 1.9	1.3 ± 1.8	
No. swollen joints[1, 3]	8.2 ± 8.7	9.4 ± 8.3	5.3 ± 4.6	1.1 ± 1.2	
No. joints with pain[1, 2]	5.8 ± 7.0	8.0 ± 9.8	5.2 ± 5.5	1.0 ± 1.4	
No. joints with limited range of motion[1, 3]	9.2 ± 9.7	9.9 ± 11.1	7.5 ± 7.3	0.6 ± 0.9	
No. active joints[1, 3]	9.3 ± 9.5	11.2 ± 9.9	6.5 ± 5.3	1.2 ± 1.3	
Female[4]	26 (68%)	65 (73%)	50 (68%)	12 (63%)	110 (50%)
Persistent systemic features[4]	14 (56%)				
Antinuclear antibody[4]	2 (6%)	33 (39%)	46 (66%)	10 (62%)	
Rheumatoid factor[4]	0	9 (11%)	1 (1%)	0	
Chronic iritis[4]	0	14 (16%)	22 (31%)	6 (33%)	

[1]Mean ± SD; [2]ANOVA $p < 0.05$; [3]not significant; [4]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 = 38	Polyarticular onset n = 89	Extended oligoart. n = 73	Persistent oligoart. n = 19	Healthy controls n =221
Dressing	1.4 ± 1.2	1.6 ± 1.1	1.3 ± 1.1	1.1 ± 1.2	0.4 ± 0.8
Arising	1.2 ± 1.0	1.3 ± 1.0	1.1 ± 1.0	0.7 ± 0.9	0.0 ± 0.3
Eating	1.2 ± 1.2	1.3 ± 1.1	0.9 ± 1.0	0.5 ± 0.9	0.2 ± 0.5
Walking	1.1 ± 1.1	1.3 ± 1.0	1.2 ± 1.0	0.5 ± 1.0	0.0 ± 0.2
Hygiene	1.5 ± 1.1	1.5 ± 1.0	1.1 ± 1.0	0.7 ± 1.0	0.1 ± 0.4
Reach	1.4 ± 1.1	1.6 ± 1.1	1.3 ± 1.0	0.6 ± 0.9	0.1 ± 0.4
Grip	1.3 ± 1.1	1.6 ± 1.1	1.1 ± 1.0	0.6 ± 0.9	0.1 ± 0.3
Activities	1.4 ± 1.2	1.6 ± 1.1	1.4 ± 1.1	0.7 ± 1.1	0.1 ± 0.4
Disability index	1.3 ± 1.0	1.5 ± 0.8	1.2 ± 0.8	0.7 ± 0.8	0.1 ± 0.3
Parent's evaluation of pain	3.8 ± 2.8	4.6 ± 3.1	3.8 ± 2.7	1.9 ± 2.0	0.1 ± 0.3
Parent's evaluation of overall well-being	3.8 ± 2.8	3.9 ± 2.9	3.2 ± 2.6	1.6 ± 1.9	0.1 ± 0.5

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 = 38	Polyarticular onset n = 89	Extended oligoart. n = 73	Persistent oligoart. n = 19	Healthy controls n =221
Global health (GGH)[1]	46.9 ± 29.2	51.1 ± 27.0	56.1 ± 29.1	82.5 ± 20.2	93.3 ± 9.5
Physical functioning (PF)	44.9 ± 35.3	47.4 ± 33.6	56.0 ± 30.8	70.7 ± 36.4	97.9 ± 9.6
Role/social limitations - Emotional/Behavioural (REB)[1]	62.6 ± 34.3	61.6 ± 35.4	67.2 ± 35.2	82.7 ± 31.5	97.8 ± 10.0
Role/social limitations - Physical (RP)[1]	47.6 ± 36.6	50.2 ± 34.4	60.9 ± 33.5	81.5 ± 31.3	97.2 ± 11.9
Bodily pain/discomfort (BP)[1]	32.8 ± 26.4	37.8 ± 28.2	42.6 ± 27.8	66.0 ± 28.5	94.3 ± 13.8
Behaviour (BE)[2]	67.0 ± 22.0	61.2 ± 19.2	66.7 ± 20.0	64.7 ± 27.1	74.3 ± 17.5
Global behaviour (GBE)[1]	74.1 ± 28.6	69.0 ± 26.9	72.6 ± 23.5	63.3 ± 31.6	78.4 ± 20.9
Mental health (MH)[2]	66.7 ± 20.8	62.5 ± 20.6	70.6 ± 18.3	76.2 ± 17.2	80.8 ± 10.9
Self esteem (SE)[1]	61.7 ± 20.8	62.6 ± 23.0	67.1 ± 22.2	75.8 ± 20.7	78.6 ± 14.9
General health perceptions (GH)[1]	44.8 ± 20.6	46.0 ± 18.6	46.8 ± 21.0	65.3 ± 20.1	79.5 ± 13.7
Change in health (CH)[3]	41.4 ± 37.8	40.7 ± 32.5	40.9 ± 31.2	66.7 ± 27.8	57.7 ± 15.6
Parental impact – Emotional (PE)[1]	45.8 ± 34.1	46.2 ± 30.4	48.0 ± 31.1	72.8 ± 23.9	85.2 ± 15.9
Parental impact - Time (PT)[1]	58.8 ± 31.6	60.3 ± 32.5	66.6 ± 27.9	81.5 ± 27.4	94.5 ± 10.4
Family activities (FA)[1]	57.4 ± 26.9	54.4 ± 28.8	61.3 ± 26.6	78.5 ± 29.7	86.5 ± 15.9
Family cohesion (FC)[3]	77.3 ± 20.6	69.7 ± 21.1	73.7 ± 24.9	81.7 ± 17.1	76.9 ± 22.0
Physical summary score (PhS)[1]	34.9 ± 11.4	37.0 ± 12.2	39.6 ± 11.4	45.0 ± 11.5	55.4 ± 4.2
Psychosocial summary score (PsS)[2]	45.7 ± 10.4	43.6 ± 9.9	45.4 ± 9.5	50.3 ± 10.6	51.6 ± 7.1

[1]ANOVA $p < 0.001$; [1]ANOVA $p < 0.05$; [3]ANOVA not significant.

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: 75-100%) with the exception of the introductory instructions of the CHAQ (line 2) that were understood only by 75% of the parents. 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 British CHAQ-CHQ was necessary.

Psychometric issues

Descriptive statistics (first Likert assumption). For the CHAQ the total number of missing responses was 6.9% (range 1.6-13.9) with dressing and activity having more missing values; the response pattern were skewed towards normal functional ability. The mean ± SD of the items within a scale were not equivalent for most except arising and grip. The total number of missing responses on the CHQ was 6.3% (3.9-8.1); the response pattern had most often a normal distribution. 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 dressing and grip, and for all CHQ health concepts except for BE, MH, and GH.

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 GH).

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 86% of the items (42% by 2 SE); no scaling failure was observed. For the CHQ, Pearson items correlations with its scale were greater by at least 1 SE for 96% of the items (80% by 2 SE); scaling failure was observed for BE, and GH.

Floor and ceiling effect. The CHAQ floor effect had a median of 81% (range 65-86%) while for the CHQ the median was 2% (range 0-8%). The CHAQ ceiling effect had median of 0.4% (range 0.0-0.8) while the CHQ had a median of 23% (range 1-69%).

Cronbach's alpha internal consistency. Cronbach's alpha was ≥ 0.7 for 8/8 domains of the CHAQ (median of 0.9; range 0.8-0.9). Cronbach's alpha was ≥ 0.7 for 11/11 measurable health concepts (i.e. health concepts with more than 1 item) of the CHQ (median of 0.9; range 0.8-0.96) with the exception being GH (0.66).

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 all CHAQ domains except for dressing and reach. For the CHQ all 11 measurable health concepts have correlation lower than their Cronbach's alpha except for PE.

Test-retest reliability. After a median of 7 days (range 3-33; number of JIA patients re-tested = 16) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility (median = 0.9; range 0.6-0.9), while for the 15 CHQ health concepts the median was 0.8 (range 0.6-1.0).

External validity. The Spearman correlation of the CHAQ with the JIA core set variables (8) showed a median of 0.4 (range 0.2 to 0.8), with the highest correlation being with the parent's evaluation of overall well being (r = 0.8). For the CHQ the median correlation was for the PhS -0.4 (range -0.8 to -0.3) and for the PsS was -0.3 (range -0.5 to -0.2). The best correlation was for the PhS with the parent's evaluation of overall well being (r = -0.8). and for the PsS with the parent's evaluation of overall well being (r = -0.5).

Discussion

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

In this study the British 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 most problematic domains were dressing, reach, grip, and activity which showed a high number of missing values, problems for internal consistency, and discriminant validity.

In this study the British CHQ was fully cross-culturally adapted from the original American English version with 3 forward and 3 backward translations. The generic CHQ questionnaire proved less able to clinically discriminate between the different JIA types than the CHAQ; patients with systemic and polyarticular onset or extended oligoarticular subtypes were very similar in both the PhS and PsS scores, whereas the results for the persistent oligoarticular patients were more similar to the healthy population. Some minor statistical problems were found for BE, and GH for internal consistency, discriminant validity.

In conclusion, the British 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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