

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

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**Key words:** Chilean Childhood Health Assessment Questionnaire (CHAQ), Chilean Child Health Questionnaire (CHQ), cross cultural adaptation and psychometric evaluation, health related quality of life, juvenile idiopathic arthritis (JIA), healthy children.

## ABSTRACT

We report herein the results of the cross-cultural adaptation and validation into the Chilean 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 Chilean CHAQ-CHQ were derived from the European Spanish version with changing of the few words whose use is different in the 2 countries. A total of 126 subjects were enrolled: 72 patients with JIA (29% systemic onset, 39% polyarticular onset, 4% extended oligoarticular subtype, and 28% persistent oligoarticular subtype) and 54 healthy children. The CHAQ clinically discriminated between healthy subjects and JIA patients, with the JIA patients 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 JIA patients having a lower physical and psychosocial well-being when compared to their healthy peers. In conclusion the Chilean 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 Chilean parent's version of the Childhood Health Assessment Questionnaire (1) and the Child Health Questionnaire (2) in a cohort of healthy children and in patients with juvenile idiopathic arthritis (JIA) being followed by the Chilean 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 Chilean 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 Chilean 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 126 patients were enrolled, 72 with JIA (29% systemic onset, 39% polyarticular onset, 4% extended oligoarticular subtype, and 28% persistent oligoarticular subtype) and 54 healthy children. The CHAQ-CHQ were completed in 91% of the cases by the mother (mean age  $39.5 \pm 6.7$ ), and in 9% of the cases by the father (mean age  $41.9 \pm 5.9$ ).

### Clinical discriminant validity

Table II reports the results (mean  $\pm$  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 JIA patients having a higher degree of disability, pain, and a lower overall well-being when compared to healthy peers.

Table III reports the CHQ results (mean  $\pm$  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 JIA patients having a lower physical and psychosocial well-being when compared to their healthy peers.

### Cross cultural adaptation

Since the Spanish spoken in Chile is similar to the Spanish spoken in Spain, the Chilean version of the CHAQ-CHQ have been derived from the European Spanish version of the (8, 9). The text of both questionnaires have been adapted with the changing of words whose use is different in Chile with respect to Spain.

### Probe technique

For the 69 lines of the translated CHAQ, most of the lines of translation were understood by more than 80% of the 20 parents tested (median = 100%; range: 35-100%) with the exception of lines 23, 28, 59, 60, 61, 62, 65, 66, and

**Table I.** Demographic and clinical characteristics of the Chilean sample.

	Systemic onset n = 21	Polyarticular onset n = 28	Extended oligoart. n = 3	Persistent oligoart. n = 20	Healthy controls n = 54
Age of the children <sup>1, 2</sup>	10.8 ± 4.0	13.2 ± 3.6	7.6 ± 1.3	11.1 ± 4.2	12.5 ± 4.6
Disease duration <sup>1, 2</sup>	4.8 ± 3.2	5.3 ± 3.4	6.0 ± 1.1	3.0 ± 2.4	
ESR <sup>1, 2</sup>	49.7 ± 40.7	31.3 ± 27.4	22.3 ± 9.3	24.0 ± 22.9	
MD VAS (0-10 cm) <sup>1, 2</sup>	2.3 ± 3.2	2.4 ± 2.1	2.7 ± 2.7	1.5 ± 1.6	
No. swollen joints <sup>1, 3</sup>	2.8 ± 3.1	4.0 ± 4.8	2.3 ± 2.1	0.7 ± 1.2	
No. joints with pain <sup>1, 3</sup>	3.1 ± 4.0	4.2 ± 4.9	1.7 ± 2.9	1.0 ± 1.4	
No. joints with limited range of motion <sup>1, 3</sup>	5.0 ± 4.8	6.7 ± 7.6	2.3 ± 2.1	1.7 ± 2.2	
No. active joints <sup>1, 3</sup>	3.5 ± 3.5	4.6 ± 4.8	2.3 ± 2.1	0.8 ± 1.2	
Female <sup>4</sup>	13 (62%)	18 (64%)	3 (100%)	10 (50%)	26 (48%)
Persistent systemic features <sup>4</sup>	16 (80%)	0	0	0	
Antinuclear antibody <sup>4</sup>	0	6 (21%)	2 (67%)	2 (10%)	
Rheumatoid factor <sup>4</sup>	2 (10%)	4 (15%)	0	0	
Chronic iritis <sup>4</sup>	0	0	1 (33%)	1 (5%)	

<sup>1</sup>Mean ± SD; <sup>2</sup>not significant; <sup>3</sup>ANOVA p < 0.05; <sup>4</sup>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 = 21	Polyarticular onset n = 28	Extended oligoart. n = 3	Persistent oligoart. n = 20	Healthy controls n = 54
Dressing <sup>1</sup>	1.1 ± 1.0	1.5 ± 1.1	0.7 ± 1.2	1.1 ± 1.1	0.4 ± 0.8
Arising <sup>1</sup>	0.7 ± 0.9	0.9 ± 0.9	0.0 ± 0.0	0.7 ± 0.9	0.0 ± 0.0
Eating <sup>1</sup>	0.9 ± 1.1	0.8 ± 0.9	0.3 ± 0.6	0.6 ± 0.8	0.2 ± 0.6
Walking <sup>1</sup>	0.5 ± 0.8	0.5 ± 0.7	0.3 ± 0.6	0.4 ± 0.7	0.0 ± 0.0
Hygiene <sup>1</sup>	1.0 ± 1.1	1.1 ± 0.9	1.0 ± 1.0	0.6 ± 0.9	0.2 ± 0.5
Reach <sup>1</sup>	1.2 ± 1.0	1.3 ± 1.0	0.3 ± 0.6	0.8 ± 0.9	0.1 ± 0.4
Grip <sup>1</sup>	1.3 ± 1.1	1.3 ± 0.9	0.0 ± 0.0	0.6 ± 0.9	0.3 ± 0.8
Activities <sup>1</sup>	0.9 ± 1.1	1.1 ± 1.1	0.7 ± 0.6	1.1 ± 1.1	0.3 ± 0.6
Disability index <sup>1</sup>	1.0 ± 0.9	1.1 ± 0.7	0.4 ± 0.5	0.7 ± 0.6	0.2 ± 0.4
Parent's evaluation of pain <sup>1</sup>	2.1 ± 2.6	3.2 ± 2.6	0.8 ± 0.6	2.5 ± 2.7	0.2 ± 0.4
Parent's evaluation of overall well-being <sup>1</sup>	1.6 ± 2.5	2.4 ± 1.9	0.1 ± 0.1	2.4 ± 2.8	0.2 ± 0.5

<sup>1</sup>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 = 21	Polyarticular onset n = 28	Extended oligoart. n = 3	Persistent oligoart. n = 20	Healthy controls n = 54
Global health (GGH) <sup>1</sup>	49.0 ± 27.0	42.5 ± 18.8	48.3 ± 31.8	56.5 ± 25.1	86.0 ± 16.8
Physical functioning (PF)	61.5 ± 34.7	68.8 ± 29.1	77.8 ± 9.6	60.8 ± 33.6	93.9 ± 19.8
Role/social limitations - Emotional/Behavioural (REB) <sup>1</sup>	71.2 ± 38.8	76.1 ± 26.5	63.0 ± 46.3	68.4 ± 40.8	91.9 ± 21.8
Role/social limitations - Physical (RP) <sup>1</sup>	67.5 ± 39.3	79.6 ± 23.7	61.1 ± 34.7	69.2 ± 37.2	95.1 ± 16.4
Bodily pain/discomfort (BP) <sup>1</sup>	62.4 ± 32.5	56.8 ± 25.5	43.3 ± 5.8	66.5 ± 27.0	90.7 ± 16.1
Behaviour (BE) <sup>1</sup>	75.4 ± 12.2	67.1 ± 21.0	71.1 ± 17.3	62.7 ± 18.6	78.8 ± 18.9
Global behaviour (GBE) <sup>1</sup>	76.0 ± 26.3	64.1 ± 26.4	68.3 ± 14.4	73.5 ± 23.5	82.7 ± 20.9
Mental health (MH) <sup>1</sup>	67.1 ± 16.9	60.8 ± 21.5	65.0 ± 18.0	56.3 ± 18.6	76.7 ± 15.2
Self esteem (SE) <sup>1</sup>	74.8 ± 24.8	69.0 ± 18.3	65.3 ± 19.2	75.4 ± 13.3	84.5 ± 23.1
General health perceptions (GH) <sup>1</sup>	45.5 ± 18.1	45.3 ± 18.3	45.6 ± 21.7	56.7 ± 14.8	78.3 ± 14.0
Change in health (CH) <sup>2</sup>	81.0 ± 32.5	76.8 ± 30.4	66.7 ± 28.9	80.0 ± 29.9	67.2 ± 22.1
Parental impact - Emotional (PE) <sup>1</sup>	52.4 ± 31.0	51.2 ± 29.8	38.9 ± 34.7	47.5 ± 29.4	78.4 ± 26.9
Parental impact - Time (PT) <sup>1</sup>	82.2 ± 33.9	76.7 ± 24.9	77.8 ± 0.0	73.6 ± 33.0	96.1 ± 12.5
Family activities (FA) <sup>1</sup>	77.2 ± 27.2	76.7 ± 20.2	87.5 ± 7.2	77.9 ± 21.4	90.6 ± 13.5
Family cohesion (FC) <sup>1</sup>	72.6 ± 26.5	66.4 ± 25.4	76.7 ± 14.4	68.4 ± 16.5	80.7 ± 15.5
Physical summary score (PhS) <sup>1</sup>	41.6 ± 13.5	45.9 ± 8.5	42.3 ± 4.8	43.8 ± 12.8	54.7 ± 3.0
Psychosocial summary score (PsS) <sup>1</sup>	47.9 ± 7.8	42.2 ± 11.0	43.5 ± 6.5	43.0 ± 7.7	52.0 ± 9.2

<sup>1</sup>ANOVA p < 0.0001.

68 that were understood by less than 80% of the parents. This led to a modification of the sentences without changing their general meaning, with the exception of lines 66 and 68, where it was necessary to complement the original questions for better understanding. For the 99 lines of the translated CHQ, most of the lines of translation were understood by more than 80% of the parents (median = 100%; range: 40-100%) with the exception of lines 16, 24, 40, 45, 48, 61, 69, 70, and 71 that were understood by less than 80% of the parents. This led to a modification of the sentences without changing its general meaning.

#### Psychometric issues

**Descriptive statistics (first Likert assumption).** For the CHAQ the total number of missing responses was 2.8% (range 0.4-5.6) with dressing and activity having more missing values; the response pattern normally distributed with the exception of walking. The mean  $\pm$  SD of the items within a scale were not equivalent for most of the CHAQ domains. All response choices of the CHAQ items have been used except for items in arising, eating, walking, and hygiene. The total number of missing responses on the CHQ was 2.1% (0.0-4.5); the response pattern had most often a normal distribution except RP, and PT. All response choices of the CHQ items have been used. The means  $\pm$  SD of the items within a scale were roughly equivalent except for BE, and GH.

**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, hygiene, and grip, and for all CHQ health concepts except for BE, MH, GH, and PE.

**Items internal consistency (third Likert assumption).** Pearson items scale correlations were 0.4 for 83% of the CHAQ items (except arising, hygiene, and grip), and for 94% of the CHQ items (except BE, MH, and 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 87% of the items (57% by 2 SE); scaling failure was observed only for arising and hygiene. For the CHQ, Pearson items correlations with its scale were greater by at least 1 SE for 97% of the items (78% by 2 SE); scaling failure was observed for BE, and GH.

**Floor and ceiling effect.** The CHAQ floor effect had a median of 82% (range 71-94%) while for the CHQ the median was 1% (range 0-7%). The CHAQ ceiling effect had median of 0.0% (range 0-1%) while the CHQ had a median of 32% (range 0-63%).

**Cronbach's alpha internal consistency.** Cronbach's alpha was 0.7 for 5/8 domains of the CHAQ (median of 0.8; range 0.4-0.9) with the exception being arising (0.4), eating (0.6), and hygiene (0.65). 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 0.8; range 0.8-0.95).

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

**Test-retest reliability.** After a median of 7 days (range 6-14; number of JIA patients re-tested = 9) the intra-class correlation coefficients for the 8 CHAQ domains showed a median of 0.9 (range 0.5-1.0) while for the 15 CHQ health concepts the median was 0.8 (range 0.4-1.0).

**External validity.** The Spearman correlation of the CHAQ with the JIA core set variables (10) showed a median of 0.4 (range 0.3 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 with the JIAcore set variables was for the PhS -0.3 (range -0.7 to -0.2) and for the PsS was -0.1 (range -0.4 to -0.2). The best correlation was for the PhS with the DI of the CHAQ ( $r = -0.7$ ), and for the PsS with the parent's evaluation of overall well being ( $r = -0.4$ ).

#### Discussion

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

In this study the Chilean CHAQ was derived from the European Spanish version of the CHAQ with changing of the few words whose use is different in the 2 countries. This disease-specific questionnaire proved its ability to clinically discriminate between the JIA subtypes and healthy controls, with the JIA patients having a higher degree of disability, pain, and a lower overall well-being when compared to their healthy peers. The most problematic domains from a psychometric point of view were arising, eating and hygiene. This might be related idiosyncratic or cultural problem related with the autonomy that parents give to their children since Chilean parents tend to overprotect their children.

In this study the Chilean CHQ was derived from the European Spanish version of the CHQ with changing of the few words whose use is different in the 2 countries. The generic CHQ questionnaire proved less able to clinically discriminate between the different JIA types than the CHAQ; patients with JIA showed a lower physical and psychological well being when compared to their healthy peers. Some minor statistical problems were found for BE, MH, and GH. Interestingly, the Chilean items in GH showed the same problems described in the original American CHQ (low item discriminant validity); this is thought to be due to the difficulty in asking questions about

generic concepts such as general health perception. About BE, there was a general rejection of lines 44 and 45, that were considered offensive.

In conclusion, the Chilean 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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