

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

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Supported by a grant from the European Union (BMH4-983531 CA), and by IRCCS Policlinico S. Matteo (Pavia, Italy).

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Clin Exp Rheumatol 2001; 19 (Suppl. 23): S86-S90.

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Key words: Hebrew Childhood Health Assessment Questionnaire (CHAQ), Hebrew 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 Hebrew 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 Hebrew CHAQ-CHQ were fully developed with 3 forward and 3 backward translations. A total of 144 subjects were enrolled: 80 patients with JIA (12% systemic onset, 34% polyarticular onset, 23% extended oligoarticular subtype, and 31% persistent oligoarticular subtype) and 64 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 JIA patients having a lower physical and psychosocial well-being when compared to their healthy peers.

In conclusion the Hebrew 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 Hebrew 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 Israeli 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 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 Hebrew version of the CHAQ-

CHQ, with the corresponding lines of the original American-English questionnaires marked in the right column, is reproduced at the end of this paper. In brief, after obtaining ethics committee 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 Israeli 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 144 subjects were enrolled: 80 patients with JIA (12% systemic onset, 34% polyarticular onset, 23% extended oligoarticular subtype, and 31% persistent oligoarticular subtype) and 64 healthy children. The CHAQ-CHQ were completed in 77% of the cases by the mother (mean age 39.5 ± 6.2), and in 13% of the cases by the father (mean age 42.1 ± 6.6).

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 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 \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 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 Hebrew 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 44/69 (64%) lines of the translations. The Hebrew CHQ 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 64/99 (65%) lines of the translations.

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

	Systemic onset n = 10	Polyarticular onset n = 27	Extended oligoart. n = 18	Persistent oligoart. n = 25	Healthy controls n = 64
Age of the children ^{1,2}	8.3 ± 3.5	12.7 ± 4.6	9.2 ± 5.0	8.4 ± 3.8	10.7 ± 4.1
Disease duration ¹	3.0 ± 2.3	4.8 ± 4.9	3.6 ± 2.6	4.2 ± 3.5	
ESR ^{1,2}	67.1 ± 31.6	38.5 ± 33.5	27.9 ± 17.6	21.5 ± 17.2	
MD VAS (0-10 cm) ^{1,2}	5.6 ± 2.7	3.2 ± 2.8	2.5 ± 1.8	1.7 ± 1.9	
No. swollen joints ^{1,2}	4.4 ± 7.5	4.2 ± 4.9	2.9 ± 2.8	0.7 ± 0.7	
No. joints with pain ^{1,2}	5.7 ± 7.6	4.8 ± 6.0	3.2 ± 3.6	0.6 ± 0.9	
No. joints with limited range of motion ^{1,2}	5.6 ± 6.5	6.5 ± 9.0	3.9 ± 4.5	0.7 ± 0.9	
No. active joints ^{1,2}	5.0 ± 7.6	5.5 ± 5.1	3.8 ± 3.6	0.8 ± 0.8	
Female ³	5 (50%)	22 (81%)	13 (72%)	18 (72%)	31 (48%)
Persistent systemic features ³	9 (100%)				
Antinuclear antibody ³		6 (23%)	10 (56%)	13 (54%)	
Rheumatoid factor ³		3 (12%)			
Chronic iritis ³			3 (17%)	6 (24%)	

¹Mean ± SD; ²ANOVA p < 0.05 (except for disease duration where p=0.57); ³number 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 = 10	Polyarticular onset n = 27	Extended oligoart. n = 18	Persistent oligoart. n = 25	Healthy controls n = 64
Dressing	0.9 ± 1.0	0.6 ± 0.9	0.6 ± 0.9	0.5 ± 0.7	0.4 ± 0.8
Arising	1.0 ± 1.1	0.7 ± 0.9	0.4 ± 0.7	0.3 ± 0.6	0.1 ± 0.4
Eating	0.3 ± 0.7	0.6 ± 1.0	0.4 ± 0.9	0.2 ± 0.5	0.2 ± 0.4
Walking	0.7 ± 1.1	0.3 ± 0.8	0.5 ± 0.9	0.4 ± 0.7	0.0 ± 0.1
Hygiene	1.0 ± 1.0	0.5 ± 0.9	0.1 ± 0.5	0.2 ± 0.6	0.1 ± 0.5
Reach	0.8 ± 1.0	1.0 ± 1.1	0.5 ± 0.6	0.2 ± 0.4	0.1 ± 0.3
Grip	0.6 ± 1.0	0.8 ± 1.0	0.5 ± 0.8	0.2 ± 0.4	0.1 ± 0.4
Activities	1.1 ± 1.0	1.0 ± 1.0	0.8 ± 0.8	0.4 ± 0.7	0.3 ± 0.5
Disability index	0.9 ± 0.9	0.7 ± 0.7	0.5 ± 0.6	0.3 ± 0.4	0.2 ± 0.3
Parent's evaluation of pain	5.3 ± 2.8	2.6 ± 2.7	2.3 ± 3.3	1.9 ± 2.5	0.1 ± 0.5
Parent's evaluation of overall well-being	3.8 ± 2.6	2.9 ± 3.0	1.9 ± 2.0	1.1 ± 1.7	0.2 ± 1.1

ANOVA p < 0.001 for all variables except dressing (p = 0.52) and eating (p = 0.11).

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

	Systemic onset n = 10	Polyarticular onset n = 27	Extended oligoart. n = 18	Persistent oligoart. n = 25	Healthy controls n = 64
Global health (GGH)	48.0 ± 21.0	56.5 ± 25.4	65.6 ± 24.5	74.4 ± 24.7	92.3 ± 12.2
Physical functioning (PF)	68.4 ± 23.1	77.0 ± 23.7	79.6 ± 21.6	85.6 ± 19.6	97.2 ± 12.2
Role/social limitations - Emotional/Behavioural (REB)	87.5 ± 13.8	82.1 ± 27.0	90.8 ± 18.9	96.0 ± 10.1	99.3 ± 3.4
Role/social limitations - Physical (RP)	79.2 ± 24.8	84.7 ± 25.0	85.3 ± 24.2	92.7 ± 16.0	98.7 ± 7.5
Bodily pain/discomfort (BP)	38.0 ± 14.0	61.9 ± 22.0	63.9 ± 19.7	64.0 ± 25.5	92.7 ± 14.3
Behaviour (BE)	71.9 ± 12.6	73.3 ± 16.0	72.5 ± 15.0	82.8 ± 14.3	83.8 ± 14.6
Global behaviour (GBE)	78.3 ± 14.6	73.1 ± 25.3	77.9 ± 19.7	83.4 ± 22.4	87.6 ± 14.9
Mental health (MH)	65.0 ± 22.8	67.1 ± 17.3	69.9 ± 17.9	77.1 ± 16.9	80.1 ± 9.2
Self esteem (SE)	73.4 ± 11.3	75.3 ± 18.4	81.8 ± 24.8	85.7 ± 15.3	90.9 ± 11.2
General health perceptions (GH)	43.0 ± 23.1	52.0 ± 19.4	61.3 ± 15.0	67.0 ± 18.2	77.8 ± 13.3
Change in health (CH)	58.3 ± 35.4	53.7 ± 35.2	68.1 ± 30.7	67.0 ± 32.0	62.7 ± 22.8
Parental impact - Emotional (PE)	48.8 ± 30.6	51.9 ± 29.6	55.6 ± 33.7	71.5 ± 23.7	87.2 ± 14.9
Parental impact - Time (PT)	71.1 ± 25.8	73.7 ± 26.5	80.9 ± 23.7	88.4 ± 13.4	95.3 ± 10.2
Family activities (FA)	69.2 ± 20.3	73.6 ± 24.0	80.6 ± 18.5	85.7 ± 19.7	91.9 ± 12.4
Family cohesion (FC)	66.0 ± 34.5	72.6 ± 26.2	74.4 ± 27.1	76.4 ± 24.4	84.2 ± 17.3
Physical summary score (PhS)	46.0 ± 6.4	48.0 ± 8.9	49.4 ± 7.2	50.8 ± 5.1	54.6 ± 3.3
Psychosocial summary score (PsS)	44.9 ± 7.5	45.7 ± 9.4	47.8 ± 9.9	52.3 ± 7.0	54.6 ± 6.2

ANOVA p < 0.001 except for CH (p = 0.42), and FC (p = 0.058).

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 Hebrew CHAQ was necessary after probe technique. One word in the Hebrew CHQ (worry in line 76) was changed, since the Hebrew word in the first version had another meaning misunderstood by 15% of the parents.

Psychometric issues

Descriptive statistics (first Likert assumption). For the CHAQ the total number of missing responses was 5.2% (range 0.7-10.6) with dressing, eating, and activity having more missing values; the response pattern was skewed towards normal functional ability for most of the CHAQ domains. All response choices of the CHAQ items were used only for arising and activity. The mean \pm SD of the items within a scale were usually not equivalent for all CHAQ domains. The total number of missing responses on the CHQ was 1.9 (range: 0.0-4.2) mainly in the RP, and SE health concept; the response pattern was usually normally distributed except for PF, REB, and RP. All response choices of the CHQ items were used except for BE, MH, SE, and FA. The mean \pm 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 eating, hygiene, and grip, and for all CHQ health concepts except for BE, MH, SE, and GH.

Items internal consistency (third Likert assumption). Pearson items scale correlations were 0.4 for 83% of the CHAQ items (except for eating, hygiene, and grip) and for 88% 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 83% of the items (35% by 2 SE); scaling failure was observed for eating, and hygiene, 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 93% of the items (66% by 2 SE); scaling failure was observed only for BE, and GH.

Floor and ceiling effect. The CHAQ floor effect had a median of 84% (range 64-92%) while the median for the CHQ was 0.0% (range 0.0-4.4%). The CHAQ ceiling effect had a median of 0.0% (range 0.0-1.2) while the CHQ had a median of 37% (range 3-83%).

Cronbach's alpha internal consistency. Cronbach's alpha was 0.7 for 7/8 domains of the CHAQ (overall 0.96; range 0.4-0.91) with the

exception of eating (0.4). Cronbach's alpha was 0.7 for 10/11 measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (overall 0.95; range 0.6-0.93) with the exception of GH (0.6).

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 arising, and walking for the CHAQ domains. For CHQ all 11 measurable health concepts had a lower correlation than their Cronbach's alpha except for MH.

Test-retest reliability. After a median of 7 days (range 7-7; number of JIA patients re-tested = 7) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility with a median of 0.9 (range -0.1;1.0; exception walking = -0.1). Also the 15 CHQ health concepts showed a fair to good reproducibility with a median of 0.9 (range -0.1;1.0; exception RP = -0.1).

External validity. The Spearman correlation of the CHAQ with the JIA core set variables (8) showed a median of 0.4 (range 0.4 to 0.7); the best correlation being was with the parent's evaluation of overall well-being ($r = 0.7$). For the CHQ the median correlation for the PhS was -0.4 (range -0.6 to -0.2), and for the PsS -0.4 (range -0.5 to -0.2). The best correlation was with the parent's evaluation of overall well-being both for the PhS (-0.6) and the PsS (-0.5).

Discussion

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

In this study the Hebrew 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 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. The two most problematic domains were eating and hygiene, which showed problems for internal consistency and discriminant validity. Cronbach's alpha was less than the standard 0.7 only for eating.

In this study the Hebrew 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 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 item internal consistency, and discriminant validity for BE, MH, and GH. There were several unique issues in transla-

tion of the CHAQ-CHQ to Hebrew. First, Hebrew as a Semitic language is written from right to left. Second, Hebrew verbs are gender specific and have different single and plural forms. In order to simplify the translation, all verbs were written as male and single and appropriate comments were added to the instructions to include females and plural forms (line 3 in the CHAQ and line 9a in the CHQ). Finally, in general, Hebrew has fewer adjectives than English. Therefore, several words in Hebrew have more than one possible meaning. This made our choice of words more difficult, and partially explains the concordance of only 2/3 of the back translations to the original American-English version.

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

Acknowledgements

We are indebted to Dr. J. Landgraf *et al.*, developers of the CHQ, to Dr. Luciana Gado-West reviewer of the CHAQ, to Dr. Anna Tortorelli for data entry, and to the committee that prepared and reviewed the forward and backward translations.

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