The German 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 German 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 German CHAQ was fully validated with 3 forward and 3 backward translations, while the CHQ has already been published and therefore it was revalidated. A total of 197 subjects were enrolled: 142 patients with JIA (5% systemic onset, 13% polyarticular onset, 8% extended oligoarticular subtype, and 74% persistent oligoarticular subtype) and 55 healthy children. The CHAQ clinically discriminated between healthy subjects and JIA patients, with the 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 polyarticular onset and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

In conclusion the German versions of the CHAQ-CHQ are reliable, and valid tools 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 German parent's version of the Childhood Health Assessment Questionnaire (1) and Child Health Questionnaire (2) in a cohort of healthy children and in patients with juvenile idiopathic arthritis (JIA) being followed by the German 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 German versions of the CHAQ-CHQ, with the corresponding lines of the original American-English questionnaires marked in the left column,are 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 German 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 were healthy children (6 to 18 years of age) attending local schools or healthy siblings of the JIA participants.

Demographic and clinical characteristics of the subjects (Table I).

A total of 170 subjects were enrolled: 141 patients with JIA (5% systemic onset, 13% polyarticular onset, 8% extended oligoarticular subtype, and 74% persistent oligoarticular subtype) and 29 healthy children; the JIAsample had a high prevalence of the oligoarticular subtype reflecting the frequency of patient groups in the participating centres. The CHAQ-CHQ were completed in 93% of the cases by the mother (mean age 36.7± 6.7),and in 7% of the cases by the father (mean age 44.8 ± 6.5).

Clinical discriminant validity

Table II reports the results (mean ± SD) for the 8 CHAQ domains, the disability index (DI) and the 2 visual analogue scale (VAS) scores for parental assessment of pain and overall well-being. The CHAQ clinically discriminated between healthy subjects and JIA patients, with the 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 polyarticular onset and extended oligoarticular subtypes having a lower physical and psychosocial well-being when compared to their healthy peers.

Cross cultural adaptation

The German CHAQ was fully cross-culturally

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

	Systemic onset n = 7	Polyarticular onset n = 19	Extended oligoart. n = 11	Persistent oligoart. n = 105	Healthy controls n = 55
Age of the children[1]	7.3 ± 4.4	10.7 ± 3.3	9.1 ± 4.7	8.7 ± 4.2	8.1 ± 3.2
Disease duration[1, 2]	3.9 ± 3.4	1.9 ± 1.8	3.1 ± 3.5	1.8 ± 1.9	
ESR[1]	21.2 ± 13.2	28.1 ± 18.2	21.3 ± 25.0	16.2 ± 16.2	
MD VAS (0-10 cm)[1, 2]	0.6 ± 1.2	2.5 ± 2.4	1.6 ± 1.8	0.3 ± 0.6	
No. swollen joints[1, 2]	0.3 ± 0.5	8.1 ± 11.1	1.6 ± 2.0	0.8 ± 1.1	
No. joints with pain[1, 2]	0.0 ± 0.0	9.7 ± 13.9	0.5 ± 1.2	0.4 ± 1.2	
No. joints with limited range of motion[1, 2]	0.6 ± 0.5	11.6 ± 10.1	2.9 ± 3.0	1.5 ± 1.7	
No. active joints[1, 2]	0.3 ± 0.5	10.6 ± 12.7	1.7 ± 2.3	0.9 ± 1.2	
Female[3]	2 (29%)	16 (84%)	8 (73%)	48 (46%)	20 (37%)
Persistent systemic features[3]	4 (57%)	0	0	0	
Antinuclear antibody[3]	1 (14%)	5 (29%)	4 (36%)	37 (37%)	
Rheumatoid factor[3]	0	1 (6%)	0	5 (5%)	
Chronic iritis[3]	0	0	2 (18%)	10 (10%)	

[1]Mean ± SD; [2]ANOVA $p < 0.05$; [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 = 7	Polyarticular onset n = 19	Extended oligoart. n = 11	Persistent oligoart. n = 105	Healthy controls n = 55
Dressing	0.0 ± 0.0	0.7 ± 0.9	0.6 ± 0.9	0.5 ± 0.9	0.5 ± 0.9
Arising[1]	0.4 ± 0.8	0.7 ± 1.0	0.3 ± 0.6	0.3 ± 0.6	0.0 ± 0.3
Eating	0.0 ± 0.0	0.6 ± 0.9	0.5 ± 0.8	0.3 ± 0.7	0.2 ± 0.6
Walking[1]	0.3 ± 0.8	0.5 ± 0.8	0.6 ± 1.0	0.3 ± 0.6	0.0 ± 0.1
Hygiene	0.0 ± 0.0	0.5 ± 0.8	0.6 ± 1.1	0.4 ± 0.7	0.2 ± 0.5
Reach[1]	0.1 ± 0.4	0.8 ± 0.8	0.8 ± 1.1	0.3 ± 0.6	0.1 ± 0.2
Grip[1]	0.0 ± 0.0	1.1 ± 1.0	0.9 ± 0.9	0.2 ± 0.5	0.1 ± 0.4
Activities[1]	0.3 ± 0.5	0.8 ± 1.0	1.0 ± 0.9	0.6 ± 0.8	0.3 ± 0.7
Disability index[1]	0.2 ± 0.3	0.7 ± 0.7	0.7 ± 0.7	0.4 ± 0.5	0.2 ± 0.3
Parent's evaluation of pain[1]	1.5 ± 3.7	3.0 ± 2.9	3.1 ± 2.9	2.0 ± 2.4	0.2 ± 1.0
Parent's evaluation of overall well-being[1]	0.7 ± 1.8	3.3 ± 2.7	2.6 ± 2.7	1.7 ± 2.1	0.4 ± 1.1

[1]ANOVA $p < 0.05$.

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 = 7	Polyarticular onset n = 19	Extended oligoart. n = 11	Persistent oligoart. n = 105	Healthy controls n = 55
Global health (GGH)[1]	73.0 ± 18.6	40.6 ± 18.2	47.1 ± 16.0	62.9 ± 22.9	83.3 ± 19.1
Physical functioning (PF)[1]	73.3 ± 42.0	73.5 ± 20.1	71.5 ± 32.6	84.6 ± 21.7	98.1 ± 4.6
Role/social limitations - Emotional/Behavioural (REB)[1]	83.3 ± 33.3	82.4 ± 20.4	85.7 ± 22.0	86.5 ± 20.9	96.6 ± 11.5
Role/social limitations - Physical (RP)[1]	100.0 ± 0.0	78.4 ± 24.8	78.6 ± 28.4	89.2 ± 21.2	97.9 ±7.2
Bodily pain/discomfort (BP)[1]	72.0 ± 40.9	41.8 ± 24.3	57.5 ± 35.4	63.9 ± 30.6	91.5 ± 17.5
Behaviour (BE)[1]	67.3 ± 32.6	80.3 ± 11.8	69.1 ± 15.8	70.4 ± 14.6	77.0 ± 13.1
Global behaviour (GBE)	78.0 ± 31.9	77.5 ± 20.2	63.3 ± 20.4	70.8 ± 20.1	79.4 ± 16.0
Mental health (MH)[1]	85.9 ± 5.7	72.9 ± 14.9	70.6 ± 19.9	75.7 ± 14.3	83.0 ± 9.6
Self esteem (SE)[1]	89.6 ± 12.5	68.1 ± 16.7	72.9 ± 22.3	77.0 ± 18.9	86.2 ± 15.9
General health perceptions (GH)[1]	26.3 ± 13.5	39.4 ± 16.7	42.4 ± 18.2	52.2 ± 20.2	72.2 ± 17.5
Change in health (CH)[1]	80.0 ± 20.9	33.8 ± 38.5	59.4 ± 39.9	56.6 ± 30.6	55.0 ± 17.6
Parental impact – Emotional (PE)[1]	70.0 ± 38.0	41.1 ± 18.8	36.5 ± 25.6	54.1 ± 28.5	78.3 ± 20.4
Parental impact - Time (PT)[1]	72.2 ± 36.0	68.9 ± 31.2	62.5 ± 38.5	72.2 ± 27.4	88.3 ± 15.6
Family activities (FA)	83.3 ± 25.7	76.4 ± 22.5	71.9 ± 33.8	79.4 ± 21.2	87.2 ± 15.8
Family cohesion (FC)	66.3 ± 12.5	66.0 ± 12.8	74.3 ± 13.4	67.2 ± 19.2	75.8 ± 17.5
Physical summary score (PhS)[1]	50.3 ± 4.0	45.2 ± 6.7	46.7 ± 7.8	49.4 ± 7.8	54.3 ± 2.8
Psychosocial summary score (PsS)[1]	51.6 ± 5.0	45.8 ± 5.7	46.0 ± 6.6	46.2 ± 7.6	52.6 ± 5.7

[1]ANOVA $p < 0.05$.

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 34/69 (49%) lines of the translations. The German CHQ was already 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: 90-100%). 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: 85-100%). No change in the text of the German 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 6.9% (range 1.8-17.6%) with dressing having more than 10% missing values; the response pattern were skewed towards normal functional ability. All response choices of the CHAQ items have been used except for response choices in eating, hygiene, reach,and grip. The mean ± SD of the items within a scale were roughly equivalent except for dressing, eating, and reach. The total number of missing responses on the CHQ was 10.3% (range:8.1-13.2%) most of the health concepts having a frequency of missing higher than 10%; the response pattern was most often normally distributed except for PF, REB, RP. All response choices of the CHQ items have been used except for BE,and MH. The means ± SD of the items within a scale were roughly equivalent except for BE, and MH.

Equal items-scale correlation (second Likert assumption). Pearson items-scale correlations corrected for overlap were roughly equivalent for items within a scale for most of the CHAQ domains except for eating, hygiene, reach, grip, and activities, and for most CHQ health concepts except for BE, MH, SE, and GH.

Items internal consistency (third Likert assumption). Pearson items scale correlations were ≥ 0.4 for 67% of the CHAQ items (except hygiene, reach, grip), and for 90% of the CHQ items (except BE, MH).

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 69% of the items (42% by 2 SE); scaling failure was observed for dressing, hygiene, reach,and grip, 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 96% of the items (71% by 2 SE); scaling failure was observed for SE.

Floor and ceiling effect. The CHAQ floor effect had a median of 85% (range 71-94%) while for the CHQ the median was 0.0% (range 0-10%). The CHAQ ceiling effect had median of 0.5% (range 0.0-0.9) while the CHQ had a median of 17% (range 0-72%).

Cronbach's alpha internal consistency. Cronbach's alpha was ≥ 0.7 for 5/8 (63%) domains of the CHAQ (overall 0.93; range 0.39-0.92) with the exception being eating (0.55), reach (0.39), and grip (0.41). Cronbach's alpha was ≥ 0.7 for 10/11 (91%) measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (overall 0.94; range 0.58-0.90) with the exception being GH (0.58).

Inter scale correlation. The Pearson correlation of each domain with all other domains of the CHAQ-CHQ was higher than their Cronbach's alpha for most the CHAQ domains except walking, and activities. 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 6-8 days; number of JIA patients retested = 9) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility with a median of 0.6 (range -0.12 to 1.0) with a poor reproducibility for arising (-0.12), reach (0.11), and activity (0.23). Also the 15 CHQ health concepts showed a fair to good reproducibility with a median of 0.9 (range 0.4-0.9).

External validity. The Spearman correlation of the CHAQ with the JIA core set variables (8) showed a median of 0.3 (range 0.2 to 0.4), with the highest correlation being with the parent's evaluation of overall well being (r = 0.4). For the CHQ the median correlation was for the PhS -0.4 (range -0.7 to -0.2) and for the PsS was -0.1 (range -0.5 to -0.1). The best correlation was with the parent's evaluation of overall well being for both the PhS (-0.7) and the PsS (-0.5).

Discussion

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

In this study the German CHAQ was fully cross-culturally adapted from the original American English version with 3 forward and 3 backward translations. Although the JIA sample had a higher prevalence of the oligoarticular subtype in comparison to the subtype distribution of the other countries (6) and the healthy controls showed a high prevalence of male children, the disease-specific questionnaire proved its ability to clinically discriminate between the JIAsubtypes and healthy controls, with the polyarticular and extended oligoarticular subtypes having a higher degree of disability, pain, and a lower overall well-being when compared to their healthy peers. Minor statistical problems were found for eating, hygiene, reach, and grip which showed different means ± SD, an unequal item scale correlation, and problems for discriminant validity, Cronbach s alpha,and test re-test reliability.

The German CHQ was already 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 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 equal item scale correlation, the item internal consistency, and discriminant validity for BE, MH, and SE.

In conclusion, the German versions of the CHAQ-CHQ are reliable and valid tools for the functional, physical and psychosocial assessment of children with JIA.

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