## The Swiss German and Swiss French versions of the Childhood Health Assessment Questionnaire (CHAQ) and the Child Health Questionnaire (CHQ)

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#### ABSTRACT

We report herein the results of the cross-cultural adaptation and validation into the Swiss German and Swiss French languages of the parent's ver sion of two health related quality of life instru ments. The Childhood Health Assessment Ques tionnaire (CHAQ) is a disease specific health in strument that measures functional ability in daily living activities in children with juvenile idio pathic arthritis (JIA). The Child Health Ques tionnaire (CHQ) is a generic health instrument designed to capture the physical and psychoso cial well-being of children independently from the underlying disease. The Swiss German and Swiss French CHAQ-CHQ were adapted from the German and French versions of the CHAQ-CHQ, and revalidated in this study. A total of 147 sub jects were enrolled: 85 patients with JIA (22% systemic onset,31% polyarticular onset,32% ex tended oligoarticular subtype, and 15% persis tent oligoarticular subtype) and 62 healthy chil dren. The CHAQ clinically discriminated be tween healthy subjects and JIA patients, with the systemic, polyarticular and extended oligoarticu lar subtypes having a higher de gree of disability, pain, and a lower overall well-being when com pared to their healthy peers. Also the CHQ clini cally discriminated between healthy subjects and JIA patients, with the systemic onset, polyarticu lar onset and extended oligoarticular subtypes having a lower physical and psychosocial wellbeing when compared to their healthy peers. In conclusion the Swiss German and Swiss French 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 Swiss German and Swiss French parent's versions 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 Swiss German and Swiss French 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). Thecomplete Swiss German and Swiss French 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 Swiss German and Swiss French members of PRINTO. Patients included children with JIA of either systemic onset, polvarticular 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 147 subjects were enrolled: 85 patients with JIA (22% systemic onset, 31% polyarticular onset, 32% extended oligoarticular subtype, and 15% persistent oligoarticular subtype) and 62 healthy children. The CHAQ-CHQ were completed in 84% of the cases by the mother (mean age  $40.9 \pm 4.6$ ), and in 16% of thecases by the father(mean age  $45.3 \pm 7.0$ ). *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 Swiss German and Swiss French versions of the CHAQ-CHQ have been derived from the German and French versions of the CHAQ-CHQ (2,8,9) with changing of the few words whose use is different in Switzerland with respect to France and Germany. The Swiss German and Swiss French CHAQ CHQ were fully revalidated in this study.

## Probe technique

For the 69 lines of the translated Swiss French

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	Systemic onset $n = 19$	Polyarticular onset $n = 26$	Extended oligoart. n = 27	Persistent oligoart. n = 13	Healthy controls n=62
Age of the children <sup>1,2</sup>	$13.6 \pm 5.0$	8.7 ± 4.4	$8.7 \pm 4.8$	8.8 ± 3.6	11.7 ± 4.6
Disease duration <sup>1, 2</sup>	$5.7 \pm 4.0$	$2.4 \pm 2.0$	$3.1 \pm 2.8$	$3.3 \pm 3.5$	
ESR <sup>1</sup>	$28.9\pm24.2$	$22.1 \pm 19.7$	$19.4 \pm 20.4$	$12.7 \pm 12.4$	
MD VAS (0-10 cm) <sup>1,2</sup>	$1.7 \pm 1.6$	$3.2 \pm 1.9$	$1.7 \pm 1.4$	$1.1 \pm 0.8$	
No. swollen joints <sup>1,2</sup>	$2.2 \pm 2.7$	$10.1 \pm 12.0$	$1.9 \pm 1.9$	$0.7\pm0.8$	
No. joints with pain <sup>1, 2</sup>	$3.2\pm5.0$	$11.4 \pm 15.9$	$1.7 \pm 3.3$	$1.4 \pm 1.8$	
No. joints with limited range of motion <sup>1,2</sup>	$10.8\pm16.0$	$12.4 \pm 13.4$	$3.0 \pm 5.9$	$1.5 \pm 1.2$	
No. active joints <sup>1, 2</sup>	$3.4 \pm 4.2$	$11.9 \pm 13.2$	$2.1 \pm 2.1$	$1.3 \pm 1.3$	
Female <sup>3</sup>	14 (74%)	22 (85%)	19 (70%)	12 (92%)	27 (44%)
Persistent systemic features <sup>3</sup>	9 (47%)	0	0	0	
Antinuclear antibody <sup>3</sup>	2 (11%)	11 (44%)	14 (54%)	8 (62%)	
Rheumatoid factor <sup>3</sup>	0	0	0	0	
Chronic iritis <sup>3</sup>	0	1 (4%)	7 (27%)	2 (15%)	
<sup>1</sup> Mean $\pm$ SD; <sup>2</sup> ANOVA p < 0.01; <sup>3</sup> number and	percentage.				

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

**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  $\pm$  SD.

	Systemic onset $n = 19$	Polyarticular onset $n = 26$	Extended oligoart. n = 27	Persistent oligoart. n = 13	Healthy controls n =62
Dressing	$0.9 \pm 1.2$	$1.0 \pm 1.2$	$0.2 \pm 0.7$	$0.4 \pm 0.5$	$0.3 \pm 0.6$
Arising	$0.8 \pm 1.2$	$0.7\pm0.9$	$0.3 \pm 0.7$	$0.2 \pm 0.4$	$0.0 \pm 0.0$
Eating	$0.5 \pm 1.1$	$0.7\pm0.9$	$0.3 \pm 0.7$	$0.0 \pm 0.0$	$0.0 \pm 0.2$
Walking	$0.7 \pm 1.2$	$0.8 \pm 1.0$	$0.6 \pm 0.9$	$0.2 \pm 0.6$	$0.0 \pm 0.3$
Hygiene	$0.8 \pm 1.2$	$0.6 \pm 1.0$	$0.2 \pm 0.7$	$0.3 \pm 0.6$	$0.1 \pm 0.4$
Reach	$0.7 \pm 1.2$	$1.2 \pm 1.1$	$0.3 \pm 0.6$	$0.2 \pm 0.4$	$0.0 \pm 0.3$
Grip	$0.4 \pm 0.7$	$0.8 \pm 1.1$	$0.2 \pm 0.7$	$0.2 \pm 0.6$	$0.0 \pm 0.3$
Activities	$1.3 \pm 1.4$	$1.0 \pm 1.1$	$0.6 \pm 0.9$	$0.5 \pm 0.7$	$0.1 \pm 0.4$
Disability index	$0.8 \pm 1.0$	$0.8 \pm 0.8$	$0.3 \pm 0.5$	$0.3 \pm 0.3$	$0.1 \pm 0.2$
Parent's evaluation of pain	$1.9 \pm 2.2$	$3.1 \pm 2.3$	$1.8 \pm 2.4$	$2.5 \pm 3.1$	$0.3 \pm 1.5$
Parent's evaluation of overall well-being	$1.9 \pm 1.9$	$2.3\pm1.7$	$1.7\pm2.3$	$1.8\pm2.2$	$0.1\pm0.2$
ANOVA $p < 0.01$ 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  $\pm$  SD.

	Systemic onset n = 19	Polyarticular onset $n = 26$	Extended oligoart. n = 27	Persistent oligoart. n = 13	Healthy controls n =62
Global health (GGH) <sup>1</sup>	77.9 ± 25.3	55.2 ± 25.6	$64.8 \pm 18.8$	69.6 ± 19.9	89.8 ± 12.2
Physical functioning (PF) <sup>1</sup>	$76.1 \pm 31.4$	$69.6 \pm 29.3$	$84.6 \pm 18.8$	$79.5 \pm 20.2$	$99.2 \pm 3.3$
Role/social limitations - Emotional/Behavioural (REB) <sup>1</sup>	$92.0\pm21.5$	86.1 ± 23.9	$85.4\pm22.8$	$84.3\pm21.9$	96.7 ± 11.1
Role/social limitations - Physical (RP) <sup>1</sup>	$88.9\pm20.6$	$72.9 \pm 31.0$	$82.6\pm28.0$	$83.3 \pm 17.4$	$97.3\pm8.7$
Bodily pain/discomfort (BP) <sup>1</sup>	$66.3\pm28.5$	$52.4 \pm 28.8$	$62.6\pm28.5$	$65.4 \pm 24.0$	$88.5\pm15.7$
Behaviour (BE) <sup>1</sup>	$85.8 \pm 14.4$	$77.4 \pm 17.4$	$71.6 \pm 15.2$	$74.1 \pm 17.5$	$81.4 \pm 12.7$
Global behaviour (GBE)1	$85.0 \pm 19.1$	$78.5 \pm 23.0$	$75.6 \pm 17.7$	$69.2 \pm 23.1$	$84.7 \pm 14.2$
Mental health (MH)	$78.4 \pm 18.0$	$70.7 \pm 19.4$	$70.4 \pm 16.9$	$70.0 \pm 14.3$	$78.0\pm13.1$
Self esteem (SE)	$80.6\pm20.5$	$76.3 \pm 16.4$	$78.4 \pm 16.4$	$77.3 \pm 21.3$	$85.0 \pm 12.4$
General health perceptions (GH) <sup>1</sup>	$54.9 \pm 16.1$	$58.3 \pm 16.0$	$56.9 \pm 17.4$	$61.3 \pm 18.9$	$82.8 \pm 11.0$
Change in health (CH)	$73.7\pm30.6$	$56.7\pm35.7$	$61.1\pm35.6$	$50.0\pm27.0$	$53.3 \pm 14.2$
Parental impact - Emotional (PE) <sup>1</sup>	$77.8\pm21.4$	$61.5 \pm 21.1$	$53.1 \pm 27.7$	$59.0 \pm 30.3$	$85.3 \pm 18.8$
Parental impact - Time (PT)	$43.3\pm40.4$	$60.0\pm32.6$	$59.4\pm30.6$	$53.0\pm37.2$	$60.2\pm43.4$
Family activities (FA) <sup>1</sup>	$84.2\pm17.6$	$78.2\pm20.7$	$79.2 \pm 19.0$	$76.6 \pm 21.3$	$90.9 \pm 14.9$
Family cohesion (FC) <sup>1</sup>	$80.0\pm20.1$	$74.2 \pm 13.6$	$65.6\pm22.5$	$78.5 \pm 13.4$	$80.2 \pm 14.1$
Physical summary score (PhS) <sup>1</sup>	$47.2 \pm 9.5$	$45.1 \pm 10.5$	$48.9\pm8.0$	$47.7 \pm 6.2$	$54.4 \pm 3.0$
Psychosocial summary score (PsS) <sup>1</sup>	$51.5\pm9.2$	$47.4\pm8.8$	$44.9\pm7.8$	$46.9\pm8.1$	$51.7\pm6.6$

 $^{1}$ ANOVA p < 0.01.

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CHAQ, all the lines of translation were understood by more than 80% of the 20 French parents tested (median =100%; range: 70-100%) with the only exception being line 65 that was understood by 70% of the parents. The German CHAO was understood > 80% of the 20 German parents tested (median = 100%; range:85-100%). For the 99 lines of the translated Swiss French CHQ, all the lines of translation were understood > 80% of the French parents tested (median = 100%; range: 90-100%). The German CHQ was understood by more than 80% of the German parents tested (median = 100%; range: 75-100%) with the only exception being line 24, 48, and 75 that was understood by less than 80% of the parents. Minor changes were done in the text of the Swiss German and Swiss French CHAQ-CHQ after the probe technique.

#### Psychometric issues

Psychometric evaluation was performed with Swiss German and Swiss French data combined.

Descriptive statistics (first Likert assumption). For the CHAQ the total number of missing responses was 6.7% (range 0.3-13.6%) with dressing and activity 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, and grip. The mean  $\pm$  SD of the items within a scale were roughly equivalent for all CHAQ domains. The total number of missing responses on the CHQ was 3.2% (range: 0.0-9.0%); the response pattern was most often normally distributed except for PF, REB, and RP that were skewed. All response choices of the CHQ items have been used except for BE, and SE. The means  $\pm$  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 most of the CHAQ domains except grip,and for most CHQ health concepts except for BE,MH,SE,GH,and FA. *Items internal consistency (third Likert as sumption).* Pearson items scale correlations were 0.4 for 97% of the CHAQ (except grip) items and for 85% of the CHQ items (except BE, MH, SE, and GH).

Items discriminant validity. For 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 75% of the items (34% by 2 SE); scaling failure was observed for dressing, and arising where the items were better correlated with other domains. For CHQ, Pearson items correlations with its scale were greater by at least 1 SE for 94% of the items (77% by 2 SE); scaling failure was observed only for SE. *Floor and ceiling effect*. The CHAQ floor effect had a median of 88% (range 79-93%) while for the CHQ the median was 0.5% (range 0-18.4%). The CHAQ ceiling effect had median of 0.0% (range 0.0-2.2) while the CHQ had a median of 27% (range 3.9-77.7%). *Cronbach's alpha internal consistency*. Cronbach's alpha was 0.7 for 8/8 (100%) domains of the CHAQ (overall 0.96; range 0.73-0.93). Cronbach's alpha was 0.7 for 8/11 (73%) measurable health concepts (*i.e.* health concepts with more than 1 item) of the CHQ (overall 0.93; range 0.69-0.92) the exception being MH (0.69, SE (0.69), and GH (0.69).

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 most of the CHAQ domains except for dressing, arising, eating, and hygiene. 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 7-89 days; number of JIA patients retested = 14) the intra-class correlation coefficients for the 8 CHAQ domains showed a fair to good reproducibility with a median of 0.8 (range 0.3-1.0) with poor reproducibility only for walking (0.35). Also the 15 CHQ health concepts showed a fair to good reproducibility with a median of 0.8 (range 0.4-1.0).

*External validity.* The Spearman correlation of the CHAQ with the JIAcore set variables (10) showed a median of 0.5 (range 0.4 to 0.6), with the highest correlation being with the parent's evaluation of overall well being (r = 0.6). For the CHQ the median correlation was for the PhS -0.4 (range -0.6 to -0.3) and for the PsS was -0.1 (range -0.3 to -0.1). The best correlation was for the PhS with the parent's evaluation of overall well being (-0.6) and for the PsS with the DI CHAQ (-0.3).

#### Discussion

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

In this study the Swiss German and Swiss French CHAQ have been derived from the German and French versions of the CHAQ (8, 9). 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. Minor statistical problems were found for dressing, eating, and grip, which showed different means  $\pm$  SD, an unequal item scale correlation, and problems for discriminant validity.

In this study the Swiss German and Swiss French CHQ have been derived from the German and French versions of the CHAQ-CHQ (2,8,9). 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 the equal item scale correlation, the item internal consistency, and the ceiling effect for BE, MH, SE, and GH.

In conclusion, the Swiss German and Swiss French versions 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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