Measurement of the Functional Status in Juvenile Rheumatoid Arthritis: Evaluation of the Arabic Version of the Childhood Health Assessment Questionnaire

K. Al-Jarallah a  D. Shehab a  K. Al-Saeid b  M.A.A. Moussa c

Departments of aMedicine, bPaediatrics and cCommunity Medicine and Behavioural Sciences, Faculty of Medicine, Kuwait University, Kuwait

Key Words
Juvenile rheumatoid arthritis · Functional assessment · Health status measures · Childhood Health Assessment Questionnaire

Abstract
Objectives: To evaluate the metric properties, reliability and validity of the translated Arabic version of the Childhood Health Assessment Questionnaire (CHAQ-A) for children with juvenile rheumatoid arthritis (JRA).

Methods: The original questionnaire was translated into Arabic without modification and was applied to 38 consecutive children with JRA attending the Out-Patient Rheumatology Clinic in the main teaching hospital of Kuwait. All patients were diagnosed according to the American College of Rheumatology criteria. The questionnaire was given to each patient during a clinic visit and the retest was done after a 7- to 10-day interval. Test-retest reliability was assessed based on the intraclass correlation coefficient. The construct validity was assessed with Spearman’s correlation coefficient between the CHAQ-A and both clinical and laboratory variables of the disease activity. Results: The test-retest reliability was 0.94 for the overall score and ranged between 0.707 (grip) to 0.936 (hygiene) for the subscale score. The construct validity ranged between 0.39 (erythrocyte sedimentation rate) and 0.71 (functional class). Conclusion: This study provides evidence of the reliability and validity of the CHAQ-A in assessing patients with JRA.

Copyright © 1999 S. Karger AG, Basel
Introduction

Juvenile rheumatoid arthritis (JRA) is the most common rheumatic disease of childhood and a leading cause of childhood blindness [1, 2]. The measurement of the outcome in rheumatic disease has been discussed in the past few years [3, 4]. The disease may produce substantial changes in the child’s ability to carry on the usual activities of daily living. The interest in measuring the physical function of children with JRA has increased significantly in the recent past with different assessment scales being developed with the aim of a multi-dimensional approach to examine the outcome as an entity separate from the disease process measurements [5–8].

The difficulty of accurately measuring the effects of the disease activity and outcome of treatment with commonly used end points, such as the number of involved joints, erythrocyte sedimentation rate (ESR), functional class of the American College of Rheumatology, in conjunction with the physical function in the rehabilitation of the children with JRA rather than the physical signs suggests the importance of using a standard test which includes functional outcome [9]. Functional improvement may be a higher priority than isolated gains in the range of motions or strength even if these are prerequisites for change [10]. There are several scales that have been developed for that purpose [6, 8, 11].

A commonly used scale is the Childhood Health Assessment Questionnaire (CHAQ) which shows acceptable reliability and validity [5–12]. The CHAQ has been translated into other languages and has been shown to be reliable and valid for measuring functional disability in these languages in addition to English [9, 13–15]. There is no instrument in the Arabic language for measuring functional disability in rheumatic diseases. Accordingly, our objective was to translate the CHAQ into Arabic and to evaluate the reliability and validity of the Arabic version (CHAQ-A) among Arabic-speaking children.

Patients and Methods

The number of patients included in the study were 38 children and adolescents with JRA who were diagnosed in the Out-Patient Paediatric Rheumatology Clinic in the teaching hospital in Kuwait. All the patients fulfilled the American College of Rheumatology criteria for classification of JRA [16]. There were no associated conditions that may interfere with the study instrument. The CHAQ [5] is an instrument that contains 2 different indexes, one related to evaluation of functional capacity and the other to pain. The CHAQ evaluates the function in 8 categories: grooming, arising, eating, walking, hygiene, reading, gripping and other activities. The answer for each of these categories includes 4 different possibilities: 0 = no difficulty, 1 = some difficulty, 2 = much difficulty and 3 = unable to do. Patients were also asked to indicate the use of any aids or devices or if help was needed. The score that represents each category results from obtaining the highest score for any component question which determines the score for that category. If any component question was not answered, the score was based on the remaining completed questions. If aids or devices were used, or help was needed to complete the task, a minimum score of 2 was recorded for that area. The score was then averaged to calculate the disability index [5]. Pain was evaluated during the past week by using a visual analogue scale (VAS) consisting of 2 faces (happy and sad) at each end connected by a 10-cm straight line.

The translation of the CHAQ into Arabic without any modification was done by a physiatrist, an adult rheumatologist and a professional Arabic teacher. It was then translated back into English by 2 independent English-speaking persons to check its fidelity to the original. No significant differences were observed.

Administration of the Questionnaire

The questionnaire was completed by the child independently if he/she was 9 years of age or older. For children younger than 9 years, a parent completed the questionnaire.

Evaluation of Reproducibility (Test-Retest)

The questionnaire was answered twice by the first 27 consecutive children at an interval of 7–10 days.
Table 1. Characteristics of the 38 patients with JRA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>male</td>
<td>10 (26.3)</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>28 (73.7)</td>
</tr>
<tr>
<td>Type of onset of the disease</td>
<td>polyarticular</td>
<td>20 (52.6)</td>
</tr>
<tr>
<td></td>
<td>pauciarticular</td>
<td>9 (23.7)</td>
</tr>
<tr>
<td></td>
<td>monoarticular</td>
<td>2 (5.3)</td>
</tr>
<tr>
<td></td>
<td>systemic</td>
<td>7 (18.4)</td>
</tr>
<tr>
<td>Physician global assessment</td>
<td>without activity</td>
<td>6 (15.8)</td>
</tr>
<tr>
<td>(disease activity index)</td>
<td>mild activity</td>
<td>22 (57.9)</td>
</tr>
<tr>
<td></td>
<td>moderate activity</td>
<td>10 (26.3)</td>
</tr>
<tr>
<td>Functional class</td>
<td>I</td>
<td>26 (68.5)</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>11 (28.9)</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>1 (2.6)</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate percentages.

Table 2. Intraclass correlation coefficient (ICC) between test and retest of 27 children with JRA

<table>
<thead>
<tr>
<th>DI Groom Arise Eat Walk Hygiene Reach Grip Other activities</th>
<th>ICC 0.945 0.718 0.718 0.750 0.785 0.936 0.892 0.707 0.892</th>
</tr>
</thead>
</table>

DI = Disability index of the CHAQ, \( p < 0.0001 \) for all categories.

Evaluation of Construct Validity

Scores obtained from the CHAQ-A were correlated with the clinical and laboratory variables including disease activity index (0 = without activity, 1 = mild activity, 2 = moderate activity, 3 = severe activity). Functional status was evaluated using the Steinbrocker functional classes: class I = complete functional capacity of being able to carry on all usual activities without handicap; class II = functional capacity adequate for normal activities despite the handicaps of discomfort or limited mobility of one or more joints; class III = functional capacity adequate to perform only a few daily activities or self-care procedures; class IV = largely incapacitated with the patient confined to a bed or wheelchair. The clinical variables ESR and pain evaluation (VAS) were scored by the same investigator to whom the CHAQ score was not revealed.

Statistical Analysis

The SPSS Windows version 7.5 was used for data analysis. Descriptive statistics was performed to summarise clinical and demographic data of the patients. The test-retest reliability was assessed using the intraclass correlation coefficient and the construct validity was tested using Spearman’s correlation coefficient.

Results

The demographic and clinical characteristics of the 38 patients with JRA are presented in Table 1. There is a female predominance
with a male:female ratio of 1:2.8, a mean age of 10.9 years and a median disease duration of 14 months with the majority of the children (52.6%) presenting with a polyarticular involvement disease onset. The mean ESR was 40.6 mm (1 h, Westergren). The majority of the children belonged to the functional class I. The disease activity index was mostly mild.

The test-retest reproducibility of the CHAQ-A was 0.945 ($p < 0.0001$) for the overall score and ranged from 0.707 (grip, $p < 0.001$) to 0.936 (hygiene, $p < 0.0001$) for the subscale scores (table 2). Table 3 shows the association between the CHAQ-A score and clinical variables. The pain score (VAS) showed the highest correlation (0.718), while the ESR showed the least (0.935).

**Discussion**

Several instruments have been developed for measuring the outcome of patients with rheumatic diseases of childhood, especially JRA. The CHAQ has been developed and has been found to be reliable, valid and sensitive for measuring functional status in children with JRA [5]. This instrument has been translated and tested in different languages [9, 13, 14]. However, there is no instrument to measure the functional status in Arabic-speaking children with JRA. Therefore we chose the CHAQ to be translated and tested for reliability and validity since it can easily be applied. It takes approximately 10 min to complete and has been found to be a reliable measure in different languages, especially when international comparisons are made. In addition, we have recently translated the Health Assessment Questionnaire into Arabic for patients with rheumatoid arthritis and it was found to be a reliable and valid instrument [17]. This will give us the advantage in longitudinal studies (surveys) in the future using the same concept from childhood to adulthood when using the same instrument. The translation has been done without any modifications since all the 8 categories tested are available and are practised among the Arabic-speaking community in Kuwait. As a pretest done on a few children and their parents prior to the study showed no significant changes, it was decided that these questions did not require any modification. As in the original study, there was a female predominance in the male:female ratio. The questionnaire was answered by children 9 years and older without encountering any difficulty, which was similar to other reported studies [9, 13]. The majority of our patients tested in this study had polyarticular disease and all of these patients were in functional classes I and II during the time the study was conducted.

The test-retest reliability over a 7- to 10-day interval was high in the tested categories, reflecting the reproducibility of the test. The correlation between the disability index, functional class, physician global assessment (disease activity index) and pain score were clinically and statistically significant. A high correlation was found between disease activity in-

<table>
<thead>
<tr>
<th>Disease variable</th>
<th>rs</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional class</td>
<td>0.627</td>
<td>0.01</td>
</tr>
<tr>
<td>ESR</td>
<td>0.395</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Physician global assessment</td>
<td>0.611</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Disease activity index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain score (VAS)</td>
<td>0.718</td>
<td>0.01</td>
</tr>
</tbody>
</table>
index, pain and the functional class, while a lesser correlation between the disease activity index and ESR was found in this study. Similarly, Giannini and Brewer [18] reported that there was a poor correlation between ESR and clinical activity in children with JRA. We have noticed that children younger than 13 years of age have difficulty in assigning a number for pain and they prefer to say there is pain or there is no pain without trying to give a specific score. Although the sample size is relatively small, the results of our study are consistent. We do recommend that further studies are needed with multi-centre effort through the Arab world in order to obtain a statistically large, valid sample size to be used for therapeutic trials and studies of disease outcome. The presence of a valid and reliable functional assessment scale in the Arabic language is an essential tool in assessing the overall functional status in children with JRA, as well as in monitoring the response to medical treatment. The Arabic-speaking population of the world is more than 500 million. Validation of this instrument and others justifies its use in this population and, therefore, its development.

In conclusion, the Arabic version of the CHAQ is a reliable and valid tool for the assessment of health status in Arabic-speaking children with JRA as well as in children with chronic arthritis.

Acknowledgment

We express our thanks to Mrs. Rita C. Abdullah for her help in the linguistic modifications and Mr. George Varghese for his secretarial assistance in the preparation of the manuscript.

References


