

Validity of Health Assessment Questionnaire Disability Index (HAQDI) for Assessing Disease Activity in Iraqi Patients with Active Rheumatoid Arthritis

Ehab Mudher Mikhael^{1,*}, Faiq Isho Gorial²

¹Pharmacy College, University of Baghdad, Baghdad, Iraq

²Medicine College, University of Baghdad, Baghdad, Iraq

*Corresponding author: ehab_pharma84@yahoo.com

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Abstract Objective: Rheumatoid arthritis is a common autoimmune disease associated with many complications like joint damage, disability and even death. It requires early and aggressive treatment with regular follow up to ensure safety and effectiveness of treatment for the patients. Disease activity score of 28 joints (DAS28) and simplified disease activity index (SDAI) are common tools that used to assess disease activity, whereas health assessment questionnaire disability index (HAQDI) is a patient reported tool for assessing patient functional ability. This study aimed to evaluate the effectiveness of HAQDI score for monitoring disease activity and response to therapy in Iraqi patients with active rheumatoid arthritis. **Methods:** A cross-sectional study was conducted in Baghdad Teaching Hospital, Rheumatology out patient Unit from August 2011 to May 2012. A total of 95 patients (21 males and 74 females) with active RA were involved in this study. Disease activity was measured by DAS28 and the SDAI whereas functional status of the patients was measured using HAQDI score. **Results:** There was a significant positive correlation of HAQDI score with clinical parameters like swelling joint count (SJC), tender joint count (TJC), visual analogue scale (VAS), physician global assessment (EGA) and morning stiffness. Additionally HAQDI was significantly correlated with disease activity scores DAS28 and SDAI. Furthermore it correlated with inflammatory markers ESR and CRP. HAQDI score was better correlated with clinical parameters in patients with high disease activity than those with moderate activity. **Conclusion:** HAQDI score is a valid and useful tool to monitor disease activity and response to treatment in Iraqi patients with highly active RA.

Keywords: rheumatoid arthritis, disease activity, disability, HAQDI

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1. Introduction

Rheumatoid arthritis is a common chronic autoimmune disease with unknown etiology involving low grade systemic inflammation, characterized by articular and extra articular involvement, which can progress with time leading to joint damage, deformity, disability and even death [1,2,3]. The paradigm of RA treatment worldwide now is early, aggressive therapy with the goal being remission or the lowest disease activity state possible, maintained for the longest time period possible [4]. Although many effective drugs are available nowadays for treating RA patients [5], but many patients still suffer from a decreased response to disease modifying anti rheumatic drugs (DMARDs) after a period of time [6]; Furthermore some patients may develop disability despite using effective medications [7], this highlight the importance of continuous follow up for RA patients and assessing the disease activity regularly to ensure not only

safety of the drug but also to ensure drug effectiveness and patient's response to it; However, this aspect is often neglected [8] may be because it is costly in terms of medical time, expertise and in the use of general health resources and can be inconvenient to the patients especially those who are still in full or part time employment [9]. Many instruments have been validated that can be incorporated into routine clinical practice for monitoring RA disease activity and to aid in treatment decisions with the goal of optimizing clinical responses and reducing joint damage from RA [8]. At present, Disease Activity Score-28 joints (DAS28) and simplified disease activity score (SDAI) are two of the standard methods to measure the disease activity in patients of RA and to assess response to therapy [10,11,12]. Meanwhile health assessment questionnaire – disability index (HAQ-DI) assesses the extent of the patient's functional ability. It has been widely used for research purposes in both experimental and observational studies, as well as in clinical settings. The HAQ-DI is sensitive to change and is a good predictor of future disability and costs. It has been

shown to be reliable and valid in different languages and contexts [13]. HAQDI was shown to be well correlated with DAS28 in detecting RA disease activity in Indian patients with early RA [14,15,16,17,18].

This study aimed to evaluate the effectiveness of HAQDI score for monitoring disease activity and response to therapy in Iraqi patients with active rheumatoid arthritis.

2. Patients and Methods

2.1. Study Design

A cross-sectional study was conducted in Baghdad Teaching Hospital, Rheumatology out patient unit from August 2011 to May 2012. A total of 95 patients (21 males and 74 females) (Table 1) with active RA were involved in this study. Patients were diagnosed to have active RA by the rheumatologist. Ethical approval for research was obtained from the Ethics Committee of Baghdad University, College of Medicine, Department of Medicine. Patients with diseases other than rheumatoid arthritis were excluded from the study.

2.2. Clinical and Laboratory Evaluation

Disease activity was measured by DAS28 and the SDAI [10,11]. The patients were clinically examined and the number of swelling joints count (SJC) (0-28) and tender joints count (TJC) (0-28) were noted. The 28 joints included bilateral knees, shoulders, elbows, wrists, metacarpophalangeal and proximal interphalangeal joints. The patients were asked to mark on the visual analogue scale (VAS) of 0-10 cm according to their global assessment of pain. The physician marked on the VAS of 0-10 cm according to the physician global assessment (EGA) of the disease activity. Erythrocytes sedimentation rate was measured by Westergren method [15], whereas CRP is measured semi-quantitatively using serial dilutions of serum; each dilution was mixed with a latex reagent and observed for the presence of agglutination [16]. DAS28 was calculated using an internet calculator: <http://www.das-score.nl/das28/DAScalculators/dasculators.html>. DAS28 values > 2.6 and ≤ 3.2 was considered as low RA disease activity, values > 3.2 and ≤ 5.1 was considered as moderate disease activity and those > 5.1 was considered as high disease activity [17]. Whereas SDAI was calculated by direct summation of the 5 variables SJC, TJC, VAS, EGA, and CRP [11]. SDAI values > 3.3 and ≤ 11 was considered as low RA disease activity, values > 11 and ≤ 26 was considered as moderate disease activity and those > 26 was considered as high disease activity [17].

Functional status of the patients was measured using Stanford Health assessment questionnaire disability index [13]. Calculation of HAQ-DI involves answering of a questionnaire by the patient. It includes questions regarding his/her functional activities under eight domains: dressing, rising, eating, walking, hygiene, grip, reach and usual activities.

Each question is answered on a four level scale of impairment ranging from 0 to 3: 0 = no difficulty; 1 = some difficulty; 2 = much difficulty; and 3 = inability to do.

Additionally morning stiffness of each patient was calculated according to patient approximate. Furthermore,

rheumatoid factor was measured qualitatively by latex agglutination test [18].

2.3. Statistical Analysis

All data were statistically analyzed using Statistical Package for Social Sciences software version 18 (SPSS v.18); Chi square test for independence was used to test the association between discrete variables; *t*-test was used for two independent samples. Pearson correlation coefficient was used to assess the correlation between continuous variables. All p values used were asymptotic and two sided. Values with $p < 0.05$ were considered significant.

3. Results

Table 1 showed the general demographic data of participated patients. It also showed that most patients who included in this study were suffering from moderate – severe RA. The most commonly used DMARD was MTX.

Table 1. Demographic data of patients

Parameter	Values
Age (years)	45.17 ± 11.84
F/M ratio	74/21
Duration of RA (years)	7.53 +/- 7.22
Disease activity according to DAS28	
Low Number (%)	1 (1%)
Moderate Number (%)	28 (29.5%)
High Number (%)	66 (69.5%)
Drug used	
MTX Number (%)	80 (84%)
HCQ Number (%)	9 (9.4%)
MTX+ HCQ Number (%)	4 (4.2%)
MTX+SZP Number (%)	2 (2.1%)

RA=Rheumatoid arthritis; DAS28=Disease activity score of 28 Joints; MTX= Methotrexate; HCQ=Hydroxychloroquine; SZP=Sulfasalazine

Table 2 showed a significant correlation of HAQDI score with clinical parameters like SJC, TJC, VAS, EGA and morning stiffness. Additionally HAQDI was significantly correlated with disease activity scores DAS28 and SDAI. Furthermore it correlates with inflammatory markers ESR and CRP.

Table 2. Correlation of HAQDI score with RA disease activity, and other inflammatory and clinical parameters

Parameter	All participated patients	
	R	P value
SJC	0.372	0.000
TJC	0.510	0.000
VAS	0.683	0.000
EGA	0.650	0.000
SDAI	0.636	0.000
DAS28	0.655	0.000
ESR	0.285	0.005
CRP	0.225	0.029
RF	0.058	0.575
Morning stiffness	0.446	0.000
RA duration	0.007	0.949
Patient's age	-0.019	0.855

SJC= Swollen joint count; TJC=Tender joint count; VAS=Visual analogue scale; EGA=Evaluator global assessment; SDAI=Simplified disease activity index; DAS28=Disease activity score of 28 joints; ESR=Erythrocyte sedimentation rate; CRP= C – reactive protein; RF=Rheumatoid factor.

Table 3 showed that there was an agreement among DAS28, SDAI and HAQDI for classification of patients to have either high disease or moderate disease activity;

This agreement result from the significant difference in the values of DAS28, SDAI and HAQDI between patients with moderate disease activity and those with high disease activity.

Table 3. Variation in disability, disease activity, age and duration of RA for patients according to disease activity as measured by DAS28

Parameter	High disease activity N = 66	Moderate disease activity N = 28	P value
DAS28	6.43 ± 0.84	4.46 ± 0.51	0.000
SDAI	38.04 ± 11.67	16.77 ± 5.71	0.000
HAQDI	1.9 ± 0.60	1.16 ± 0.58	0.000
Duration of RA	6.89 +/- 6.69	8.97 +/- 8.23	0.161
Age of patient	44.86 ± 11.28	46 ± 13.43	0.674

SDAI=Simplified disease activity index; DAS28=Disease activity score of 28 joints; HAQDI=Health assessment questionnaire disability index.

Table 4 showed that HAQDI score was better correlated with clinical parameters in patients with high disease activity than those with moderate activity; Moreover HAQDI score was well correlated with disease activity as measured by SDAI in patients with moderate and those with high disease activity.

Table 4. Correlation of HAQDI score with inflammatory markers, clinical parameters and disease activity according to patients' disease activity

Parameter	High disease activity N = 66		Moderate disease activity N = 28	
	R	P value	R	P value
SJC	0.166	0.182	0.189	0.336
TJC	0.342	0.005	0.310	0.109
VAS	0.569	0.000	0.517	0.009
EGA	0.481	0.000	0.536	0.003
SDAI	0.484	0.000	0.458	0.014
DAS28	0.560	0.000	0.263	0.177
ESR	0.196	0.115	-0.324	0.093
CRP	0.174	0.163	-0.321	0.096
RF	0.001	0.993	-0.031	0.875
stiffness	0.303	0.013	0.515	0.005
RA duration	0.006	0.992	0.246	0.208
Patient's age	0.208	0.094	-0.428	0.023

SJC= Swollen joint count; TJC=Tender joint count; VAS=Visual analogue scale; EGA=Evaluator global assessment; SDAI=Simplified disease activity index; DAS28=Disease activity score of 28 joints; ESR=Erythrocyte sedimentation rate; CRP= C – reactive protein; RF=Rheumatoid factor.

4. Discussion

This study (as shown in Table 2) showed that HAQDI score was well correlated with clinical parameters like TJC, VAS, EGA, SJC and morning stiffness, similarly Ghosh et al showed that TJC, VAS and EGA are well correlated with HAQDI score [14]; whereas Erdem et al showed that HAQDI score is strongly correlated with morning stiffness in patients with RA [19]; while SJC was shown to be correlated with HAQDI score in patients with gout [20]. Moreover inflammatory markers, ESR and CRP was also correlated with HAQDI score but to a lesser degree than other clinical parameters, similarly Ghosh et al showed that HAQDI is less correlated with ESR than other clinical parameters [14]; Furthermore, this study showed that HAQDI score was significantly and strongly correlated with disease activity scores (SDAI and DAS28), which is similar to the finding of other studies, that showed that a good correlation of HAQDI score with DAS28 and SDAI [11,21].

Some studies consider the importance of HAQDI score in assessing RA disease activity is relative because of the difference in HAQDI values between patients and physicians [22]. However the current study is different from that study since HAQDI score was correlated with all clinical parameters that obtained from the patients and those that are obtained by clinical examination or even by laboratory analysis.

It is well known that lack of accessibility to rheumatologists and discomfort in prescribing DMARDs for patients with RA are potential barriers to optimal treatment [23]. This will highlight the importance of the current study findings especially the correlation of HAQDI with disease activity scores since measuring RA disease activity by either DAS28 or SDAI require an accurate evaluation of the patient clinical status by a physician, which means that the patient must go to meet the physician in the hospital or in the out patient clinic if the patient can afford that in order to be examined by the physician; however and whatever the site at which the patient disease activity can be assessed, it will not be an easy task for a patient with rheumatoid arthritis to dress, and walk to reach his/her physician, besides that the situation of traffic accidents and road closure in Iraq, is an additional cause that makes the arrival of patient to the physician more hard. Moreover the calculation of both DAS28 and SDAI require not only clinical parameters but also laboratory parameters, this in turn means that the patient is in need for invasive procedures which may be painful and costly to the patient, especially for patients with poor socio economic status in 3rd world like Iraq, that may result in decreasing patient compliance for regular follow up. Hence, even if the patients fail their appointment for any reason as mentioned above, it will allow the physicians to assess the disease activity and the response to treatment to a larger extent depending on the result of HAQDI score through a mobile or even through a message by an email. Since some other studies states that HAQDI score worse as the duration of RA become longer [24], while other studies states that old age of RA patient may be associated with disability and higher HAQDI scores [25]; A correlation analysis of HAQDI with patient age and RA disease duration was done to exclude any doubts about the current study findings, and it was found that there is no any correlation between these parameters and HAQDI score which further confirm the results of this study.

The finding of HAQDI correlation with disease activity score in this study was further confirmed by the presence of statistically significant difference (Table 3) in the values of HAQDI between RA patients with moderate disease activity and those with high disease activity as measured by DAS28 and SDAI; Meanwhile there was no any difference between the age of patients or the duration of RA among patients with moderately and highly active RA. Additionally the results of this study showed that HAQDI correlation with RA disease activity, clinical parameters and even with inflammatory markers is better for RA patients with high disease activity than those with moderate disease activity, this observation may not lessen the importance of this study findings, since patients with more severe symptoms and high disease activity require more frequent follow up than those with lower disease activity [4], and those patients with high disease activity

are the ones who can't meet their doctors easily because of limitation in their activities by the active disease.

In conclusion HAQDI score is a valid and useful tool to monitor disease activity and response to treatment in Iraqi patients with highly active RA.

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