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ORIGINAL RESEARCH ARTICLE

RELATIONSHIP BETWEEN FUNCTIONAL STATUS AND DISEASE ACTIVITY OF RHEUMATOID ARTHRITIS PATIENTS AT INITIAL PRESENTATION - A CROSS SECTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Background

Health assessment questionnaire (HAQ) is increasingly being used for assessing health outcome in the Rheumatoid Arthritis (RA) patients. The present study aims to determine the relationship between the functional status and disease activity of South Indian patients with RA at initial presentation using HAQ and tools such as disease activity score (DAS -28 ESR) and Clinical Disease Activity Index (CDAI).

Methods

This was a cross sectional observational study on relationship between DAS-28 ESR, CDAI and HAQ tools in 100 consecutive newly diagnosed patients with RA in Southern India. Patients were stratified based on HAQ score and their association was studied using chi square test and Mann Whitney U test.

Results

The patients were classified as Group I with HAQ score <1 (n=73) and Group II with HAQ score>1 (n=27). The median TJC (22 vs 12; p<0.01) and SJC (7 vs 5; p=0.04) scores were significantly higher in patients with HAQ>1 group. Also, patients in HAQ>1 group had significantly higher median DAS-28 ESR (7.5 vs 6.5; p<0.01) and CDAI (43 vs 29.5; p<0.01).

Conclusion

There was a very high positive correlation between HAQ with DAS 28 ESR and CDAI score at initial presentation in RA patients. Hence HAQ score can be used earlier in the disease course to assess functional limitations and monitor disease activity in RA patients.

Keywords

Rheumatoid Arthritis, Health assessment questionnaire, DAS-28 ESR, CDAI

Background

Rheumatoid Arthritis (RA) is a chronic autoimmune disease resulting in progressive joint damage that is strongly associated with duration of active disease. The disease presentation can be mild to rapidly progressing, debilitating and highly variable. Hence, early initiation of treatment in RA patients minimizes the structural damages to the joints. Tools such as Disease Activity Score (DAS -28 ESR) and Clinical Disease Activity Index (CDAI) were widely used in patients with RA in the past years.[1–4]

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These tools also require complex calculations and laboratory investigations. The merits and demerits between DAS-28 ESR and CDAI were widely published.[1–3]

Health assessment questionnaire (HAQ) is increasingly being used for assessing health outcome in the RA patients.[5] HAQ measures patient reported outcomes in the form of questionnaire and the scores can be recorded rapidly. This tool has been validated in RA patients and can be adopted as a consistent measure on patient related outcomes. .[5]

The present study aims to determine the relationship between the functional status and disease activity of RA patients at initial presentation between HAQ versus DAS-28 ESR and CDAI scores in Indian population.

Materials and Methods

This was a cross-sectional observational study conducted in a tertiary care hospital in Southern India. Initial 100 newly diagnosed RA patients attending Rheumatology Clinic of a tertiary care hospital in Southern India for a period of 6 months from April 2017 to September 2017 were included. Ethical clearance was obtained from Institutional Ethics Committee prior to start of the study. Written informed consent was taken from all patients at the time of enrollment for the study.

Newly diagnosed RA patients satisfying the American College of Rheumatology/ European League Against Rheumatism (ACR/EULAR) criteria 2010 with age group 20 to 70 years and duration of illness 3 months and more were included in the study. Pregnant women, patients with other autoimmune diseases (such as SLE, scleroderma, overlap syndrome), chronic liver disease, chronic renal disease, malignancies, tuberculosis, uncontrolled diabetes mellitus and congestive cardiac failure were excluded.

Procedure: Patients satisfying ACR/EULAR 2010 criteria were assessed according to a proforma containing detailed history, physical examination and laboratory findings. The demographic characteristics of patients including age, gender, duration of disease, duration of morning stiffness, clinical features, activities of daily living, vocation, tender joint count, swollen joint count and global health assessment using visual analogue scale (VAS) were recorded. Results of laboratory tests such as rheumatoid factor (RF), Anti-cyclic citrullinated peptide (ACCP), Erythrocyte sedimentation rate (ESR) and C- Reactive Protein (CRP) were also noted.

Disease activity of patient was assessed by DAS-28 and CDAI scores. DAS-28 was calculated using tender joint count (TJC), swollen joint count (SJC), global health assessment (GH) using visual analogue scale (VAS in 0 to 100mm) and ESR (erythrocyte sedimentation rate in mm/first hour) using Westergren Method. The DAS-28 score was calculated using the formula. [1]

$$\text{DAS-28} = 0.56\sqrt{\text{TJC}} + 0.28\sqrt{\text{SJC}} + 0.70 \ln(\text{ESR}) + 0.014\,(\text{GH})$$

A patient having DAS-28 of <2.6 is in remission. If the score is ≥2.6 and ≤3.2, patient is having low disease activity. A score of >3.2 and ≤5.1 indicates moderate disease activity and a score of >5.1 indicates high disease activity.[3]

CDAI was calculated using TJC (0 to 28), SJC (0 to 28), patient global assessment of disease activity using VAS (0 to 10cm) and provider global assessment of disease activity using VAS (0 to 10cm). CDAI was estimated using the formula[1]

CDAI = TJC + SJC + Patient global assessment + Provider global assessment

A patient with CDAI score of 0 to 2.8 is in remission. If the score is >2.8 and ≤10, it indicates low disease activity. A score >10 and ≤22 indicates moderate disease activity and a score >22 indicates high disease activity.[3]

The functional status of patients was assessed using health assessment questionnaire (HAQ). There are eight categories and the categories include dressing and grooming, rising, eating, walking, hygiene, reach, grip and activities including shopping, getting in and out of bus/car and do house hold chores. These eight categories were subdivided into 20 functions. Each function is assessed on a 4 point Likert scale where 0= without any difficulty, 1= with some difficulty, 2= with much difficulty and 3= unable to do.[5]

The HAQ score was calculated using the highest subcategory score from each of the eight categories. If the patient needed help or appliance for a function, adjust the score by increasing the score from 0 or 1 to 2. If the subcategory score was already a 2 or 3, no adjustment was made. Final HAQ was obtained by adding the highest subcategory score and dividing the total score by the number of categories answered. Final score was rounded to the nearest value evenly divisible by 0.125. Patient was requested to answer a minimum of 6 categories. The HAQ score ranges from 0 to 3, in 0.125 increments. Higher scores indicate worse function and severe disability.

Statistical Analysis

Categorical variables were expressed as frequency (percentages) and continuous variables as mean (SD) and median (range). Chi square test and Mann Whitney U test were used for studying the relationship between HAQ and other clinical parameters. A p value of <0.05 were considered significant. All analysis values were performed in SPSS version 20 software.

Results

The mean age of study population was 47(11) years. Of 100 patients included in the study, 85 were females and 15 were males. The mean duration of illness was 4.9(5.1) years and the median duration was 3(0.3-22) years. The mean ESR was 76 (24) mm/hr [median 71(34 to 150)]. 85 patients had elevated CRP. 76% of patients had positive rheumatoid factor and 64% of patients had positive ACCP. The mean TJC was 16.1 (6) and the mean SJC was 6.7(5.2). The median TJC was 15 (range 8 to 36) and median SJC was 6 (range 0 to 28). Mean EULAR score was 9.2 (1.2) and median score was 10 (range 7 to 10).

All 100 patients were classified having high disease activity based on DAS-28 ESR score with mean 6.8 (±0.8) and median 6.7 (range 5.1 to 8.7). Mean score of CDAI was 34.8(±11.3) and median 32 (19 to 69). Nine patients had moderate disease activity while 91 patients had high disease activity with CDAI.

Most of the patients presented with polyarthritis (82%), morning stiffness of more than one hour was present in 78% of patients. The mean patient global assessment was 68.95 (12.3) and median 70 (50 to 90). The mean provider global assessment was 55.6 (11) and median 50(40 to 80).

The HAQ score had a mean 1.0(0.3) and median 1 (0.6 to 2.0). The patients were classified as Group I with HAQ score <1 (n=73) and Group II with HAQ score>1 (n=27). The median HAQ score in group I and II were 0.87 (0.63 to 1.0) and 1.5 (1.1 to 2.0) respectively. Table-1 discuss the demographic characteristics of patients stratified based on HAQ scores. The median TJC (22 vs 12; p<0.01) and SJC (7 vs 5; p=0.04) scores were significantly higher in patients with HAQ>1 group. Also, patients in HAQ>1 group had significantly higher median DAS-28 ESR (7.5 vs 6.5; p<0.01) and CDAI (43 vs 29.5; p<0.01). There was no other significant difference in demographic variables between the patient groups based on HAQ.

There was no correlation observed between HAQ score and disease duration (r=0.04; p=0.67) (Figure 1). Figure 2 and 3 displayed a very high positive correlation between HAQ and DAS 28 ESR (r=0.70) and CDAI (r=0.71) scores.

Discussion

Rheumatoid arthritis is a chronic disease resulting in disability. The treatment of rheumatoid arthritis aims to decrease the pain and improve the function of patients. This in turn will improve the quality of life of patients. By finding out the relationship between functional status and disease activity, measures can be taken to improve the function of patients.

HAQ score is very important for measuring functional status of RA patients at initial presentation. It can be repeated at regular intervals for assessing the course of the disease and response to treatment. It is a simple disease severity assessment score devoid of laboratory investigations. In the present study 27% of patients had HAQ score >1 indicating severe disability.

Previous studies observed significant correlation between RF positivity and decreased functional status.[6,7] However, in the present study there were no significant differences in clinical presentation of these patients when stratified with HAQ score of 1. None of the laboratory investigations such as RF, CRP, ACCP had significant differences in patients with higher HAQ scores (Table 1). Similar trends were also reported by Maryam SA et.al and Noreen Nasir et al.[1,8]

There was no correlation observed between HAQ score and disease duration (r=0.04, p=0.67) in this study. But study by Anirban Ghosh et al reported statistically significant positive correlation between the duration of the disease and HAQ-DI score.[5]

Most of the patients in the present study had severe disease activity at initial presentation. Present study showed a very high positive correlation between HAQ and DAS28 ESR (r=0.70) and CDAI (r=0.71) scores. Noreen Nasir et al reported positive correlation between DAS28 ESR and mHAQ.[1] Pincus et al also demonstrated significant agreement between mHAQ and DAS28 scores in >80% of patients with moderate to high disease activity.[9] Study by Tristan A.Boyd et al showed strongest correlation between HAQ and DAS 28 in the first year at the initial visit.[7] Kumar et al observed utilized Routine Assessment of Patient Index Data with 3 (RAPID 3) in RA patients and observed there was no robust agreement between DAS28, HAQ-DI and RAPID 3 tools in RA patients from Indian population.[4]

The major limitation of this study was that it was a single centre hospital-based study. Sample size was small (n=100). The study assessed the patients only at initial presentation.

Conclusion

There was a very high positive correlation between HAQ with DAS 28 ESR and CDAI score at initial presentation in RA patients. Hence HAQ score can be used earlier in the disease course to assess functional limitations and monitor disease activity in RA patients.

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Tables

Table 1: Clinical and demographic variables using health assessment questionnaire in RA patients (n=100)

		HAQ <1 (n=73)	HAQ >1 (n=27)	P value
Age	20 to 49	40	13	0.55
	50 to 70	33	14	
Gender	Male	10	5	0.55
	Female	63	22	
Morning Stiffness	<1hr	17	5	0.61
	>1hr	56	22	
Clinical Features	Polyarthritis	63	19	0.07
	Polyarthritis + Fatigue	10	8	
ADL	Dependent	0	1	0.27
	Independent	73	26	
Vocational Affected	Yes	68	27	0.32
	No	5	0	
Disease Duration	Median (Range)	3 (0.3 to 22)	3 (0.3 to 20)	0.33
TJC	Median (Range)	12 (10 to 8)	22 (8 to 36)	**<0.01**
SJC	Median (Range)	5 (0 to 20)	7 (1 to 28)	**0.04**
Patient Global Assessment	Median (Range)	65 (50 to 90)	60 (50 to 80)	**<0.01**
ESR	Median (Range)	66 (34 to 150)	76 (50 to 130)	1.0
DAS 28 ESR	Median (Range)	6.5 (5.1 to 8.5)	7.5 (5.7 to 8.7)	**<0.01**
CDAI	Median (Range)	29.5 (19 to 63)	43 (20 to 69)	**<0.01**
CRP	Positive	61	25	0.34
	Negative	12	4	
RF	Positive	53	23	0.29
	Negative	20	4	
ACCP	Positive	43	21	0.08
	Negative	30	6	

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Figure 1: Correlation between HAQ and Disease duration in patients with RA

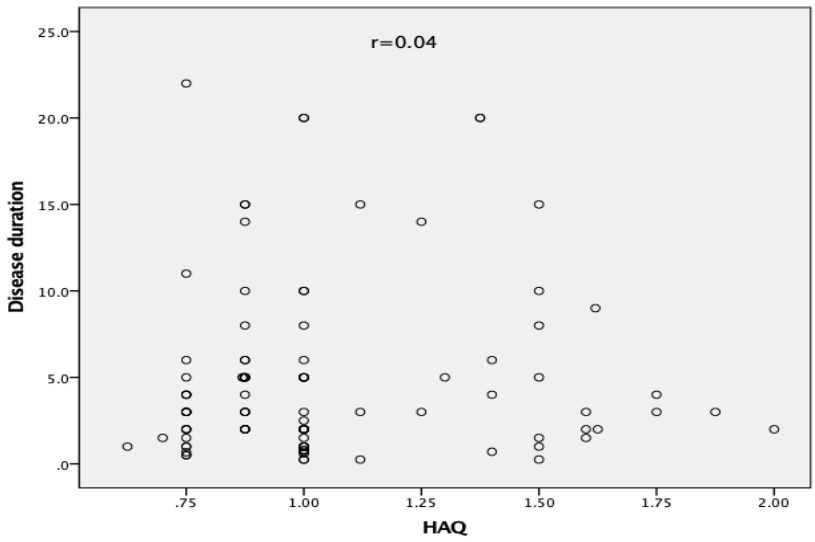

Figure 2: Scatter plot relating very high positive correlation between HAQ with DAS 28 ESR score in RA patients (r=0.70)

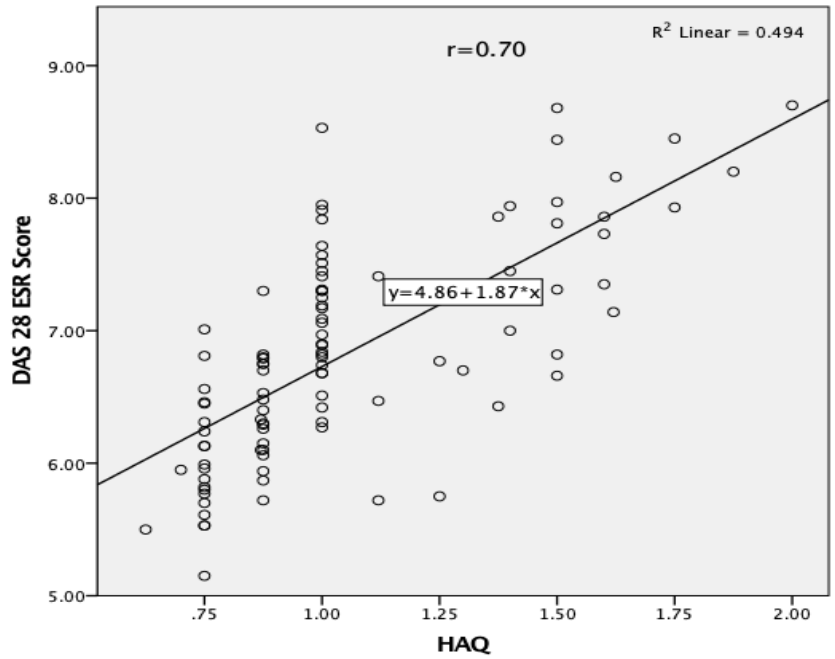

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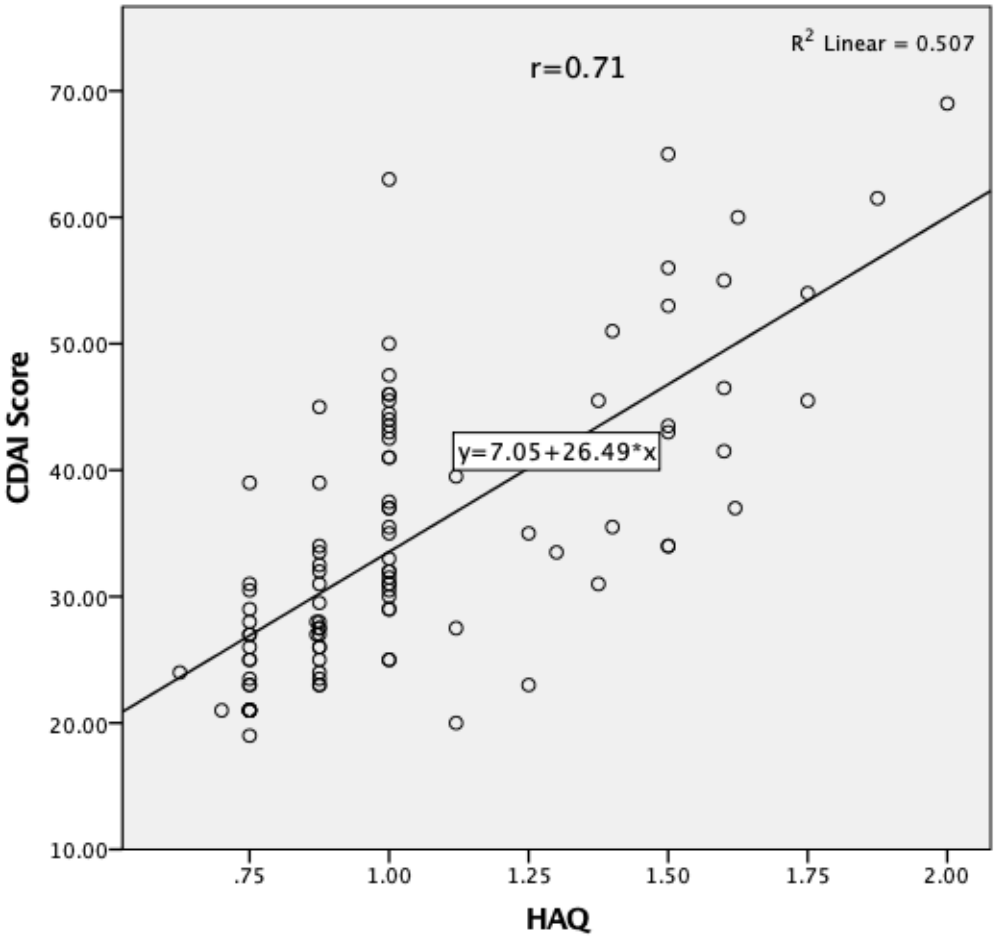
Figure 3: Scatter plot relating very high positive correlation between HAQ with CDAI score in RA patients (r=0.71)



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