ORIGINAL ARTICLE

Disease Activity (Rheumatoid Arthritis Disease Activity Index-5) in Patients With Rheumatoid Arthritis and its Association With Quality of Life, Pain, Fatigue, and Functional and Psychological Status

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ABSTRACT

Objectives: This study aims to determine disease activity in patients with rheumatoid arthritis by Rheumatoid Arthritis Disease Activity Index-5 (RADAI-5), and to evaluate its association with the quality of life, pain, fatigue, and functional and psychological status.

Patients and methods: A total of 170 rheumatoid arthritis patients (30 males, 140 females; mean age 55.2±11.3 years; range 28 to 82 years) were included in the study. Quality of life was evaluated by using Rheumatoid Arthritis Quality of Life Scale. Stanford Health Assessment Questionnaire was used for evaluating functional status, and Beck Depression Scale for psychological status. Level of fatigue was assessed by Fatigue Severity Scale. Disease activity was measured by using Disease Activity Score-28 (DAS28) and RADAI-5.

Results: Mean RADAI-5 score was 3.9±2.7, and mean DAS28 score was 3.3±1.4 (moderate disease activity). According to RADAI-5, 16.5% of the patients were in remission, 28% had mild disease activity, 27% had moderate disease activity, and 29% had high disease activity. RADAI-5 was strongly correlated with visual analog scale-pain, DAS28, Beck Depression Scale, Fatigue Severity Scale, Rheumatoid Arthritis Quality of Life Scale, and Health Assessment Questionnaire (r= 0.91, 0.81, 0.78, 0.75, 0.75 and 0.72, respectively) (p<0.0001). Disease activity values measured with RADAI-5 were compatible with the ones measured with DAS28.

Conclusion: RADAI-5 is a short, practical questionnaire that can easily be administered by the patient in a busy clinical practice setting. It can be used as a rheumatoid arthritis outcome measure to estimate the impact of the disease and evaluate health outcome in clinical studies.

Keywords: Depression; fatigue; pain; quality of life; rheumatoid arthritis.

Rheumatoid arthritis (RA) is a chronic, inflammatory disease characterized by chronic inflammation of the synovial joints leading to progressive joint destruction.[1] It has multifactorial etiology and progression, including a range of immune, neuroendocrine, and psychosocial variables. It is partially known how these variables interact with one another and how they ultimately influence the disease process.[2]

Disease activity, which is reflected by tender and swollen joint counts, levels of acute phase reactants, and patient's and physician's global assessments, is a good predictor of damage and physical disability, and an outcome measure, which is used to evaluate health outcome in clinical studies of patients with RA.[3] Various disease activity scales have been used for measuring disease activity in RA; however, they are long, tedious, and may interfere with the flow of patient visits rather than contributing information to clinical care.[4] For busy clinical settings, Leeb et al.[5] developed a simplified version of the Rheumatoid Arthritis Disease Activity Index (RADAI) questionnaire, RADAI-5.

RADAI-5 is a short and practical questionnaire that can be easily administered by the patient in a busy clinical practice setting. It takes less than 10 seconds to calculate. Its adaptation to Turkish language and validation were proven by Sunar et al.[6]

In this study, we aimed to determine disease activity in patients with RA by RADAI-5, and to evaluate its association with the quality of life (QoL), pain, fatigue, and functional and psychological status.

PATIENTS AND METHODS

The study included a total of 170 RA patients (30 males, 140 females; mean age 55.2±11.3 years; range 28 to 82 years) fulfilling the American Rheumatism Association 1987 revised criteria for the classification of RA.[7] Patient information regarding age, sex, and disease duration was recorded. Number of swollen and tender joints, and erythrocyte sedimentation rate and C-reactive protein levels were determined. QoL was evaluated by using Rheumatoid Arthritis Quality of Life Scale.[8] The severity of pain was measured by 100 mm visual analog scale-pain.[9] Turkish version of the Stanford Health Assessment Questionnaire was used to evaluate functional status.[10] Psychological status was assessed by using Beck Depression Scale,[11] and fatigue by Fatigue Severity Scale.[12] Disease activity was measured by using the quadrivariate disease activity score-28 (DAS28),[3] and RADAI-5.[6]

Rheumatoid Arthritis Disease Activity Index-5 is a 5-item, self-administered RA-specific questionnaire that assesses global disease activity in last six months and current disease activity in terms of joint swelling and tenderness, pain, duration of morning stiffness and general health. Scores between 0.0 and 1.4 indicate remission, 1.6 and 3.0 low disease activity, 3.2 and 5.4 moderate disease activity, and >5.6 high disease activity.[5,6] Turkish version of RADAI-5 is shown in Appendix 1.

All of the patients were informed about the study, and their written informed consent was taken. Medical research ethics committee of the training and research hospital approved

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Appendix 1. Turkish version of Rheumatoid Arthritis Disease Activity Index-5

Patient's name :

Dear patient;

This questionnaire aims to determine aspects of your rheumatic disease exactly. Please answer the following questions regarding your rheumatic complaints. Do not leave any question unanswered.

For each question below, mark a number between 0 and 10.

1. During the last six months, how active was your inflammatory joint disease (arthritis)?

| Not at all active | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Extremely active |

2. How active is your joint disease (arthritis) today in terms of sensitivity to pression and swellness of your joints?

| Not at all active | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Extremely active |

3. How severe is your joint pain (arthritis) today?

| No pain | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Intolerable pain |

4. How do you describe your current health status?

| Very good | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Very bad |

5. Did your joints (hands) get stiff when you woke up this morning? If your answer is yes, how long did this stiffness continue?

| No stiffness | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | It continued all day |

Table 1. Demographic and clinical patient data

	Mean±SD	Median	Minimum-maximum
Age (year)	55.2±11.3	56.00	28.0-82.0
Disease duration (month)	160.1±99.9	145.00	10-423.0
Erythrocyte sedimentation rate (mm/h)	25.0±19.5	19.5	2-100
C-reactive protein (mg/dL)	10.0±13.5	4.85	0.24-70.29
Disease activity score 28	3.3±1.4	3.27	0.68-7.0
Rheumatoid arthritis disease activity index-5	3.9±2.7	3.1	1.0-10.0
Health assessment questionnaire	1.0±0.9	0.75	0.0-3.0
Rheumatoid arthritis quality of life	12.6±9.8	10	0.0-30.0
Fatigue severity scale	30.0±14.4	27.5	12.0-62.0
Beck depression scale	9.4±7.6	7.0	0.0-34.0
Visual analog scale pain	42.0±30.7	38	0.0-100

SD: Standard deviation.

the study protocol. The study conforms to the provisions of the World Medical Association's Declaration of Helsinki.

Statistical analyses

Scores of the above-mentioned scales were obtained for statistical analyses. Depending on these values, the level of the linear relation between these scales was evaluated by correlation analysis. The presence of correlation between these scales was evaluated by Pearson's correlation coefficient. IBM SPSS for Windows version 21.0 software program (IBM Corp. Armonk, NY. USA) was used for statistical analyses. Statistical significance and the confidence interval was set at $p<0.01$ and 99%, respectively.

RESULTS

Demographic and clinical patient data including age, mean erythrocyte sedimentation rate and C-reactive protein levels, and mean scores of DAS28, RADAI-5, visual analog scale-pain, Health Assessment Questionnaire, Rheumatoid Arthritis Quality of Life Scale, Fatigue Severity Scale, and Beck Depression Scale are given in Table 1.

Mean RADAI-5 score was 3.9±2.7 (median 3.1) (range 0-10), indicating moderate disease activity. At the time of the study, 28 patients (16.47%) were in remission (RADAI-5: 0-1.4), 47 patients (27.65%) had mild disease activity (RADAI-5: 1.6-3.0), 46 patients (27.06%) had moderate disease activity (RADAI-5: 3.2-5.4), and 49 patients (28.82%) had high disease activity (RADAI-5 >5.6).

Mean DAS28 score was 3.3±1.4, indicating moderate disease activity. According to DAS28, 35 patients (20.59%) were in remission (DAS28 ≤2.6), 42 patients (24.71%) had mild disease activity (DAS28: 2.6-3.2), 48 patients (28.24%) had moderate disease activity (DAS28: 3.2-5.1), and 45 patients (26.47%) had high disease activity (DAS28 ≥5.1).

Correlations of RADAI-5 and DAS28 with other variables are given in Table 2. Analyses of correlation coefficients revealed that the strongest correlation of both DAS28 and RADAI-5 was with visual analog scale-pain.

Table 2. Relationship between disease activity and quality of life, functional status, pain, fatigue, and depression

	RAQoL	HAQ	VAS-pain	FSS	BDS	RADAI-5	DAS28
RADAI-5							
r	0.75*	0.72*	0.91*	0.75*	0.78*	1	0.81*
p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
DAS28							
r	0.59*	0.59*	0.79*	0.63*	0.59*	0.81*	1
p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	

RAQoL: Rheumatoid Arthritis Quality of Life; HAQ: Health Assessment Questionnaire; VAS: Visual Analog Scale; FSS: Fatigue Severity Scale; BDS: Beck Depression Scale; RADAI-5: Rheumatoid Arthritis Disease Activity Index-5; DAS28: Disease Activity Score; * p<0.01 (significant).

DISCUSSION

This study was conducted to determine the disease activity in Turkish RA patients, the impact of disease activity on QoL, physical function, pain, and psychological status and fatigue.

In our study, both RADAI-5 and DAS28 scores of the patients indicated moderate disease activity. 27.7% of our patients had low, 27.1% had moderate, and 28.8% had high disease activity, according to RADAI-5. These rates were 24.7%, 28.2%, and 26.5%, respectively, according to DAS28. In another study performed in Turkey, 26.1% of the patients had low, 39.9% had moderate and 34% had high disease activity, according to DAS28.[13] In a study from Colombia, where the disease activity was measured by using both American College of Rheumatology Improvement Criteria and clinical remission criteria of Pinals for RA, 24% had very active RA, 60.7% had moderately active RA, and 15.2% were in clinical remission.[14] The frequency of patients with high disease activity seems to be higher in our series. This may be due to the patient selection criteria. Our group of patients was composed of mostly severe ones requiring regular controls in a tertiary hospital.

Disease activity values of our patients measured with RADAI-5 were compatible with the ones measured with DAS28. On the other hand, RADAI-5 was strongly correlated with DAS28. RADAI-5 has proven to be in line with more time consuming tools such as DAS28 and Clinical Disease Activity Index.[6]

Depression commonly occurs with RA, in the range of 13 to 20%.[15] Its high prevalence in RA has been reported frequently in the literature.[16-19] There are two hypotheses that systemic inflammation contributes to high prevalence of depressive symptoms in RA. First, disability from RA prevents patients from functioning the way they used to, thus generating feelings of loss and depression. Second, the proinflammatory cytokines that cause acute flares in RA may have a direct neural effect in promoting sickness behavior and corresponding depressive symptoms. It was reported that patients with major depression had increased plasma concentrations of C-reactive protein, interleukin 6, and tumor necrosis factor-alpha.[20,21]

Thus, we detected that disease activity, measured by using DAS28 and RADAI-5, was significantly correlated with depression. This association was previously shown in the study of Pollard et al.,[22] where disease activity was measured by using DAS28. Similarly, Walker et al.[23] and Rathbun et al.[24] confirmed that comorbid depression in RA was associated with worsening of disease activity and severity. On the other hand, Cadena et al.,[14] Wolfe and Michaud,[25] and Sheehy et al.[26] reported strong associations between psychological status and disease activity, confirming our data. Contrarily, Cordingley et al.[27] found no statistically significant association between disease activity and depression levels, where depression was measured by using Hospital Anxiety and Depression Scale. Also, Heimans et al.[28] reported that depression severity was associated with symptoms of arthritis like pain and unwell being, but not disease activity.

In the present study, a statistically significant correlation between fatigue and disease activity was reported. This result conforms with the findings of Pollard et al.[22] and Raterman et al.[29] which confirm that fatigue has a negative impact on disease activity in patients with RA.

Furthermore, we detected a significant relationship between disease activity and functional status. This relationship was previously shown in the study of Molenaar et al.[30] which reported that patients with RA in remission experienced minimal functional disability.

In our study, we reported that disease activity in RA had negative impact on QoL, which was measured with Rheumatoid Arthritis Quality of Life Scale, a RA-specific measure. Cadena et al.[14] conducted a study among 79 RA patients in Colombia. They evaluated QoL by using Quality of life-Rheumatoid Arthritis Scale, another RA-specific measure. They demonstrated that RA activity significantly influenced QoL. Similarly, this finding was confirmed in previous studies by Prajs et al.[31] and Houssien et al.[32]

To our knowledge, this is the first study to demonstrate that disease activity in RA is strongly correlated with five important items: QoL, depression, fatigue, pain, and functional status. Severity of pain ranked in first place among the variables that were associated with disease

activity. A similar relationship was previously shown in the study of Garip et al.[33]

High disease activity has a negative impact on QoL, physical and psychological functions, and vitality. To our knowledge, this is the first study analyzing the association between disease activity and QoL, fatigue, and depression levels, where disease activity was assessed by using RADAI-5, which is an important scale reflecting disease activity. One particular advantage of RADAI-5 is that it can be used in crowded outpatient clinics, owing to the fact that it does not require acute phase reactants to be calculated. Moreover, it can be used as a RA outcome measure to estimate the impact of the disease and evaluate health outcome in clinical studies.

Declaration of conflicting interests

Funding

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