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RESEARCH ARTICLE

MEAN OVERALL INDEX FOR RHEUMATOID ARTHRITIS IN RHEUMATOID ARTHRITIS AND ITS CORRELATION WITH DISEASE ACTIVITY

***Harpreet Singh, Manoj kumar Mangla, Ashish Mittal, Mahesh Gaikwad, Gourab Bhaduri and Ritu Sangwan**

Senior Professor, Department of General Medicine, PGIMS, Rohtak

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ABSTRACT

Background: Mean Overall Index for Rheumatoid Arthritis (MOI-RA) is a new, continuous and feasible index to assess the impact on activity of daily living (which is the patient's prime concern) so it could be useful in regular clinical practice for monitoring Rheumatoid Arthritis (RA) patients. **Objective:** Assessment of disease activity in Rheumatoid Arthritis using Mean Overall Index for Rheumatoid Arthritis (MOI-RA). **Material and method:** The present study was a cross sectional study done on hundred RA patients as per American college of rheumatology criteria (ACR criteria) who presented in Rheumatology clinic at PGIMS, Rohtak (Haryana). Patients were assessed for disease activity using Disease activity score-28 (DAS28), Clinical disease activity index (CDAI), MOI-RA at baseline and at three months. **Results:** The mean age was 40.04 ±11.47 yrs with 84 females and 16 males. At baseline the mean DAS28, CDAI and MOI-RA score was 5.91±1.309, 30.56±17.82 and 43.54±18.81 respectively, while at three months was 2.74±0.84, 3.79±4.18, and 8.11±5.67, respectively. Pearson's Correlation Coefficient of MOI-RA with DAS28 and CDAI at baseline was 0.962 and 0.961 respectively and at three months was 0.929 and 0.939 respectively (all p-value <0.001). Reliability index (assessed by Cronbach's alpha) was 0.751, 0.445 and 0.360 for MOI-RA, DAS28 AND CDAI respectively. **Conclusion:** MOI –RA was found to be significantly correlated with DAS28 and CDAI. The components of MOIRA include all important measures of disease activity, so it could be useful in regular clinical practice for monitoring RA patients.

Corresponding author:* **Harpreet Singh

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INTRODUCTION

The last two decades has been the major advances in the care of patients with Rheumatoid arthritis (RA). New therapeutics are available that significantly reduce disease activity, improve physical function and reduce damage to the joints that, over time, can reduce to the disability. Critical to accomplishing these important advances has been the development and refinement of measurement of tools (based on patient reported outcome or physician reported outcomes) to accurately assess the disease activity in clinic/ clinical trials. Currently used disease activity measures incorporate some or all core set variables: a) physician assessed measures (tender/ swollen joint count, physician global assessment), b) patient assessed measures (pain, physical function, patient global assessment) and c) laboratory measures (acute phase reactants- erythrocyte sedimentation rate (ESR), C reactive protein (CRP) (Marjonne, 2008). Patient reported outcome measures (PROMs) based on the above core set variables and reported by patient themselves have been found to provide knowledge about patients health including functional status of quality of life by their own personal perspectives (Gossec, 2010 and Fransen, 2005). Mean overall index for Rheumatoid arthritis (MOI-RA) (Mäkinen *et al.,* 2008), a PROM, measures all seven core set components but too few studies are available testing its potential use in RA. This study was planned to find the utility of MOI-RA and also its correlation with physician related outcome measures- Disease activity score-28 (DAS28) and Clinical disease activity index (CDAI).

MATERIAL AND METHODS

A total of hundred patients of Rheumatoid Arthritis (RA) as perAmerican college of rheumatology criteria (ACR criteria 1987) reporting to the Out Patient Department of Rheumatology Clinic of Pt. B.D. Sharma PGIMS, Rohtak were enrolled in the study from May 2017 to February 2018. A written informed consent was taken from all patients of

rheumatoid arthritis (RA) selected for being subjects in the study. All those patients of RA who were severely anemic, hypothyroid, having evidence of severe renal, cardiac, liver or pulmonary disease were excluded from the study. Patients with any evidence of malignancy and with recent infections or developing infections during the study period were excluded from the study. All the subjects included in the study were detailed for their history and clinical examination. All these subjects underwent routine laboratory investigations including radiographic examination and biochemical evaluation at baseline. All the subjects were assessed for disease activity using DAS28, CDAI, and MOI-RA at baseline using the formula mentioned below:

DAS28: DAS28 = $0.56\sqrt{TJC} + 0.28\sqrt{SJC} + 0.70$ (log ESR) + 0.014 (GH) (Van der Heijde, 1990 and Prevoo, 1995).

where, TJC = Tender Joint Count, SJC = Swollen Joint Count, ESR=Erythrocyte Sedimentation Rate (in mm/1st hr), GH = Global Health on visual analog scale(VAS), in 0 to 100 min

CDAI: CDAI = TJC + SJC + PGA + EGA (Aletaha and Smolen, 2005)

where, TJC = Tender Joint Count, SJC = Swollen Joint Count , PGA = Patient Global Assessment of disease activity (as per VAS - 0 to 10 cm), EGA = Evaluator Global Assessment of disease activity (as per VAS - 0 to 10 cm)

MOI-RA: The mean of the standardized values was calculated as:

MOI-RA (Mäkinen *et al*., 2008)

$$= \sum \frac{\text{values of individual variables (range 0 to 100)}}{\text{total number of variables (n=7)}}$$

All subjects continued with their medications and all three mentioned scores were reassessed at follow up at three months.

Statistical analysis: Data was collected and analyzed by using the Statistical Package for social sciences version 23 and compared the MOI-RA score with DAS28, CDAI score, and disease activity variables of DAS28 and CDAI (TJC,SJC,PGA, EGA, ESR) with MOI-RA, and DAS28, CDAI with the disease activity variables of MOI-RA(TJC,SJC,PGA,EGA,ESR, Assessment of pain, Indian heath assessment questionnaire (IHAQ).Pearson's correlation was used, for all tests with p value of less than 0.05 and confidence interval kept at 95 percent. Values were expressed as numbers, percentage, mean±SD. Statistical significance was measured by p-value <0.05= significant.

RESULTS

In the present study, the mean duration ofillness was 67.5 ± 59.8 months. The mean age of study group was 40.04±11.47 years and there were 84 females and 16 males. Seventy were rheumatoid factor positive.

Assessment of disease activity: Disease activity of the study group were assessed using MOI-RA, DAS28 and CDAI score at baseline (M0) and at 3 months follow up (M3) (Tables 1 and 2). The mean change in MOI-RA, DAS28, CDAI from the base line was 35.42, 3.17 and 26.77 respectively, all were statistically significant (all p<0.001).

Table 1. Mean values of the disease activity characteristics of the study population

Variable	Mean at M0 (±SD)	Mean at M3(±SD)	Change in variable	P value
TJC	12.21±8.67	1.43±1.96	10.78	<0.001
SJC	7.32±6.464	0.65±1.58	6.67	<0.001
PGA	6.01±2.24	1.07±0.96	4.94	<0.001
EGA	5.02±2.34	0.64±0.67	4.38	<0.001
AOP	5.78±2.303	0.93± 0.92	4.85	<0.001
ESR	41.37±11.77	19.11±4.62	22.26	<0.001
HAQ	0.76±0.501	0.11±0.129	0.65	<0.001

TJC, tender joint counts; SJC, swollen joint counts;PGA, patient global assessment; EGA, evaluator global assessment; AOP, assessment of pain; ESR, erythrocyte sedimentation rate; HAQ, healthassessment questionnaire; M0, month 0; SD, standard deviation; M3, month 3

Table 2. Table showing Mean values of disease activity scores at M0 and at M3

Variable	Mean at M0	Mean at M3	Change in scores	P value
DAS28	5.91±1.309	2.74±0.84	3.17	<0.001
CDAI	30.56±17.82	3.79±4.18	26.77	<0.001
MOI-RA	43.54±18.81	8.11±5.67	35.42	<0.001

DAS28, Disease Activity Score-28; CDAI, Clinical disease activity index; MOI-RA, Mean overall index for Rheumatoid arthritis; M0, month 0; M3, month 3

Table 3. Correlation between the DAS28, CDAI and MOI-RA at baseline (M0) and follow up (M3)

Disease Activity Scores	Pearson's Correlation Coefficient		
	M0	M3	p-value
DAS28& MOI-RA	0.962	0.929	<0.001
CDAI & MOI-RA	0.961	0.939	<0.001

DAS28, Disease Activity Score-28; MOI-RA, Mean overall index for Rheumatoid arthritis; CDAI, Clinical disease activity index; M0, month 0; M3, month 3

Table 4. Table showing the Cronbach's Alpha value of MOI-RA, DAS28 and CDAI

	MOI-RA	DAS28	CDAI
Cronbach's Alpha value	0.751	0.445	0.360

MOI-RA, Mean overall index for Rheumatoid arthritis; DAS28, Disease Activity Score-28; CDAI, Clinical disease activity index

Correlation between MOI-RA, DAS28 and CDAI: At baseline M0 and at follow up M3 was done using Pearson's correlation coefficient (r). All correlations were found to be statistically significant (p<0.001) (Table 3)

Cronbach's Alpha was calculated to measure the reliability of indices. It was 0.751 for MOI-RA, 0.445 for DAS28 and 0.360 for CDAI. (Table 4)

DISCUSSION

RA is a disease with highly variable presentation and disease course so attempts have been made especially in the last decade for consensus about a minimal set of variables measuring the disease activity. A wide variability of instruments (variables for use in assessing disease activity have been described and used including various types of joint counts (SJC,TJC), acute phase reactants (ESR, CRP) (Marjonne, 2008), global assessment scales(PGA, EGA) and general measures such as hemoglobin or body weight. Amongst the currently available composite disease activity indices that provide a single snatcher on a continuous scale, the two most widely used variables are the Disease Activity Score

using 28 joint count (DAS28) and Clinical Disease Activity Index (CDAI). Recently patient reported outcome measures (PROMs) (Gossec, 2010 and Fransen, 2005), have been used to assess the disease activity, based on the assessment done by patient himself. PROMs provide knowledge about patient's health, functional status, symptoms, treatment preferences, satisfaction and quality of life from patients's personal perspective. Health Assessment Questionnaire Disability Index (HAQ) (Bruce, 2003), Rheumatoid Arthritis Disease Activity Index (RADAI) (Fransen, 2001) and Routine Assessment of Patient Index Data (RAPID) (Pincus, 2008), are the effective PROMs used for RA assessment of disease activity.

Mean overall index for Rheumatoid arthritis (MOI-RA) (Mäkinen, 2008) is a new PROM for assessment of disease activity in Rheumatoid Arthritis. This is based on 7 ACR score data set of disease activity measures. MOI-RA is the mean of standardized values of tender and swollen joint counts (28); patients (GH) and physician/evaluator (GL) assessment of global health, patients assessment of pain(VAS 0-100), the HAQ(0-3) and ESR (1-100). MOI-RA has been found to have a good reliability evidence. There has been limited work using MOI-RA in disease assessment despite usable advantages. Disease activity was assessed using MOI-RA, DAS28 and CDAI score at baseline and at 3 months follow up where on treatment for Rheumatoid Arthritis. At 3 months follow up all subjects showed a decrease in all the three scores (indicating better control of disease activity). Various scores (at baseline and 3 months) were: MOI-RA was 43.54 and 35.42, DAS28 was 5.91 and 3.17 and CDAI was 30.56 and 26.77 respectively (Table 2). MOI-RA was compared with both CDAI and DAS28 at baseline and three months follow up using Pearson's coefficient and found to be statistically correlated with both scores. Pearson's coefficient was 0.962 and 0.929 respectively for DAS28 and 0.961 and 0.939 respectively for CDAI (Table 3). In a study done by Mäkinen *et al*., 2008 MOI-RA decreased from 38.5 to 13.3 from baseline to six months and DAS28 decreased from 5.57 to 2.77 and correlation of MOI-RA with DAS28 was 0.90 (Mäkinen, 2008) in the present study. The reliability measure correlated by internal consistency using Cronbach's alpha value was 0.751 for MOI-RA, 0.445 for DAS28 and 0.360 for CDAI indicating a significantly higher reliability for MOI-RA than other indices (DAS28/ CDAI) (Table 4).

Conclusion

Based on the above results and analysis, MOI-RA was significantly correlated with DAS28 and CDAI. So, use of MOI-RA may be a novel approach for RA to objectively assessing the inflammatory part of disease as well as impact on activity of daily living, the prime concern of the patient.

Till time there is a paucity of data so it is suggestive that larger and longer study should be planed to study the reliability of MOI-RA to assess disease activity in rheumatoid arthritis.

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