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Original Article

Comparison of Disease Severity in Established Rheumatoid Arthritis by DAS28-ESR and Clinical Disease Activity Index

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ABSTRACT

Objective: To compare disease severity in established rheumatoid arthritis by Disease Activity Score-28 for Rheumatoid Arthritis with Erythrocyte sedimentation rate (DAS28-ESR) and Clinical Disease Activity Index.

Study Design: Cross-sectional study.

Place and Duration of Study: Rheumatology Department, Pak Emirates Military Hospital, Rawalpindi Pakistan, from Jul 2021 to Feb 2022.

Methodology: Patients diagnosed with active Rheumatoid Arthritis were clinically evaluated in detail by consultant rheumatologist. Disease activity and severity was assessed by using DAS-28 and Clinical Disease Activity Index. Association of disease severity on DAS-28 was established with severity on Clinical Disease Activity Index and other socio-demographic factors.

Results: Mean age of the study participants was 35.81±8.45 years. In our sample, 303(75.75%) patients were female while 97(24.25%) were male. As per DAS-28 scoring, 175(43.75%) had mild, 142(35.5%) had moderate while 83(20.75%) had severe Rheumatoid Arthritis while as per Clinical Disease Activity Index scoring, 176(44%) had mild, 145(36.25%) had moderate while 79(19.75%) had severe Rheumatoid Arthritis. Disease severity on DAS-28 was strongly associated with disease severity on Clinical Disease Activity Index (p-value <0.001).

Conclusion: Severity of illness with DAS28-ESR had significant association with severity on Clinical Disease Activity Index, thus, both scales can be used interchangeably depending upon choice of clinician and availability of resources.

Keywords: Disease scoring, Inflammatory disease, Rheumatoid arthritis.

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INTRODUCTION

Rheumatoid arthritis is one of the commonest disorders encountered by clinicians[1] due to which it has been studied extensively in Pakistan in the last few years.[2] Due to its multisystem involvement, a variety of diagnostic modalities must be used for initial diagnosis and assessing response to treatment,[3,4] with biochemical markers and radiological investigations being key components of investigations.[5] These parameters can be incorporated to make a clinical scale to assist physicians in assessing exact severity of illness and response to treatment.[6] Different scales have been studied for diagnosing and assessing severity of patients suffering from RA and a recent study concluded that scales used to assess activity of RA had strong correlation with each other and can be used interchangeably depending upon availability,[7] and DAS-28 as 'gold standard'.[8,9] As no culturally adapted scale exists, the question arises that which scale would be best in our patients especially as a local study highlighted the burden of RA in Pakistan.[10] We, therefore, planned this study to compare disease severity in established RA by using both DAS28-ESR and CDAI.

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METHODOLOGY

The cross-sectional study was conducted from Jul 2021 to Feb 2022 at Pak Emirates Military Hospital (PEMH), Rawalpindi Pakistan. Sample size of 400 was calculated by using the World Health Organization (WHO) sample size calculator and keeping the population prevalence proportion of rheumatoid arthritis as 0.65%.[11] Non probability consecutive sampling technique was used for data collection after obtaining approval of Ethics Review Board.

Inclusion Criteria: Patients of either gender, between 15 to 60 years of age, who fulfilled the 2010 American College of Rheumatology classification criteria of active RA[12] were included.

Exclusion Criteria: Patients who were pregnant or without a clear diagnosis of RA, were excluded.

After detailed history and physical examination, relevant investigations were carried out in all the

study participants by consultant rheumatologist accompanied by registrar and both scales were administered. DAS-28 score includes clinical and laboratory parameters and recent lab values and physical examination findings are noted before calculating the final score,[13] however CDAI only includes clinical parameters with no laboratory parameter.[14] All analysis was done on Statistical Package for the Social Sciences (SPSS) version 23.0 where frequency and percentage were calculated for the qualitative variables, mean and standard deviation was calculated for quantitative variables and Pearson chi-square test was applied to see the association between dependent and independent variables with *p*-value less than or equal to 0.05 considered as significant.

RESULTS

We enrolled 400 patients of RA with mean age being 35.814±8.451 years. Table-I enumerates patient demographic information. Among our participants, 303(75.75%) were female while 97(24.25%) were male. According to DAS-28 score, 175(43.75%) had mild, 142(35.5%) had moderate while 83(20.75%) had severe RA while according to CDAI score, 176(44%) had mild, 145(36.25%) had moderate while 79(19.75%) had severe RA. Mean duration of symptoms in our study participants was 9.6±2.342 months. Table-II shows that age, gender and presence of comorbid illness were associated with disease severity on DAS-28 and disease severity on DAS-28 was strongly associated with disease severity on CDAI (*p*-value <0.001).

Table-I: Characteristics of Patients with Rheumatoid Arthritis (n=400)

Study Parameters		n(%)
Age (years)	Mean+SD	35.814±8.451
	Range (min-max)	18 years - 57 years
Mean duration of Symptoms (months)	9.6±2.342	
Gender	Male	97(24.25%)
	Female	307(75.75%)
Disease severity on DAS 28	Mild	175(43.75%)
	Moderate	142(35.35%)
	Severe	83(20.75%)
Disease severity on CDAI	Mild	176(44%)
	Moderate	145(36.25%)
	Severe	79(19.75)

DISCUSSION

Severity of disease in both the scales used in this study was associated with each other, therefore, both can be used in local clinical setting among patients suffering from RA. Leong *et al.*[15] analyzed various indices used to assess severity of RA and revealed that DAS28-ESR and DAS28-CRP were approximately linearly related to SDAI and CDAI. Our results supported these findings as severity of illness with DAS28-ESR had significant association with severity on CDAI in our study. DAS-28 was compared with findings on ultrasound on joints to look for severity of RA by Coras *et al.*[16] who found that clear difference existed between DAS and ECODAS when tender joint count was high. While our study compared different indices, we did not include ultrasound approach in our study. Kumar *et al.* compared DAS-28, CDAI and other scales[17] and concluded that CDAI was better among all the scales to assess disease activity and severity at time of diagnosis of illness and initial phase of treatment. However, we found out that CDAI is comparable to DAS-28 and they both could be used interchangeably. Singh *et al.* investigated how well scales designed to measure severity and activity of RA correlate with each other[18] and concluded that all three indices were equally effective in determining disease activity and severity. Our results supported their findings, and the two indices compared in our study also showed strong association with each other.

Table-II: Disease Severity Impact on Clinical Disease Activity Index with Disease Severity on DAS 28 (n=400)

Factors		DAS 28			*p*-value
		Mild	Moderate	Severe	
Age	< 40 years	78(44.5%)	89(62.7%)	40(48.2%)	0.004
	> 40 years	97(55.5%)	53(37.3%)	43(51.8%)	
Gender	Female	121(69.1%)	114(80.2%)	68(81.9%)	0.024
	Male	54(30.9%)	28(19.8%)	15(18.1%)	
Presence of comorbid illness	No	153(87.4%)	107(75.3%)	66(79.3%)	0.018
	Yes	22(12.6%)	35(24.7%)	17(20.7%)	
Disease severity on CDAI	Mild	169(96.6%)	07(4.9%)	0(0%)	<0.001
	Moderate	06(3.4%)	132(92.9%)	07(8.4%)	
	Severe	0(0%)	03(2.15%)	76(91.6%)	

LIMITATION OF STUDY

Not all patients were evaluated by the same clinician which introduces observer bias in our data. More studies with better design and higher power can generate more sound evidence.

CONCLUSION

Severity of illness with DAS28-ESR had significant association with severity on CDAI, thus both scales can be used interchangeably depending upon choice of clinician and availability of resources.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

AA & AF, : Data acquisition, data analysis, critical review, approval of the final version to be published.

FZ & SNA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

JI & HMU: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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