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## Assessment of disease activity score with respect to vitamin D in rheumatoid arthritis

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### Abstract

**Background:** Rheumatoid Arthritis (RA) is a crippling disorder with articular, extra-articular as well as systemic drawbacks. The present study was conducted to assess disease activity score with respect to vitamin D in rheumatoid arthritis.

**Materials & Methods:** 58 patients of rheumatoid arthritis of both genders were selected and measurement of vitamin D was done with ELISA in an autoanalyzer. Disease activity score 28 (DAS28) and Visual analog scale scoring system tools were used. Disease severity was evaluated according to the significance of DAS28 score as follows- Remission:  $DAS28 \leq 2.6$ , Low disease activity:  $2.6 < DAS28 \leq 3.2$ , Moderate disease Activity:  $3.2 < DAS28 \leq 5.1$  and high disease Activity:  $DAS28 > 5.1$ .

**Results:** Out of 58 patients, males were 26 and females were 32. The mean vitamin D level in patients with low disease activity was 10.5 ng/ml, in moderate disease activity was 11.2 ng/ml and in high disease activity group was 10.3 ng/ml. The mean DAS- 28 score in low, moderate and high disease activity group was 2.7, 4.3 and 5.2 respectively. The difference was significant ( $p < 0.05$ ).

**Conclusion:** A significant association has been found between the comparison of the level of vitamin D and the DAS-28 score.

**Keywords:** Rheumatoid arthritis, children, vitamin D

### Introduction

Rheumatoid Arthritis (RA) is a crippling disorder with articular, extra-articular as well as systemic drawbacks. Anaemia, cardiovascular diseases, lymphoma, cancers, renal disease, endocrine diseases, infections, lung diseases, and neuropsychiatric disorders are some comorbidities of RA. This can be prohibited by early diagnosis and periodic treatment of the patients retaining RA [1, 2].

The Disease Activity Score (DAS) is a numerical scoring system used to assess the severity of rheumatoid arthritis (RA). The score takes into account the number of swollen and tender joints, the level of inflammation measured by a blood test called C-reactive protein (CRP) or erythrocyte sedimentation rate (ESR), and the patient's subjective assessment of their disease activity using a visual analog scale (VAS) [3, 4].

Vitamin D has been shown to have an effect on the immune system and may play a role in the development and progression of RA. Some studies have investigated the association between vitamin D levels and disease activity in RA, with mixed results [5]. Vitamin D has inevitable effects on numerous physiological procedures as well as pathological conditions and several studies have evaluated the association of vitamin D deficiency in rheumatoid arthritis and have attained varied conclusions. vitamin d status may be a potential contributor to inflammatory diseases such as RA [6]. Overall, the association between vitamin D levels and disease activity in RA is still a topic of ongoing research and debate, and more studies are needed to fully understand the relationship between these two factors [7]. The present study was conducted to assess disease activity score with respect to vitamin D in rheumatoid arthritis.

## Materials & Methods

The present study consisted of 58 patients of rheumatoid arthritis of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Cases were diagnosed by American college of Rheumatology criteria (ACR/EULAR criteria). Parameters such as onset of symptoms, disease progression, pattern of joint involvement, pain and swelling in joints etc. was recorded. Investigations i.e. ESR, Rheumatoid factor (Quantitative) and C - reactive protein (Quantitative) were carried out. Measurement of vitamin D was done with ELISA in an autoanalyzer. Disease activity score 28 (DAS28) and Visual analog scale scoring system tools were used. For calculating the DAS28, swollen tender joint examination was performed and the value of each affected was noted. Disease severity was evaluated according to the significance of DAS28 score are as follows- Remission:  $DAS28 \leq 2.6$ , Low disease activity:

$2.6 < DAS28 \leq 3.2$ , Moderate disease Activity:  $3.2 < DAS28 \leq 5.1$  and high disease Activity:  $DAS28 > 5.1$ . Data thus obtained were subjected to statistical analysis. P value  $< 0.05$  was considered significant.

## Results

**Table 1:** Distribution of patients

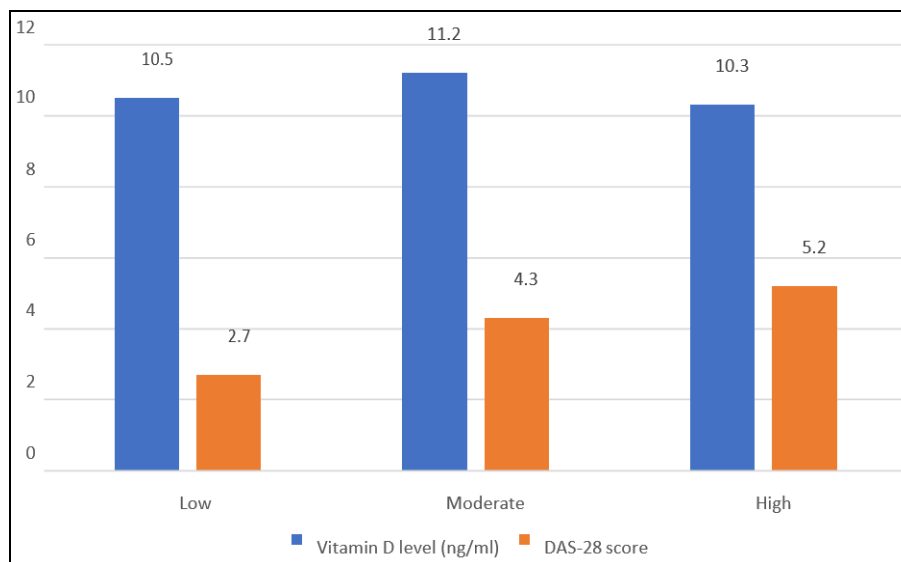
Total- 58		
Gender	Male	Female
Number	26	32

Table 1 shows that out of 58 patients, males were 26 and females were 32.

**Table 2:** Assessment of vitamin D level based on disease activity

Disease activity	Vitamin D level (ng/ml)	DAS-28 score
Low	10.5	2.7
Moderate	11.2	4.3
High	10.3	5.2
P value	0.92	0.01

Table 2, graph 1 shows that mean vitamin D level in patients with low disease activity was 10.5 ng/ml, in moderate disease activity was 11.2 ng/ml and in high disease activity group was 10.3 ng/ml. The mean DAS- 28 score in low, moderate and high disease activity group was 2.7, 4.3 and 5.2 respectively. The difference was significant ( $p < 0.05$ )



**Graph 1:** Assessment of vitamin D level based on disease activity

## Discussion

RA is a crippling disorder with articular, extra-articular as well as systemic drawbacks [8]. Anaemia, cardiovascular diseases, lymphoma, cancers, renal disease, endocrine diseases, infections, lung diseases, and neuropsychiatric disorders are some comorbidities of RA [9]. This can be prohibited by early diagnosis and periodic treatment of the patients retaining RA [10]. Disease Activity Score (DAS) is a type of examination equipment used by clinicians for assessing RA disease activity, in order to determine whether the evidence and indications have curtailed or stopped, and if treatment needs to be modified [11].

We found that out of 58 patients, males were 26 and females were 32. Sharma *et al.* [12] conducted a study on 42 patients in the age group of 18-45 years having RA, for assessing disease activity score concerning vitamin D in them. In the distribution of Disease Activity Level, the proportion of moderate activity level was found higher i.e. 66.7%. The mean vitamin D level was  $10.93 \pm 2.70$ , the minimum was 7 and the maximum was 18. The mean DAS-28 Score was

$4.46 \pm 0.82$  with a minimum value of 2.63 and a maximum of 6.08.

We found that mean vitamin D level in patients with low disease activity was 10.5 ng/ml, in moderate disease activity was 11.2 ng/ml and in high disease activity group was 10.3 ng/ml. The mean DAS- 28 score in low, moderate and high disease activity group was 2.7, 4.3 and 5.2 respectively. Kerr *et al.* [13] in their study vitamin D status (25-OH-D) was assessed in patients with RA using radioimmunoassay on banked plasma collected at enrollment. Insufficiency was defined as concentrations  $< 30$  ng/ml and deficiency as  $< 20$  ng/ml. Associations of 25-OH-D insufficiency/deficiency with patient characteristics obtained at enrollment were examined using multivariate logistic regression, adjusting for age, sex, season of enrollment, and race. Patients (850 men, 76% Caucasian) had a mean (SD) age of 64 (SD 11.3) years. The prevalences of 25-OH-D insufficiency and deficiency were 84% and 43%, respectively. After multivariate adjustment, both insufficiency and deficiency were more common with anti-cyclic citrullinated peptide antibody

positivity and non-Caucasian race, and in the absence of vitamin D supplementation. 25-OH-D deficiency, but not insufficiency, was independently associated with higher tender joint counts and highly sensitive C-reactive protein levels.

Kumar *et al.* [14] in their study 100 patients with 50 each in case and control groups were selected. Disease activity was measured in patients of RA using DAS-28. Mean of Vitamin D level in case and control groups were measured. Association of different stage of disease activity among cases was calculated with various laboratory parameters. Correlation coefficient of Vitamin D with various laboratory parameters and DAS-28 score with various laboratory parameters calculated. The mean vitamin D level in case group was 18.726 ng/ml, while in control group, it was 42.851 ng/ml. Association of various stages of disease activity was statistically highly significant for CRP and anti-CCP levels. Vitamin D was negatively correlated with serum ESR, while DAS-28 score was positively correlated with serum ESR, CRP, RA factor, and anti-CCP values.

The limitation the study is small sample size.

### Conclusion

Authors found that a significant association has been found between the comparison of the level of vitamin D and the DAS-28 score.

### Conflict of Interest

Not available

### Financial Support

Not available

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