

ORIGINAL RESEARCH

Vitamin D status and its association with disease activity in early rheumatoid arthritis in rural population of central India

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ABSTRACT

Background: Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by joint swelling, joint tenderness, and destruction of synovial joints, leading to severe disability and premature mortality. Early rheumatoid arthritis is defined as “RA with duration of disease/symptoms of disease < 6 month.”

Aim: To study serum vitamin D level in newly onset rheumatoid arthritis patients.

Methodology: It is a Case-control study, all patients fulfilling revised American College of Rheumatology criteria/EULAR criteria(2010) for Rheumatoid Arthritis being attended to in the rheumatology clinic, Tools like Oral questionnaire, History & Clinical examination, laboratory equipments will be used. Sample size is 45 cases and 45 controls, complying with inclusion and exclusion criteria.

Result: The study suggested that, mean value of Clinical Disease Activity Index (CDAI) of RA was 12.24 ± 8.05 in cases and 2.89 ± 0.83 in control, DAS28 Score was 4.24 ± 1.07 in cases and 3.00 ± 0.37 in control, it showed statistically significant association between serum Vitamin D3 level with CDAI and DAS28 Score in rheumatoid arthritis patients.

Conclusion: The study results suggest that the inverse relationship between serum Vitamin D levels and RA disease activity.

Keywords: Rheumatoid arthritis, Vitamin D, Disease activity

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by joint swelling, joint tenderness, and destruction of synovial joints, leading to severe disability and premature mortality. Early rheumatoid arthritis is defined as “RA with duration of disease/symptoms of disease < 6 month. It is marked by a symmetric, peripheral polyarthritis. It is the most common form of chronic inflammatory arthritis and often results in joint damage and physical disability.

Vitamin D, is a prohormone and is considered to be able to play potential immune-suppressive roles and to exert an endocrine action on the immune system cells, generating anti-inflammatory and immunoregulatory effects^{1,2}. The potential role of vitamin D deficiency in the pathogenesis of several chronic diseases such as, cancer, cardiovascular

disease, depression, pain perception, autism, obesity, type 2 diabetes, as well as autoimmune diseases including Rheumatoid arthritis and psoriasis^{3,4}

METHODOLOGY

It is a Case-control study, all patients fulfilling revised American College of Rheumatology criteria/EULAR criteria(2010) for Rheumatoid Arthritis being attended to in the rheumatology clinic, Tools like Oral questionnaire, History & Clinical examination, laboratory equipments will be used. Sample size is 45 cases and 45 controls, complying with inclusion and exclusion criteria.

INCLUSION CRITERIA

Age > 18 years, patients diagnosed within 6 months duration of RA, patients fulfilling revised American College of Rheumatology/ EULAR criteria(2010) for Rheumatoid Arthritis.

EXCLUSION CRITERIA

Patients who do not give consent and patients who expired/discharged/absconded/LAMA before the study could be completed on them.

RESULT

The study suggested that, mean value of Clinical Disease Activity Index (CDAI) of RA was 12.24 ± 8.05 in cases and 2.89 ± 0.83 in control, DAS28 Score was 4.24 ± 1.07 in cases and 3.00 ± 0.37 in control, it showed statistically significant association between serum Vitamin D3 level with CDAI and DAS28 Score in rheumatoid arthritis patients.

Table 1: Sex distribution among the patient

Serial no	Sex	Frequency
1.	Male	28
2.	Female	62

Table 2: Shows relationship between s. vit d3 and clinical disease activity index (CDAI) of rheumatoid arthritis in the study group .

SerialNo		N	CDAI(Mean \pm SD)	t-value	p-value
1.	Low Vit. D3	45	12.24 ± 8.05	-7.750	<0.0001
2.	Normal Vit. D3	45	2.89 ± 0.83		

Table 3: Shows relation of s. vit d3 level with CDAI and DAS28 Score in the study group.

SerialNo		Low Vit D3	Normal Vit D3	t-value	p-value
1.	DAS28 Score	4.24 ± 1.07	3.00 ± 0.37	-7.340	<0.0001
2.	CDAI	12.24 ± 8.05	2.89 ± 0.83	-7.750	<0.0001

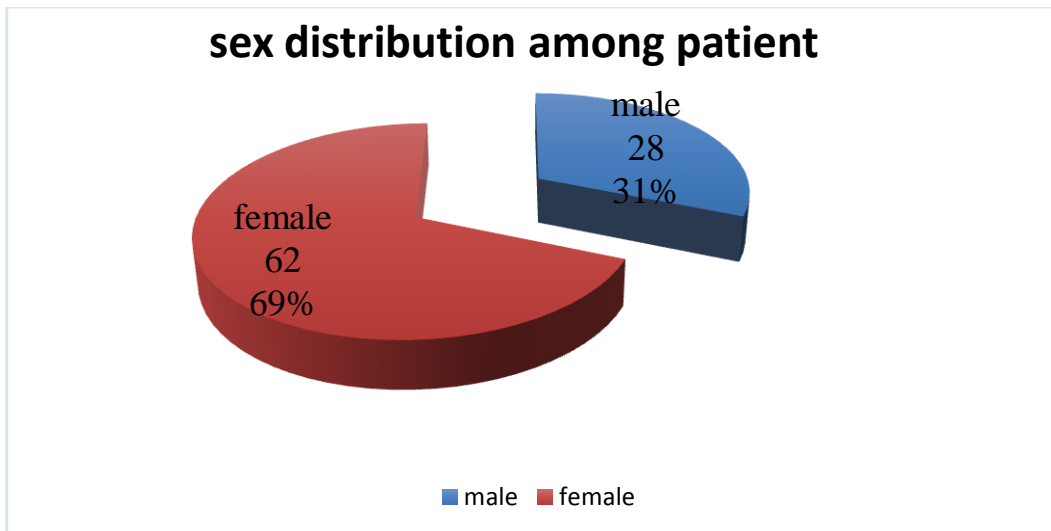


Figure 1- Gender distribution of Study group

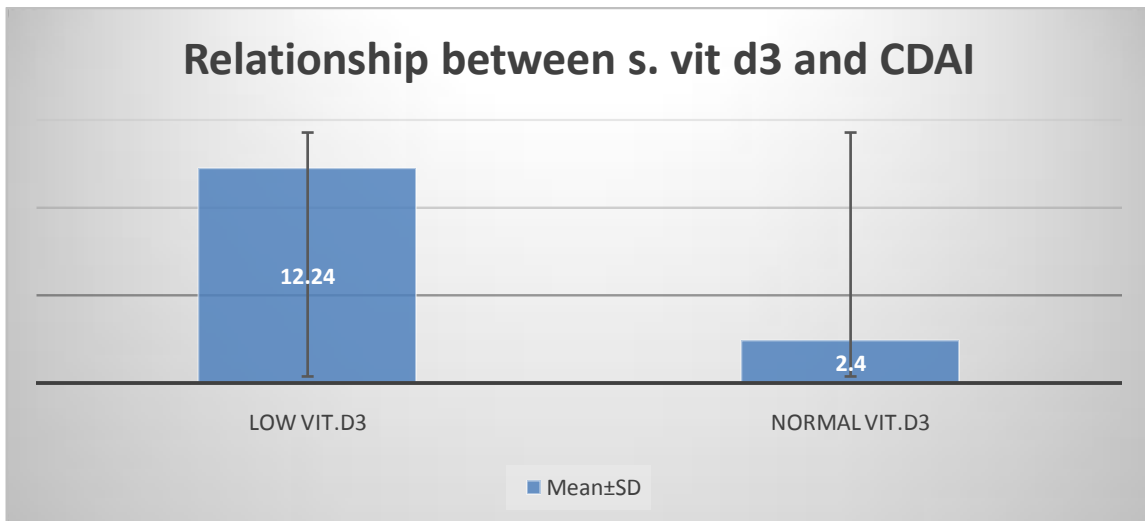


Figure 2- Relationship between s. vit d3 and CDAI

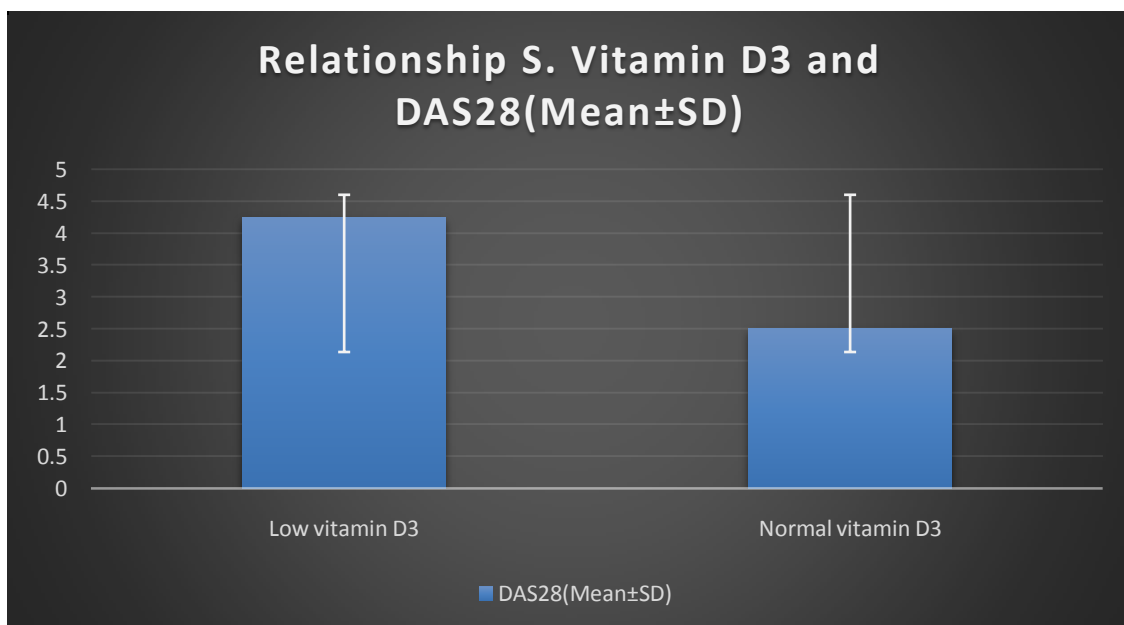


Figure 3- Relationship S. Vitamin D3 and DAS28 (Mean±SD)

DISCUSSION

RA is a chronic inflammatory disease of unknown aetiology marked by asymmetric, peripheral polyarthritis. Various studies done so far suggest that Vitamin D deficiency increases the risk of developing autoimmune diseases such as multiple sclerosis, inflammatory bowel disease, Type I diabetes mellitus, SLE, and RA.

This was a case control observational study done in Medicine Department of U.P.U.M.S with 90 patients, all were diagnosed as Rheumatoid Arthritis by Anti CCP and RA Factor, among them 45 were taken as case with low serum vitamin D3 and 45 were control with normal vitamin D3, majority of patients were between 31-40 (26.6%) years of age groups. The sex ratio in our study population was 62.69% female and 28.31% were male. The proportion of female patients was higher than male for both groups. This study coincides with the similar study done by **Narendra Meena Et al (2019)**⁵ also reported majority (86%) were female. This observation indicates that females are more prone to RA.

In this study, low vit D3 was most commonly found in mean age groups of 41.44±11.87 years and normal vit D3 was most commonly found in mean age groups of 40.60±12.72. This result shows statistically insignificant association of vit D3 activity in age group between case and control, similar result coincide with another study done by **Kinga Polasik Et al (2017)**⁶ showed vitamin D status is generally not altered in patients with RA in northern Poland when compared with age- and gender-matched healthy individuals (16.89 ± 8.57 ng/ml vs. 14.12 ± 7.51 ng/ml, respectively).

We also found that, mean value of Clinical Disease Activity Index (CDAI) of RA was 12.24±8.05 in cases and 2.89±0.83 in control DAS28 Score was 4.24 ± 1.07 in case and 3.00 ± 0.37, it showed statistically significant association between serum Vitamin D3 level with CDAI and DAS28 Score in rheumatoid arthritis patients. This was consistent with same result done by another study **Narendra Meena et al (2019)**⁵.

ABBREVIATION

25(OH) D	25-HydroxyVitamin D
ACR	American College of Rheumatology
CDAI	Clinical Disease Activity Index
DAS	Disease Activity Score
DIP	Distal Interphalangeal Joints
DMARD	Disease-Modifying Antirheumatic Drugs
ERA	Early Rheumatoid Arthritis
EULAR	European League against Rheumatism
MCP	Metacarpophalangeal Joints
MTP	Metatarsophalangeal Joints
PGE2	Prostaglandin E2
PIP	Proximal Interphalangeal Joints
RA	Rheumatoid Arthritis
RF	Rheumatoid Factor

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