



## STUDY OF LEVELS OF 25 HYDROXYCHOLECALCIFEROL (25(OH)D3) IN PATIENTS OF KNEE OSTEOARTHRITIS IN A TERTIARY CARE HOSPITAL IN NORTHERN INDIA.

**Dr. Roopali Mahajan**

Senior Resident Deptt. Of Medicine GMC Jammu.

**Dr. Annil Mahajan**

Ex. Professor and Head Deptt. Of Medicine GMC Jammu.

**Dr Shahbaz Khan\***

Senior Resident Deptt. of Medicine GMC Jammu. \*Corresponding Author

**ABSTRACT** **BACKGROUND :** Osteoarthritis is the most common type of arthritis. Its high prevalence especially in elderly, and the high rate of disability related to disease make it leading cause of disability in elderly. There is increasing evidence that a low vitamin D status may be important factor in the pathogenesis of osteoarthritis. It has been shown that vitamin D deficiency and insufficiency are global problems involving many countries and different age groups.

**MATERIALS AND METHODS:** The present tertiary care hospital based study was conducted from November 2016 to October 2017 in the department of Medicine and department of Orthopaedics, Government Medical College and associated hospital, Jammu.

**RESULTS:** Only 3.33% of cases were vitamin D sufficient in comparison to 43.33% in control population, whereas 86% of cases were either vitamin D insufficient or vitamin D deficient in comparison to 53.3% of control population thereby suggesting a highly significant correlation between vitamin D insufficiency/ deficiency and osteoarthritis.

**KEYWORDS :** Osteoarthritis, vitamin D, Body Mass Index, Joint Space Narrowing.

### INTRODUCTION

Vitamin D deficiency is pandemic, yet it is the most under-diagnosed and under-treated nutritional deficiency in the world **Van Schoor et al, 2011(1)**. Vitamin D deficiency is widespread in individuals irrespective of their age, gender, race and geography **Mithal A et al, 2009(2)**. Vitamin D was first discovered during the industrial revolution, when England was struck by an unprecedented epidemic of rickets. However, vitamin D deficiency is widely prevalent despite plentiful sunshine even in tropical countries like India. Vitamin D has a documented role in supporting bone and teeth health; it enhances the intestinal absorption of calcium and phosphorus and transports it to the bones and teeth, and regulates how much calcium remains in the body **Holick MF 2008(3)**. Vitamin D deficiency prevails in epidemic proportions all over the Indian subcontinent, with a prevalence of 70%–100% in the general population. Largely, the studies have shown association of vitamin D deficiency and osteoarthritis, however contrary reports are also available. Moreover, not much data is available particularly from this region. So the study is planned to define/effect/relationship of vitamin D with Osteoarthritis. In India, widely consumed food items such as dairy products are rarely fortified with vitamin D. Indian socioreligious and cultural practices do not facilitate adequate sun exposure, thereby negating potential benefits of plentiful sunshine. Consequently, subclinical vitamin D deficiency is highly prevalent in both urban and rural settings, and across all socioeconomic and geographic strata. **McAlindon et al, 1996(4)** published on the relation of vitamin D levels and the progression of knee osteoarthritis in 556 participants in the Framingham study. It was concluded that low intake and low vitamin D levels (<74nmol/l) appeared to be associated with increased risk for progression of osteoarthritis of the knee with an odds ratio of 2.9 for the lower tertile compared with the upper tertile. **Cao et al, 2013(5)** reviewed the association between serum levels of 25-hydroxy vitamin D [25-(OH)D] and OA and the effect of vitamin D therapy on OA. The study concluded that 25-(OH) D appeared to be implicated in structural changes of knee OA rather than symptoms, and further studies are required to determine whether vitamin D supplementation can slow disease progression.

### METHODS AND MATERIALS:

The present study entitled “Study of levels of 25 hydroxycholecalciferol (25(OH)D3) In patients of Knee Osteoarthritis in a tertiary care hospital in northern India” was conducted from November 2016 to October 2017 in the department of Medicine and department of Orthopaedics, Government Medical College and associated hospital, Jammu after getting valid, informed consent from the patients and after getting permission from the institutional ethics committee. All principles of bioethics were followed in the current study.

### Inclusion Criteria:

1. Ambulatory patients
2. Any gender
3. Age 40-75 years
4. Suffering from knee OA grades 1 and 2 and above as per Kellgren-Lawrence grading.

### Exclusion Criteria:

1. Any history of /diagnosed case of rheumatoid or other forms of arthritis
2. Known case of Osteomalacia
3. Patients of chronic renal disease
4. Patients of Acute Coronary syndrome
5. Cancer
6. Tuberculosis
7. Parathyroid and thyroid dysfunction
8. Lactation, pregnancy or on hyaluronic acids
9. Patients on Vitamin D and calcium supplements within 2 weeks.
10. Diabetes Mellitus

Statistical analysis was carried out using SPSS 16 for Windows (SPSS Inc., Chicago, Illinois, USA). The Student *t*-test was used to measure continuous variables and chi-square test for dichotomous variables.

### RESULTS AND DISCUSSION:

There is increasing evidence that a low vitamin D status may be important factor in the pathogenesis of osteoarthritis. It has been shown that vitamin D deficiency and insufficiency are global problems involving many countries and different age groups **Holick, 2007(6)**. However, these studies differed from each other in the terms of varying types of study designs, length of follow-up, proposed threshold for definition of vitamin D categories, types of outcomes and ascertainment method used, prevalence of vitamin deficiency, adjustment for confounders and statistical analysis, leading to inconsistent results.

In the present study, Forty seven (78.3%) out of 60 had levels less than 20 ng/mL whereas in control 26 (43.3%) out of 60 had levels less than 20ng/mL. Mean level of 25(OH)D were 16.83±9.88 ng/mL in cases and 22.76±3.55 for controls with p value less than 0.0001. **Goula et al, 2015(7)** found that 81.7% patients were vitamin D deficient; 15.2% of them were vitamin D insufficient (hypovitaminosis). Only 3% of patients were vitamin D sufficient. There was a significantly positive association between vitamin D and osteoarthritis. **Al-Jarallah K.F et al, 2012** in their study found that 92% patients were vitamin D deficient and mean value of vitamin D level was 11.4±6.07 ng/mL and is comparable with our study. In the present study, out of 60 cases, 36 (60%) were male and 24 (40%) were females and in control group 40

(66.67%) were male and 20 (33.33%) were females with p value 0.332. Regarding urban versus rural population, there was urban predominance both in cases i.e. 65% and controls i.e. 58.33%. However it is beyond the scope of present study to comment on this predominance which may be due to more health awareness, accessibility where we have done our study. **Breijawi N et al, 2008 (8)** observed 84.7% of osteoarthritis patients had vitamin D deficiency which was more or less consistent with current study with 86% of osteoarthritis patients were vitamin D deficient or insufficient.

#### CONCLUSIONS:

- I. Mean age of cases and control was  $66.42 \pm 7.45$  and  $64.83 \pm 8.44$  respectively.
  - II. Male predominance in study.
  - III. Cases studied were more from urban area.
  - IV. As per occupation, majority belong to moderate type of occupation.
  - V. Majority of the patient had duration of pain of 2-10 years amongst the cases.
  - VI. Non smoker, non vegetarian predominated the study.
  - VII. Majority of cases were overweight with BMI  $25-29.9 \text{ kg/m}^2$ .
- Only 3.33% of cases were vitamin D sufficient in comparison to 43.33% in control population, whereas 86% of cases were either vitamin D insufficient or vitamin D deficient in comparison to 53.3% of control population thereby suggesting a highly significant correlation between vitamin D insufficiency/deficiency and osteoarthritis.

Substantially high prevalence of vitamin D deficiency was recorded among patients of OA in our study cohort. The results, thereby suggests that vitamin D level screening and accordingly supplementation should be a part of treatment protocol of OA.

#### Conflicts of Interest: NONE

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