

## STUDY ON VITAMIN D STATUS AMONG ORTHOPAEDIC PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL

Sahil Sanghi<sup>1</sup>, Viney Kumar Govila<sup>2</sup>, Alok Kumar<sup>1</sup>, Vishisht Singh<sup>1</sup>

<sup>1</sup>Assistant Professor, Department of Orthopedics, World College of Medical Sciences & Research, Gurawar, Jhajjar, Haryana, India

<sup>2</sup>Associate Professor, Department of Orthopedics, World College of Medical Sciences & Research, Gurawar, Jhajjar, Haryana, India

Received : 09/08/2022  
Received in revised form : 11/09/2022  
Accepted : 05/11/2022

**Keywords:**

Vitamin D deficiency, non-specific pain, low back pain, Orthopaedic patients & Vitamin D.

Corresponding Author:

**Dr. Vishisht Singh,**  
Email: vishisht\_s@hotmail.com  
ORCID: 0000-0002-9523-1762

DOI: 10.47009/jamp.2023.5.1.123

Source of Support: Nil,  
Conflict of Interest: Nondeclared

*Int J Acad Med Pharm*  
2023; 5 (1); 599-602



### Abstract

**Background:** Osteomalacia, proximal muscle weakness, and bone pain are all symptoms of vitamin D inadequacy that affect the musculoskeletal system yet are usually ignored by patients and under diagnosed and under treated by physicians. The purpose of the current study is to determine the prevalence of Vitamin D deficiency (<20ng/dl) among patients attending the Orthopaedic Outpatient Department of a teaching hospital with complaints of generalized body pain, low back pain, generalized fatigue and weakness on minimal exertion without any other concomitant medical conditions. **Materials and Methods:** This descriptive study was conducted in the Orthopaedics Department at World College of Medical Sciences Research & hospital, Jhajjar situated in a rural area with a total of 428 adult patients above the age of 20 years. The sample size was worked out based on the previous studies regarding the prevalence of vitamin D deficiency in Indians which varies between 70-100% in different age groups. **Result:** Out of the 428 patients that were tested, 355 (82.94%) had vitamin D levels that were below normal. 49.06% had vitamin D deficiencies, 33.9% had insufficiencies, and only 17.05% had sufficient levels. When compared to other age groups, the proportion of patients with Vitamin D deficiency/insufficiency is higher in the 40–59 age group. This difference was shown to be statistically significant.

**Conclusion:** There is a need to screen the patient reporting with generalized body pain, low back pain, generalized fatigue and weakness in routine and vitamin D supplement should be given.

## INTRODUCTION

The so called sunlight vitamin or antirachitic factor better known as Vitamin D in modern medicine is produced by UVB spectrum of the sunlight and is essential for the health of bones and muscles. Chronic vitamin D insufficiency causes osteoporosis, osteomalacia, muscle weakness, generalised body aches, and nonspecific back pain subsequently increasing the risk of fracture from trivial falls. Every gender, age category, ethnicity, and cultural origin has been associated with vitamin D insufficiency impacting more than 1 billion individuals globally.<sup>[1]</sup> According to Ritu et al 2014, comprehensive review from India, vitamin D insufficiency is epidemic in proportion across the Indian subcontinent, with a frequency of 70–100% in the general population.<sup>[2]</sup> 30 to 50% of children and adults in studies conducted in Saudi Arabia, the United Arab Emirates, Turkey, India, and Lebanon have 25-hydroxy vitamin D [25(OH)D] levels below 20 ng/ml.<sup>[3]</sup> The most accurate measure of a person's

vitamin D status is their serum 25(OH)D level. Serum 25(OH)D levels below 20 ng/mL are referred to as "Deficiencies," levels between 20 ng/ml and 30 ng/mL are referred to as "Insufficiencies," and levels above 30 ng/mL are referred to as "Normal" levels. Low serum 25(OH)D levels, particularly in women, are a common laboratory finding of vitamin D deficiency in the developed world and the populated areas of Asia, the Middle East, and India.<sup>[4]</sup> Both doctors and patients have not recognised the importance of vitamin D for skeletal and extraskelatal health and the rampant prevalence of low vitamin D levels.<sup>[5]</sup> Insufficient or low levels of 25-hydroxyvitamin D (25-OH D) have been found in healthy children, young adults, middle-aged adults, and elderly people especially osteoporotic and post menopausal women around the world. Adult vitamin D deficiency consequences affect the musculoskeletal system and cause osteomalacia, proximal muscle weakness, and bone discomfort.<sup>[6]</sup> The socio-cultural habits of the population have changed, making it harder for people to get enough

sun exposure, and the food they eat is rarely vitamin D-fortified, which has led to a high incidence of vitamin D deficiency in the general Indian population.<sup>[7-9]</sup> The goal of the current investigation was to ascertain the prevalence of vitamin D deficiency (<20 ng/dl) in patients who were presenting to the orthopaedic outpatient department of a tertiary care hospital with complaints of generalised body pain low back pain and frequent exhaustion and weakness without any other concomitant conditions.

## MATERIALS AND METHODS

This descriptive study was carried out in the department of Orthopedics, World College of Medical Sciences & Research, Gurawar, Jhajjar during the period from April, 2021 to July, 2022 with a total of 428 adult patients above the age of 20 years. The sample size was worked out on the basis of previous studies with the prevalence of vitamin D deficiency in Indians varying between 70-100% in different age groups [10].

### Inclusion Criteria

The study includes adult patients over the age of 20 years who have vague complaints of generalised body discomfort, back pain, exhaustion, generalized fatigue & weakness while working or walking, who do not have any joint aches and other medical comorbid conditions.

### Exclusion Criteria

Patients under the age of 20 years and adult patients exhibiting symptoms such as trauma, fever, GIT issues, or a known medical ailment are excluded from the study.

### Data Collection and Procedure

When other usual tests, such as complete blood count, ESR, Blood sugar and RFT were normal, patients were examined for vitamin D levels on ERBA ELISA. According to a recent consensus, the patients were categorised into four groups based on the results: deficiency with a Vitamin D level (25-OH VITAMIN D) of <20 ng/ml, insufficiency with a level of 20–30 ng/ml, sufficiency / desirable with a level of >30 ng/ml, and toxicity with a level of >100 ng/ml. [Table 1] shows the standard ranges that this study accepts.

### Statistical Analysis

The collected information was entered into Microsoft Excel 2010 as a spreadsheet, which was then exported to the data editor page of SPSS version 20. (SPSS Inc., Chicago, Illinois, USA). Calculation of percentages, means, and standard deviations were all covered in the descriptive statistics. 5% was taken as the confidence interval to determine significance.

## RESULTS

The study comprised 428 individuals over the age of 20 years who had visited the Orthopaedic Outpatient Department with complaints of myalgia and bone pain but no joint pain and were examined for vitamin D levels. Among the participants under study, there were 261 women and 167 men comprising of 61% and 39% respectively. The participants' average age was  $47.6 \pm 10.2$  years. For males it was  $48.6 \pm 11.4$  years and for females it was  $43.56 \pm 9.24$  years. The bulk of them, 44.39% were in the 40 to 59 years old age bracket, followed by 32.9% of people in the 20 to 39 year old bracket. Males had a mean vitamin D level of 26.34 ng/ml, while females had a mean level of 25.92 ng/ml.

**Table 1: Biological reference range. Method: ERBA ELISA**

Parameters	Range
Vitamin D level	Deficient<20 ng/ml Insufficient20-30 ng/ml sufficiency / desirable >30 ng/ml Toxicity>100ng/ml

**Table 2: Shows the distribution of the study participants' age and sex.**

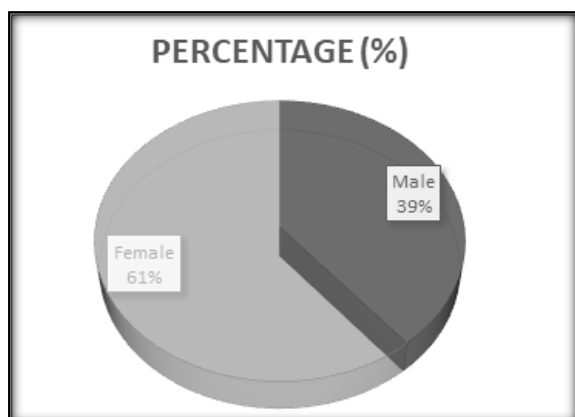
Age group in years	Total	Male	Female
20-39 years	141 (32.9%)	54 (38.3%)	87 (61.7%)
40-59years	190 (44.39%)	76 (40.0%)	114 (60.0%)
60 years and above	97 (22.66%)	37 (38.14%)	60 (61.86%)
Total	428(100.0%)	167(39.01%)	261(60.98%)

**Table 3: Shows the vitamin D level and its distribution among participants**

Variables	Range	No. of patient (%) N=428	Male	Female
Deficiency	<20 ng/ml	210 (49.06%)	75(35.7%)	135(64.3%)
Insufficiency	20-30 ng/ml	145 (33.9%)	67(46.2%)	78(53.8%)
Sufficient	>30 ng/ml	73 (17.05%)	29(39.7%)	44(60.3%)

**Table 4: Shows the age distribution and vitamin D level.**

Vit.D level/age group distribution	20-39 years (%)	40-59 years (%)	60 years and above (%)	Total (%)
Deficiency<20 ng/ml	68(15.9%)	105(24.5%)	37(8.6%)	210 (49.06%)
Insufficiency20-30 ng/ml	54(12.6%)	60(14.01%)	31(7.24%)	145 (33.9%)
Sufficient >30 ng/ml	19(4.4%)	25(5.8%)	29(6.8%)	73 (17.05%)
Total	141 (32.9%)	190 (44.4%)	97 (22.7%)	428(100.0%)

**Figure 1: Shows the distribution of Male and Female.**

[Table 3] shows the vitamin D levels of the 428 patients who were tested; of these, 355 (82.94%) had levels that were below normal, of which 49.06% had deficiency, 33.9% had insufficiency and 17.05% had sufficient levels. None of the participants were found to have toxic level (>100ng/ml) of Vitamin D. [Table 4] lists the age distribution and vitamin D levels of patients who visited the Orthopaedic Outpatient Department during the study period. On comparing the various age groups, the proportion of patients with Vitamin D deficiency and insufficiency is higher in the 40-59 years group and the observation was found to be statistically significant.

## DISCUSSION

In India, vitamin D insufficiency is pervasive. Numerous studies have documented low vitamin D levels found in a range of people, including young individuals, hospital staff, postmenopausal women and school children.<sup>[11,12]</sup> Although other researchers, such as BabitaGhai et al,<sup>[13]</sup> reported 66% of the men and 73% of the women to have low levels of vitamin D, the prevalence of vitamin D deficiency among adult patients attending the Orthopaedic department of a tertiary care hospital with non-specific complaints of general body pain/back pain/tiredness/weakness on exertion was 39% and 61% respectively in the present study. According to Halim Yilmaz et al.<sup>[14]</sup> 79.8% of premenopausal women had vitamin deficiencies. According to Chittari V Harinarayan et al,<sup>[9]</sup> 25 (OH) D levels in South Indian subjects were considerably higher compared to the subjects from North India. They also observed that 44% of men and 70% of women in rural regions and 62% of men and 75% of women in urban areas had vitamin D deficiency. Similar findings reported by NatasjaM,<sup>[4]</sup>

and Rituet al,<sup>[7]</sup> of low blood level of vitamin D were found increasingly among women. In the current study, the mean levels of vitamin D were insufficient between 20 to 30 ng/ml throughout the age and sex groups. In their study in Kuwait, Khaled Al-Jarallah et al,<sup>[15]</sup> found that the mean vitamin D levels for both the control group without musculoskeletal pain and the symptomatic group were insufficient. According to David Arvoldet al,<sup>[16]</sup> non-specific skeletal pain was more common in patients than in controls. There was also a positive correlation between deficiency and skeletal pain, such as leg pain, arthralgia and generalised pain, with the correlations being stronger in women than in men. According to Babita Ghai et al,<sup>[13]</sup> individuals with persistent low back pain had an average vitamin level of 18.4 ng/mL, with mean values of 17.3 ng/mL for men and 19.6 ng/mL for women which are lower as in comparison to the present study may be because the study has been conducted in a rural population.

## CONCLUSION

There are multiple studies that have demonstrated that the level of vitamin D was low among symptomatic patients with musculoskeletal pain. The mean value of vitamin D level of the study groups with musculoskeletal symptoms were lower than the optimum level of 30 ng/ml. When a patient has a vitamin D deficiency/insufficiency, proper vitamin D supplementation must be prioritised. As per the data from the present study, it can be fairly concluded that patients can safely be prescribed vitamin D supplementation without knowing the laboratory levels in case they are symptomatic especially in cases of elderly women. The patients attending the hospital especially with complaints of generalized body pain, low back pain, generalized fatigue and weakness should be screened in routine. Even the screening of asymptomatic general population for vitamin D is recommended for early intervention.

## REFERENCES

1. Holick MF. Vitamin D deficiency. *N Engl J Med.* 2007;357:266-81.
2. Ritu G, Gupta A. Vitamin D deficiency in India: Prevalence, Casualties and interventions. *Nutrients.* 2014;6:729-75.
3. Al-Othman A, Al-Musharaf S, Al-Daghri NM, Krishnaswamy S, Yusuf DS, Alkharfy KM, et al. Effect of physical activity and sun exposure on vitamin D status of Saudi children and adolescents. *BMC Pediatr.* 2012;12(1):92.
4. Natasja M, Van Schoor. Worldwide vitamin D status. *Best Practice & Research Clinical Endocrinology & Metabolism.* 2011; 25:671- 680.

5. Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. *Am J Clin Nutr.* 2004;80(6)1678S-1688S.
6. Holick MF. High prevalence of vitamin D inadequacy and implications for health. *Mayo Clin Proc.* 2006;81(3)353-373.
7. Gupta A. Vitamin D deficiency in India prevalence, causalities and interventions. *Nutri.* 2014;6(2)729-775.
8. Grant WB, Holick MF. Benefits and requirements of vitamin D for optimal health- a review. *Altern Med Rev.* 2005;10(2)94-111.
9. Harinarayan CV, Ramalakshmi T, Prasad UV, Sudhakar D, Srinivasarao PV, Sarma KV, et al. High prevalence of low dietary calcium, high phytate consumption, and vitamin D deficiency in healthy south Indians. *Am J Clin Nutri.* 2007;85(4)1062-1067.
10. Gupta A. Fortification of foods with vitamin D in India. *Nutri.* 2014;6(9)3601-3623.
11. Beloyartseva M, Mithal A, Kaur P, et al. Widespread vitamin D deficiency among Indian health care professionals. *Arch Osteoporos.* 2012;7(1-2):187-192.
12. Multani SK, Sarathi V, Shivane V. Study of bone mineral density in resident doctors working at a teaching hospital. *J Postgrad Med.* 2010;56:65-70.
13. BabitaGhai MD, Dipika Bansal MD, Raju Kanukula M. High prevalence of hypovitaminosis D in Indian chronic low back patients. *Pain Physician.* 2015;18(E853)E853-E862.
14. Yilmaz H, Bodur S, Karaca G. The association between vitamin D level and chronic pain and depression in premenopausal women. *Turk J Phys Med Rehab.* 2014; 60(2)121-125.
15. Al-Jarallah K, Shehab D, Abraham M, Mojiminiyi OA, Abdella NA. Musculoskeletal pain- should physicians test for vitamin D level. *Int J Rheum Dis.* 2013;16(2)193-197.
16. Arvold D, Odean M, Dornfeld M, Regal R, Arvold J, Karwoski G, et al. Correlation of symptoms with vitamin D deficiency and symptom response to cholecalciferol treatment- a randomized controlled trial. *Endo Pract.* 2009;15(3)203-212.