ORIGINAL RESEARCH

Evaluation of Vit D Levels in Seasonal Variations Among Known Population: An Observational Study in Rohilkhand Region

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ABSTRACT

Background: Vitamin D deficiency, which classically manifests as bone disease is characterized by impaired bone mineralization. Because of seasonal variations in sunlight exposure, variations in vitamin D levels have been proposed to occur. Hence; the present study was conducted for evaluating the vit D levels in seasonal variations among known population in Rohilkhand Region. **Materials & Methods:** A total of 50 patients were enrolled in the present study. All the patients belonged to the age group of 25 to 50 years. Patient demographic data, including age, gender, and body mass index (BMI), were collected. Blood samples were taken, and biochemical values of vitamin D was recorded using FINECARE via fluorescent immunoassay (FIA) method. The entire study period of 2022 was divided into four time periods as follows: January-March, April-June, July-September and October-December. Vitamin D status in patients based on the Endocrine Society clinical practice guidelines. According to the guidelines, a vitamin D level <50 nmol/L is considered deficient, 50–74 nmol/L is considered insufficient, and ≥75 nmol/L is considered optimal. **Results:** Majority of the Vitamin D deficient patients were seen in January-March time period (28 percent of patients) and October-December time period (30 percent of patients). There were significantly more patients with vitamin D deficiency during the cold season than during warm/hot season. **Conclusion:** Due to inadequate sunlight in winters, there is comparatively higher deficiency of vitamin D.

Key words: Vitamin D, Seasonal.

INTRODUCTION

Vitamin D deficiency, which classically manifests as bone disease (either rickets or osteomalacia), is characterized by impaired bone mineralization. More recently, the term vitamin D insufficiency has been used to describe low levels of serum 25-hydroxyvitamin D that may be associated with other disease outcomes. Reliance on a single cutoff value to define vitamin D deficiency or insufficiency is problematic because of the wide individual variability of the functional effects of vitamin D and interaction with calcium intakes. In adults, vitamin D supplementation reduces the risk of fractures and falls.[1- 3]A robust relationship has long been established between vitamin D status and bone health. Most impressive is healing of rickets or osteomalacia and its symptoms by a treatment with this vitamin. Also well-established is the improvement of neuromuscular coupling by repletion of vitamin D depots, resulting in a decrease of body sway and falls. There is increasing evidence that some carcinoma types like colon, breast, prostate and skin cancer are less frequent with sufficient vitamin D supply.[4-6]Because of seasonal variations in sunlight exposure, variations in vitamin D levels have been proposed to occur. However, the phenomenon of variation in vitamin D levels over the year remains controversial. Several studies have concluded that vitamin D levels fluctuate over the year, whereas other studies have concluded the opposite. Several factors might account for the inconsistency in the reported results regarding the prevalence of vitamin D deficiency.[7- 9] Hence; the present study was conducted for evaluating the vit D levels in seasonal variations among known population in Rohilkhand Region.

MATERIALS & METHODS

The present study was conducted in Department of Biochemistry, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh (India) for evaluating the vit D

levels in seasonal variations among known population in Rohilkhand Region. A total of 50 patients were enrolled in the present study. All the patients belonged to the age group of 25 to 50 years. Patient demographic data, including age, gender, and body mass index (BMI), were collected. Blood samples were obtained and biochemical values of vitamin D was recordedusing FINECARE via fluorescent immunoassay (FIA) method. Patients with a history of vitamin D or calcium supplement use in the three months prior to study, and comorbidities affecting calcium and vitamin D levels were excluded from the present study. The entire study period of 2022 was divided into four time periods as follows: January-March, April-June, July-September and October-December. Vitamin D status in patients based on the Endocrine Society clinical practice guidelines. According to the guidelines, a vitamin D level <50 nmol/L is considered deficient, 50–74 nmol/L is considered insufficient, and ≥75 nmol/L is considered optimal. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

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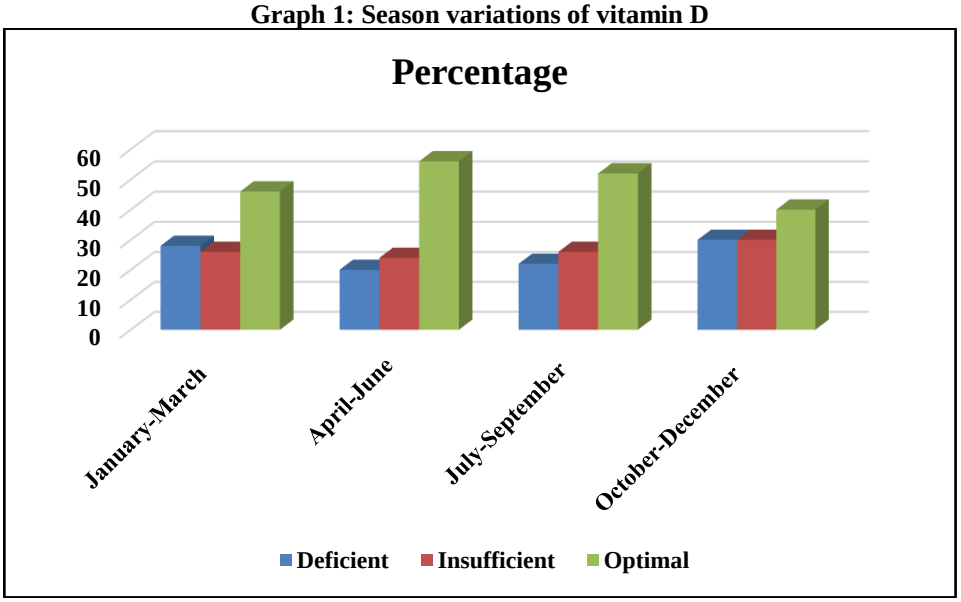
RESULTS

A total of 50 patients were enrolled. Mean age of the patients was 45.8 years. Out of 50 patients, 28 patients were males while remaining were females. Majority of the Vitamin D deficient patients were seen in January-March time period (28 percent of patients) and October-December time period (30 percent of patients). There were significantly more patients with vitamin D deficiency during the cold season than during warm/hot season.

Table 1: Season variation of vitamin D

Month	Deficient		Insufficient		Optimal		Total	
	n	%	n	%	n	%	N	%
January-March	14	28	13	26	23	46	50	100
April-June	10	20	12	24	28	56	50	100
July-September	11	22	13	26	26	52	50	100
October-December	15	30	15	30	20	40	50	100

Graph 1: Season variations of vitamin D



DISCUSSION

Vitamin D is an important factor for regulation of bone metabolism. However, its actions are not limited to the skeletal system but extend to several no skeletal organs such as the brain, heart, prostate, colon and immune cells. Several studies have shown a link between vitamin D deficiency and the development of many clinical conditions such as diabetes, hypertension, coronary heart diseases, as well as a number of inflammatory and non-inflammatory skeletal diseases.[10] Sources of vit D are sunlight, food, and supplements, with sunlight being the predominant source. Based on the important contribution of sunlight exposure to vitamin D levels, it has been commonly assumed that hypovitaminosis D is negligible and vitamin D seasonal variation is minimal in populations living in lower latitudes. A recent study conducted on 7,437 British Caucasians born in 1958 showed that 47% of British adults have insufficient levels of serum 25-(OH)D (<40 nmol/l) and 16% have deficient levels (<25 nmol/l) in the winter and spring. Furthermore, a study from Canada showed that the prevalence of vit D insufficiency was generally lowest in the summer and highest in the fall and winter, with 20% of the participants having 25-(OH)D concentrations below 40 nmol/l during the

winter.[11, 12] Hence; the present study was conducted for evaluating the vit D levels in seasonal variations among known population in Rohìlkhand Region. A total of 50 patients were enrolled. Mean age of the patients was 45.8 years. Out of 50 patients, 28 patients were males while remaining were females. Majority of the Vitamin D deficient patients were seen in January-March time period (28 percent of patients) and October-December time period (30 percent of patients). There were significantly more patients with vitamin D deficiency during the cold season than during warm/hot season. In a similar study conducted by Levis S et al, authors vitamin D Deficiency and Seasonal Variation in an Adult Population. At the end of the winter, 212 men and women attending an internal medicine clinic at a local county hospital were enrolled for measurements of 25-hydroxyvitamin D [25(OH)D], 1,25-dihydroxyvitamin D, and PTH; 99 participants returned at the end of summer. In the 99 subjects who returned for the end of summer visit, the mean 25(OH)D concentration was 31.0 ± 11.0 ng/ml (77.5 ± 27.5 nmol/liter) in men and 25.0 ± 9.4 ng/ml (62.5 ± 23.5 nmol/liter) in women. Seasonal variation represented a 14% summer increase in 25(OH)D concentrations in men and a 13% increase in women, both of which were statistically significant.[13]Seasonal variations in serum levels of vitamin D in patients prior to thyroid surgery was assessed in a previous study conducted by Aldrees T et al. Serum vitamin D levels were deficient in 70% of the patients, insufficient in 18%, and optimal in 12%. The mean age of patients in the deficient group was significantly lower than that in the optimal group. There were significantly more patients who had vitamin D deficiency during the cold season than during the warm/hot season. Serum vitamin D levels did not vary between seasons; however, the preoperative magnesium and thyroid stimulating hormone (TSH) levels were significantly higher during the warm/hot season than during the cold season. Preoperative calcium level was not significantly different between the cold and warm/hot months.[14] In a previous study conducted by Bozkurt S et al, authors evaluated the medical records of the patients who attended a physical medicine and rehabilitation outpatient clinic, and the serum 25-(OH)D levels in 440 subjects of varying ages and sexes in both the summer (n=177) and winter (n=263). Serum 25-(OH)D, parathyroid hormone, alkaline phosphatase (ALP), calcium, and phosphorus levels were recorded. A large percentage of the adult Turkish population has insufficient levels of vit D during the winter and summer. Serum 25-(OH)D levels were significantly lower in the winter compared with the summer season. The prevalence of 25-(OH)D deficiency was 94% in the winter and 85% in the summer. With respect to age or sex, there were no differences in the 25-(OH)D levels.[15]

CONCLUSION

Due to inadequate sunlight in winters, there is comparatively higher deficiency of vitamin D.

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