

Original Article

Evaluation of Prevalence Pattern of Vitamin D Deficiency in Known Population- An Observational Study

Megha Kapoor¹, Garima Charak²

^{1,2}Demonstrator in Department of Physiology, G.M.C Jammu, J & K, India

ABSTRACT:

Background: In adults, chronic vitamin D deficiency leads to osteoporosis, osteomalacia, muscle weakness and increased risk of falls and fractures. The present study was conducted to assess the cases of vitamin D deficiency in known population. **Materials & Methods:** The present study was conducted in the department of Physiology. It comprised of 480 subjects. Subjects with vitamin D level (25(OH)D) below 20 ng/ml (50 nmol/l), vitamin D insufficiency as 25(OH)D level at 21-29 ng/ml were evaluated. The serum 25(OH)D estimation was done using radioimmunoassay (RIA) method. All were supplemented with vitamin D3 60,000 IU/week for eight weeks as rapid restoration phase. **Results:** Out of 480 subjects, males were 68 and females were 412. The difference was significant (P- 0.02). Age group 21-30 years had 2 males and 10 females, 31-40 years had 6 males and 48 females, 41-50 years had 12 males and 88 females, 51-60 years had 20 males and 124 females and > 60 years had 28 males and 142 females. The difference was significant (P- 0.01). Mean vit D3 25(OH)D level of < 20 ng/ml was seen in 66 males and 396 females, 20-30 ng/ml was seen in 2 males and 16 females. The difference was significant (P- 0.01). **Conclusion:** Vitamin D is an essential vitamin required in sufficient amount for bones and teeth. Vitamin D deficiency is quite common in females.

Key words: Osteoporosis, Osteomalacia, Vitamin D

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Corresponding Author: Dr. Garima Charak, Demonstrator in Department of Physiology, G.M.C Jammu, J & K, India

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INTRODUCTION

Vitamin D has been traditionally known as the anti-rickets factor or the sunshine vitamin. It is considered unique due to its ability to be synthesized in the body and functioning as a hormone. Additionally, it plays a crucial role in calcium homeostasis and bone mineral metabolism. Vitamin D is a group of fat-soluble secosteroids responsible for increasing intestinal absorption of calcium, magnesium, and phosphate, and multiple other biological effects.¹

In humans, the most important compounds in this group are vitamin D₃ and vitamin D₂. Cholecalciferol and ergocalciferol can be ingested from the diet and from supplements. Only a few foods contain vitamin D. The major natural source of the vitamin is synthesis of cholecalciferol in the skin from cholesterol through a chemical reaction that is dependent on sun exposure. Dietary recommendations typically assume that all of a person's vitamin D is taken by mouth, as sun exposure in the

population is variable and recommendations about the amount of sun exposure that is safe are uncertain in view of the skin cancer risk.²

In adults, chronic vitamin D deficiency leads to osteoporosis, osteomalacia, muscle weakness and increased risk of falls and fractures. Inadequate vitamin D intake and low blood levels of vitamin D metabolites are related to increased incidence of several autoimmune diseases involving the T helper type 1 lymphocyte, including multiple sclerosis, rheumatoid arthritis, type I diabetes, systemic lupus erythematosus and psoriasis. Lower levels of vitamin D, adjusted for body mass index, are also associated with increased risk of hypertension, myocardial infarction and may lead to death as a result of cardiovascular disease.³ The present study was conducted to assess the cases of vitamin D deficiency in known population.

MATERIALS & METHODS

The present study was conducted in the department of Physiology. It comprised of 480 subjects of both genders. All were informed regarding the study and written consent was obtained.

General information such as name, age, gender etc. was recorded.

Subjects with vitamin D level (25(OH)D) below 20 ng/ml (50 nmol/l), vitamin D insufficiency as 25(OH)D level at

21-29 ng/ml were evaluated. The serum 25(OH)D estimation was done using radioimmunoassay (RIA) method. All were supplemented with vitamin D3 60,000 IU/week for eight weeks as rapid restoration phase. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

		Total- 480	
Males	Females		P value
68	412		0.02

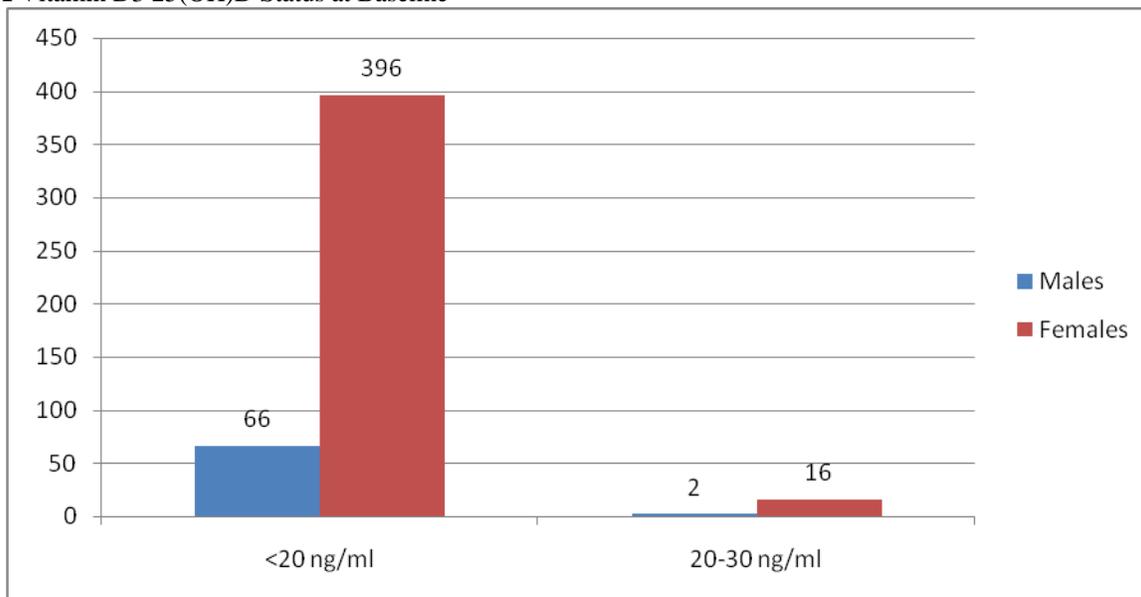
Table I shows that out of 480 subjects, males were 68 and females were 412. The difference was significant (P- 0.02).

Table II Age wise distribution of subjects

Age group (years)	Males	Females	P value
21-30	2	10	0.01
31-40	6	48	
41-50	12	88	
51-60	20	124	
>60	28	142	

Table II shows that age group 21-30 years had 2 males and 10 females, 31-40 years had 6 males and 48 females, 41-50 years had 12 males and 88 females, 51-60 years had 20 males and 124 females and > 60 years had 28 males and 142 females. The difference was significant (P- 0.01).

Graph I Vitamin D3 25(OH)D Status at Baseline



Graph I shows that mean vit D3 25(OH)D level of < 20 ng/ml was seen in 66 males and 396 females, 20-30 ng/ml was seen in 2 males and 16 females. The difference was significant (P- 0.01).

DISCUSSION

Vitamin D has a significant role in calcium homeostasis and metabolism. Its discovery was due to effort to find the dietary substance lacking in children with rickets (the childhood form of osteomalacia). Vitamin D supplements are given to treat or to prevent osteomalacia and rickets, but the evidence for other health effects of vitamin D supplementation in the general population is inconsistent.⁴ Several forms (vitamers) of vitamin D exist. The two major forms are vitamin D₂ or ergocalciferol, and vitamin D₃ or cholecalciferol; vitamin D without a subscript refers to either D₂ or D₃ or both. These are known collectively as calciferol. Vitamin D₂ was chemically characterized in 1931. In 1935, the chemical structure of vitamin D₃ was established and proven to result from the ultraviolet irradiation of 7-dehydrocholesterol.⁵

We found that out of 480 subjects, males were 68 and females were 412. Age group 21-30 years had 2 males and 10 females, 31-40 years had 6 males and 48 females, 41-50 years had 12 males and 88 females, 51-60 years had 20 males and 124 females and > 60 years had 28 males and 142 females. This is similar to Cigolini et al.⁶

Vitamin D deficiency remains the main cause of rickets among young infants in most countries, because breast milk is low in vitamin D and social customs and climatic conditions can prevent adequate sun exposure. In sunny countries such as Nigeria, South Africa, and Bangladesh, where rickets occurs among older toddlers and children, it has been attributed to low dietary calcium intakes, which are characteristic of cereal-based diets with limited access to dairy products.⁷

We found that mean vit D₃ 25(OH)D level of < 20 ng/ml was seen in 66 males and 396 females, 20-30 ng/ml was seen in 2 males and 16 females. This is similar to Zargar et al.⁸ Vitamin D₃ supplementation has been tentatively found to lead to a reduced risk of death in the elderly, but the effect has not been deemed pronounced or certain enough to make taking supplements recommendable. Other forms (Vitamin D₂, alfalcidol, and calcitriol) do not appear to have any beneficial effects with regard to the risk of death. High blood levels appear to be associated with a lower risk of death, but it is unclear if supplementation can result in this benefit. Both an excess and a deficiency in vitamin D appear to cause abnormal functioning and premature aging. The relationship between serum calcifediol level and all-cause mortality is parabolic. Harm from vitamin D appears to occur at a lower vitamin D level in the black population than in the white population.⁹

A study by Pravina,¹⁰ of these 178 subjects, 94.94% subjects were found to be vitamin D deficient (<20 ng/ml) and the mean plasma vitamin D₃ 25(OH)D level was 9.36 ng/ml (\pm 5.19) at baseline. At the end of the study, the mean 25(OH)D plasma level was noted to be 29.28 ng/ml (\pm 13.57). The mean change from baseline was 19.92 ng/ml.

CONCLUSION

Vitamin D is an essential vitamin required in sufficient amount for bones and teeth. Vitamin D deficiency is quite common in females.

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