Original Research Article

Prevalence of vitamin D deficiency among patients visiting a tertiary care centre

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Abstract

Background: Vitamin D deficiency is prevalent worldwide. Even though India is a tropical country with good amount of ample sunlight all through the year, high percentage of deficiency of Vitamin D was reported. This study was done to evaluate the prevalence of vitamin D deficiency among patients visiting Orthopaedic department at a tertiary care hospital. **Methods:** This cross-sectional study was carried out at SVS Medical College, MahbubNagar, Telangana, India. In this study 200 patients of both the sexes aged 18 years and above were included. Data pertaining to sex, age, body weight, height, and body mass index were obtained from all the participants and serum 25(OH)D level was estimated from each participant by the Beckman coulter immunoassay fully automatic hormonal analyser. Data were expressed as percentages and Statistical analysis was done using Chi-square test. P<0.05 was considered as statistically significant **Results:** In this study 200 participants were included. There were 110 females and 90 males. Prevalence of Vitamin D deficiency was found to be 65.5%. Insufficient, deficient and severe deficient of vitamin d deficiency was found to be 13%, 63% and 24%. Elderly, Females, and obese showed a higher prevalence of vitamin D deficiency. **Conclusion:** In our study high prevalence of vitamin D deficiency was reported among the participants. There is a need for public awareness regarding the need for dietary rectifications and lifestyle changes providing opportunities for greater exposure to sunlight

Keywords: Vitamin D, prevalence, 25(OH)D.

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INTRODUCTION

Vitamin D is a fat-soluble vitamin, known for its antirachitic activity.[1] Calciferols are a group of lipid-soluble compounds with a 4-ringed cholesterol backbone and refer to both, Vitamin D3, i.e., cholecalciferol and Vitamin D2, i.e., ergocalciferol.[2] Generally Vitamin D3 is referred to Vitamin D. Vitamin D can be synthesized endogenously and with the sun exposure about 90% of the required Vitamin D is synthesized in the skin.[3] It is required for controlling the normal levels of calcium and phosphate in the blood which are needed for contraction of muscle, normal mineralization of bone, nerve conduction, and general cellular function in all cells of the body and is also found to be important for immune function, for inflammation, cell proliferation, and differentiation.[3,4]

The high prevalence of vitamin D deficiency is an extremely important public health issue[5] Chronic deficiency of vitamin D in adults causes osteomalacia, osteoporosis, muscle weakness and increased risk of falls.[6-9] There is well known Epidemiological support for skeletal benefits of vitamin D.[6,7] Even though India is a tropical country with good amount of ample sunlight all through the year, high percentage of deficiency was reported by previous studies.[10-13] Hence, to provide an overview about Vitamin D status, the present study is carried out to determine the prevalence of the Vitamin D deficiency and associated factors among the participants.

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MATERIALS AND METHODS

This is a cross-sectional study, carried out among the 200 subjects of both the sexes aged 18 years and above at Orthopaedics department, SVS Medical college, MahbubNagar, Telangana, India during January 1, 2020, to August 30, 2020 who came for the estimation of serum 25(OH)D level. The exclusion criteria include: 1. pregnant and lactating women 2. Patient of age below 18 years 3.those who were taking vitamin supplements. 4. Patients with major CVS disorders, endocrine disorders, renal disorders and liver disorders 5. Who are not willing to participate. Institutional ethics committee approval was taken from the institution and informed consent was taken from all the participants. From each participant data about sex, age, body weight, height, and body mass index were collected. after overnight fasting Blood samples were collected from all the 200 subjects under aseptic precaution into plain vacutainers and properly labeled followed by separation of serum. Then, the estimation serum 25(OH)D level was done by the Beckman coulter immunoassay fully automatic hormonal anlayser. We classified participants as normal, vitamin D deficient and insufficient as per recently available literature [34]. Vitamin D Level (ng/ml) >30 (Normal) 21-29.9 (Insufficient) 10-20.9 (Deficient) <10 (severe deficiency)[14]

Statistical analysis: Variables were expressed as percentages. The data obtained was analyzed by chi-square test. P<0.05 was considered as statistically significant.

RESULTS

63.5% of study subjects were in the age group 18-40 years, 28% of study subjects were 41-60 years age group followed by 8.50% of study subjects were 61 years and above. Results showed that 55% were female and 45% were males. 69.5% of the study subjects were of normal weight and only 30.50% of the study subjects were overweight. (Table 1).

Table 1: Demographic characteristics of study subjects

Demographic characteristics	Frequency	Percentage (%)
Age in years		
18-40 years	127	63.50%
41-60 years	56	28.00%
61 and above	17	8.50%
Gender		
Female	110	55.00%
Male	90	45.00%
BMI (KG/M$^{2)}$		
<25	139	69.50%
>=25	61	30.50%

Among 200 study subjects with vitamin D deficiency, severe deficient of vitamin d deficiency was present in 24% (31 out of 131) of study subjects, deficient severity of vitamin D deficiency was present in 63% (83 out of 131) of study subjects and insufficient severity of vitamin D deficiency was present in 13% (17 out of 131) of study subjects (Table 2)

Table 2: Distribution of severity of deficiency

	Frequency	Percentage
Insufficient	17	13%
Deficient	83	63%
Severe deficient	31	24%
Total	**131**	**100.00%**

In this study significant association was seen between age and presence of vitamin D deficiency. In this study high proportion of females had vitamin D deficiency as compared to males and it is statistically significant (P<0.05). higher proportion of overweight subjects had vitamin D deficiency as compared to normal weight subjects and it is statistically significant (P<0.05). (Table 3).

Table 3: Association of variables and vitamin-D deficiency

Demographic characteristics	Vitamin d deficiency		total	P value
	Not deficient(n=69)	Deficient(n=131)		
Age (in years)				
18-40 Years	52 (41%)	75 (59%)	127 (100.00%)	**0.03**
41-60 years	17 (30%)	39 (70%)	56 (100.00%)	
>60 years	0 (0.00%)	17 (100.00%)	17 (100.00%)	
Gender				
Female	32 (29%)	78 (71%)	110 (100.00%)	**0.02**

Male	37 (41%)	53 (59%)	90 (100.00%)	
BMI				
<25	63 (45%)	76 (55%)	139 (100.00%)	0.02
>=25	6 (10%)	55 (90%)	61 (100.00%)	

DISCUSSION

In our study 65.5% participants were having Vitamin D deficiency. Harinarayan *et al.*[15] in their study reported that 69.3% subjects were having vitamin D deficiency. Agarwal *et al.*[16] in their study reported 58% subjects were having vitamin D deficiency. Beloyartseva *et al.*[17] in their study reported that 79% subjects were having vitamin D deficiency. In our study, highest percentage of vitamin D deficiency was observed in elderly (65.69%). It was reported by many other studies. González-Molero *et al.* in their study found that the level of 25-OHD had a significant correlation with age.[18] Daly *et al.* reported that prevalence of vitamin D deficiency increased with advancing age.[19] In our study it was observed that prevalence of vitamin D deficiency was more in females than males. It was reported by many other studies. Ford *et al.*[20] reported higher prevalence of vitamin D deficiency in Asian women compared to Asian men to the type of clothing worn due to fully covered dressing style. It has been reported that wearing a sunscreen with an SPF of 15 reduces vitamin D synthesis in the skin by 99%.[21] In our study Vitamin D deficiency was more prevalent in obese persons. It was reported by many other studies. Forrest *et al.* reported that obese persons have the risk of having less serum 25(0h)d levels than non obese persons.[22] daly etal observed that serum 25(0h)d levels were lower in obese persons than non obese persons.[23] It is documented that in persons with higher BMI, Vitamin D gets accumulate in adipose tissue leading to decreasing availability of Vitamin D in the blood.[24]

CONCLUSION

In this study high prevalence of vitamin D deficiency was detected and can be concluded that in India even though longer hours of sunshine were there, still there is deficiency of Vitamin D. There is a need for public awareness regarding the need for dietary rectifications and lifestyle changes providing opportunities for greater exposure to sunlight.

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