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ORIGINAL ARTICLE

Evaluation of Vitamin D Status in Corporate staff in Urban Population

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ABSTRACT

Introduction: Across the globe Vitamin D Deficiency (VDD) is a major health issue in both the developed and developing countries. In India, despite of ample sunlight which is required for the synthesis of vitamin D within the body, VDD is prevalent at a range of 50-90% among all the age groups. Scientific evidence reveals that, in addition to skeletal disorders, Vitamin D is also associated with the risk of cardiovascular diseases, obesity, hypertension and diabetes mellitus etc.

Aim: This study was conducted to evaluate vitamin D status in normal healthy individuals who are engaged in jobs where exposure to sunlight is low. The study also aimed to find out any gender differences and age variation in levels of vitamin D.

Material and methods: 200 normal individuals were randomly selected from various corporate offices of Puducherry and vitamin D levels were estimated by chemiluminescence immunoassay. They were then divided into 3 groups- deficiency (< 20ng/ml), insufficiency (20-30ng/ml) and sufficiency (> 30ng/ml). Any subject with acute, chronic or terminal illness were excluded from the study

Results: More than 80% of the subjects were found to be vitamin D deficient or insufficient. The subject of older age group and females had more severe deficiency than young males.

Conclusion: Vitamin D deficiency is highly prevalent in urban population.

KEY WORDS : Vitamin D; obesity; hypertension

Introduction

Vitamin D can be produced in the body with mild sun exposure or consumed in food or supplements. Adequate vitamin D intake is important for the regulation of calcium and phosphorus absorption, maintenance of healthy bones and teeth, and is suggested to supply a protective effect against multiple diseases and conditions such as cancer, type 1diabetes and multiple sclerosis.

Worldwide, an estimated 1 billion people have inadequate levels of vitamin D in their blood, and deficiencies can be found in all ethnicities and age groups. (1-3) Indeed, in industrialized countries, doctors are even seeing the resurgence of rickets, the bone-weakening disease that had been largely eradicated through vitamin D fortification. (4–6). Numerous studies are being conducted worldwide to relate vitamin D and many chronic diseases. But it is interesting to note that normal levels of vitamin D, especially in urban population is generally low. So it is a matter of debate that whether vitamin D supplementation is of prophylactic value to prevent many diseases or it can be actually added as an adjuvant to treat the diseases along with main drug regimen.

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The major source of vitamin D for children and adults is exposure to natural sunlight.[7,8,9] Thus, the major cause of VDD is inadequate exposure to sunlight.[7,11-13] Wearing a sunscreen with a sun protection factor of 30 reduces vitamin D synthesis in the skin by more than 95%.[14] People with a naturally dark skin tone have natural sun protection and require at least three to five times longer exposure to make the same amount of vitamin D as a person with a white skin tone.[15-17] There is an inverse association of serum 25(OH)D and body mass index (BMI) greater than 30 kg/m2, and thus, obesity is associated with VDD.[17]

Patients with one of the fat malabsorption syndromes and bariatric patients are often unable to absorb the fat-soluble vitamin D, and patients with nephritic syndrome lose 25(OH)D bound to the vitamin D-binding protein in the urine. Patients on a wide variety of medications, including anticonvulsants and medications to treat AIDS/HIV, are at risk because these drugs enhance the catabolism of 25(OH)D and 1,25(OH)2D.[18] Patients with chronic granuloma-forming disorders (sarcoidosis, tuberculosis, and chronic fungal infections), some lymphomas, and primary hyperparathyroidism who have increased metabolism of 25(OH)D to 1,25(OH)2D are also at high risk for VDD.[19,20]

Aim Of The Study

This study was conducted to evaluate vitamin D status in normal healthy individuals who are engaged in jobs where there is low exposure to sunlight. The study also aimed to find out any gender differences and age variation in vitamin D levels.

Materials

The study was conducted after approval from Sri Lakshmi Narayana Institute Of Medical Science From February 2017 to July 2017. 200 normal individuals were randomly selected from various corporate offices of Bhubaneswar and vitamin D levels were estimated. They were then classified into 3 groups- deficiency (< 20ng/ml), insufficiency (20-30ng/ml) and sufficiency (> 30ng/ml). The following inclusion and exclusion criteria were decided for the study

Inclusion Criteria

Age >18 years , upper limit at the discretion of investigator.

Subjects with indoor jobs with < 30 minutes of exposure to sunlight in a day

Ability to understand and the willingness to sign and date a informed written consent at the screening visit before performing any specific procedures.

Exclusion Criteria

<18 years of age.

Children, pregnant and lactating mothers.

Any acute or terminal illness.

Uncontrolled hypertension or uncontrolled diabetes.

Any form of endocrine disorder, which could alter the plasma levels of vitamin D.

Those receiving any form of therapy in the preceding one week, which would affect the plasma levels of vitamin D like vitamin D preparations, calcium, corticosteroids, etc.

Methods

Vitamin D Assay by Chemiluminescence immunoassay:

25 OH Vitamin D assay is a direct, competitive chemiluminescent immunoassay (CLIA) for quantitative determination of total 25 OH

vitamin D in serum or plasma. During the first incubation, 25 OH Vitamin D is dissociated from its binding protein and binds to the specific antibody on the solid phase. After 10 minutes the tracer (vitamin D linked to an isoluminol derivative) is added. After additional 10 minute incubation, the unbound material is removed with a wash cycle. Subsequently, the starter reagents are added to initiate a flash chemiluminescent reaction. The light signal is measured by a photomultiplier as relative light units (RLU) and is inversely proportional to the concentration of 25 OH Vitamin D present in calibrators, controls, or samples.

Results and Discussion

Gender	Numbers	%
Males	110	55
Females	90	45

TABLE 1- Gender Distribution

	Mean	Minimum (Years)	Maximum (Years)
Age	43.62	19	60

Table 2- Mean age of the study group.

	Mean	
Plasma Vit D levels ng/ml	14.89	
Range	8.0- 38.5 ng/ml	
Plasma Vit D status	Numbers	%
Deficiency (< 20ng/ml)	91	45.5
Insufficiency (20-30 ng/ml)	83	41.5
Sufficiency (>30 ng/ml)	31	15.5

Casle 3 : Mean and Range

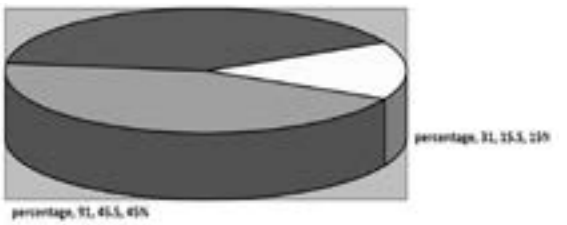
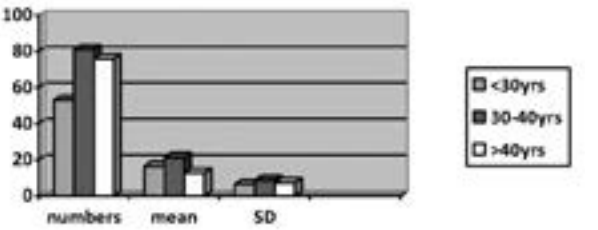


Table 4- Mean and Stander

	Male	Females
Vit D levels (ng/ml) Mean± SD	19.26±8.42	13.86±6.65

Vitamin D levels in different age Groups	Numbers	Mean
<30 years	53	16.42
30-40 years	81	21.21
>40 years	76	12.66

Table 5- Mean Vitamin D Levels In Different Age Groups



The gender distribution and mean age of the study group are depicted in table 1 and 2. The levels of vitamin D in the 3 groups- group 1 (deficiency), group 2 (insufficiency) and group 3 (sufficiency) are illustrated in table 3. It was observed that about more than 80% of the study population had either deficiency or insufficiency of vitamin D. Table 4 shows comparison of vitamin D levels between males and females and table 5 shows mean vitamin D levels in different age groups.

Vitamin D Deficiency is on a rise as a major public health problem in India. Majority of the population in India resides in areas receiving ample sunlight throughout the year; still vitamin D deficiency is a problem of growing concern [21, 22]. Skin complexion, poor sun exposure, vegetarian food habits and lower intake of vitamin D fortified foods could be attributed to the high prevalence of VDD in India [23]. However till the early 1990s, VDD

was considered to be rare in India.

Such belief was based on studies measuring serum calcium and alkaline phosphatase in Indian population [24]. Till the year 2000, there was no systematic study which directly assessed body vitamin D status of Asian Indians residing in India [23]. A study conducted amongst apparently healthy subjects to measure their serum 25(OH)D level using sensitive and specific assay documented that significant hypovitaminosis D was present in up to 90 per cent of the subjects [23]. Subsequently, studies conducted in different parts of the country have documented a widespread prevalence of VDD.

This study also showed similar results with high prevalence of vitamin D deficiency in corporate staff in urban populations. It was also observed that vitamin D deficiency is more in older age groups and the women in general had lower levels of vitamin D. The reasons for such findings in this study may be the fact that women and older people are more confined to their homes outside office hours whereas younger males are involved in more outdoor jobs on holidays and in leisure hours. So they are exposed to more sunlight when compared to other groups which is still not enough to overcome deficiency of vitamin D in most cases.

Conclusion

Vitamin D deficiency is very prevalent in normal healthy individuals and we should be very careful in linking the disease with vitamin D deficiency unless there is strong proof of any association with a particular disease. Vitamin D supplementation in our view will not be harmful in disease condition due to widespread nature of deficiency in all age groups.

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