



Original Research Article

To find vitamin D status in in-patients coming to DM WIMS hospital, Wayanad

Vinisha K¹, Vijatha Thomas^{2,*}, Arun T Mithrasan³¹Dept. of Biochemistry, Sreechand Speciality Hospital, Kannur, Kerala, India²Dept. of Biochemistry, DM WIMS Medical College, Wayanad, Kerala, India³Dept. of Community Medicine, DM WIMS Medical College, Wayanad, Kerala, India

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ABSTRACT

Introduction: Vitamin D deficiency is a serious health problem and is widespread in individuals irrespective of age, gender, race and geography. Despite being studied so much its deficiency is still missed by clinicians. This study was done to find vitamin D status of patients attending DM WIMS, Wayanad, Kerala, irrespective of the department they attended.

Materials and Methods: A retrospective cross-sectional study was done and the data for 1 year was extracted from HIS (hospital information system) and reviewed. The subjects were divided into three groups: Group A: level <20 ng/ml (vitamin D deficient), Group B: level = 21-29 ng/mL (vitamin D insufficient) and Group C: level between 30-100 (vitamin D sufficient).

Result: Out of total 498 subjects in our study, 27% were males and 73% were females. Vitamin D deficiency was seen in 57.4% males and 72.5% females. The most affected age groups were 20 -40 years (28.7%) and 41-60 years (28.3%).

Conclusion: In the present study vitamin D deficiency was found to be more in females compared to males. Also the most affected age groups were 20-40 years. Routine screening for vitamin deficiency and its supplementation starting at all ages should be recommended to improve vitamin D status.

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1. Introduction

Vitamin D is a fat-soluble vitamin, known for its antirachitic activity.¹ It is also called the sunshine vitamin and is very important nutrient that helps body take in calcium from foods. They are required for building strong bones. It maintains calcium homeostasis. It also has a role to play in inflammation, cell proliferation, and differentiation, etc.^{2,3}

There is evidence showing association of vitamin D deficiency with greater risk of heart attack, heart failure, stroke, diabetes, cancers, high blood pressure, autoimmune disease, respiratory disease, etc.⁴ Addition of vitamin D as supplements or fortified foods is said to improve bone and overall health and reduce the risk of various diseases like respiratory tract infections, autoimmune diseases, diabetes,

and cancer.⁵

Vitamin D deficiency is mainly due to lack of exposure to sun and decrease intake. There are lot of studies from around the world reporting lower levels of vitamin D.^{5,6} The prevalence of vitamin D deficiency in India is around 50 to 90%, despite abundant sunshine being present in the country, and this deficiency is irrespective of age and sex.⁷⁻¹⁰

Therefore, the present hospital-based study was done to find the vitamin D status of patients attending DM WIMS, Wayanad, Kerala, irrespective of the department they attended.

2. Materials and Methods

The present study was conducted in Biochemistry laboratory at DM WIMS Hospital, Wayanad. Data of

* Corresponding author.

E-mail address: drvijathaatm@gmail.com (V. Thomas).

498 patients with vitamin D level, age and sex were retrospectively collected from HIS (hospital information system) and medical record department (MRD) for 1 year (May 2018 to April 2019) and were reviewed extensively. Serum levels of vitamin D were estimated on venous blood sample and the test was carried by electrochemiluminescence immunoassay (ECLIA) method on e-cobas 411 analyser. As per latest recommendation of International Endocrine society on serum vitamin D level, subjects were divided into three groups. Group A: vitamin D deficient with levels <20ng/mL, group B: Vitamin D insufficient with levels 21-29ng/mL and group C: Vitamin D sufficient with levels 30-100ng/mL.

Subjects were further divided into 2 groups based on gender as male and female. Subjects were also divided into 4 groups based on age as <20years, 20-40 years, 41-60 years and >60 years. The data was also categorized on the basis of various departments they attended.

Those patients who attended DM WIMS Hospital and their results were available were only enrolled in the study. Children <1 year and adults >90 years were excluded from the study. Vitamin D level <3ng/mL and >70ng/mL were excluded from the study.

Data was analyzed using Statistical Analysis System (SAS) 9.4. Results of the study were expressed in percentage.

3. Results

A total of 498 patients who underwent vitamin D estimation were included in our study with 134 male subjects and 364 female subjects. Out of total 134 male subjects, 57.4% (77) subjects were vitamin D deficient (<20ng/mL), 21.6% (29) were vitamin D insufficient (21-29ng/mL) and 21% (28) were vitamin D sufficient (30-100ng/mL) respectively (Table 1). Out of total 364 female subjects, 72.5% (264) were vitamin D deficient (<20ng/mL), 16% (58) subjects and 11.5% (42) subjects were vitamin D insufficient (21-29ng/mL) and vitamin D sufficient (30-100ng/mL) respectively (Table 1).

Age group of our study subjects ranged from 1year to 88years. Maximum number of subjects (163) with vitamin D deficiency was seen in the age group 41-60years followed closely by the age group 20-40 years (159). (Figure 1).

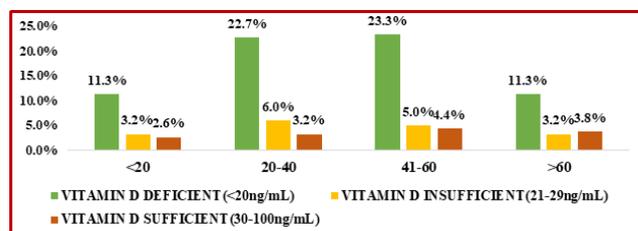


Fig. 1: Age wise distribution of the subjects in accordance to their vitamin D status

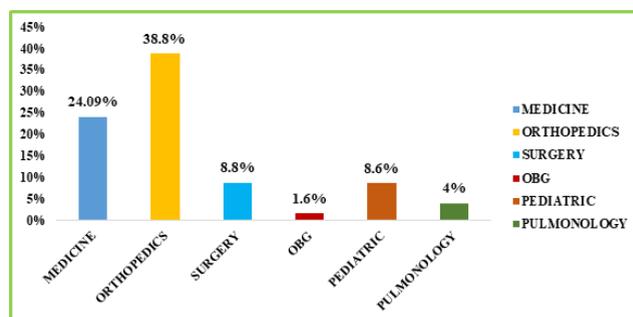


Fig. 2: Age wise distribution of the subjects in accordance to their vitamin D status

Figure 2 shows the department wise distribution of the subjects in accordance to their low vitamin D level. Out of total 498 subjects in our study, 86% had vitamin D level <30ng/mL. 193 (39%) of them visited orthopedics department, 120 (24%) visited in medicine department. Around 44 (8.8%) of them visited surgery department, 43 (8.6%) visited pediatrics department and 20 (4%) visited pulmonology department.

4. Discussion

In the present study, hypovitaminosis D was observed in 85.9% of the study population. Mean vitamin D status of study population was 19.41 ± 13.4 ng/mL. Vitamin D deficiency (<30ng/mL) was high in females (88.5%) as compared to the males (79%). Our findings were similar to many published articles which relates to vitamin D deficiency in Indian population. In a study by Mansoor S et al. in their study found vitamin D deficiency in 94.3% of the females and 88.6% of the males.⁵

In a study done by Niru Chhetri et al., hypovitaminosis D (vitamin D deficiency and vitamin D insufficiency) was observed in 74.44% of the study population and the mean value of vitamin D was 22.36ng/ml.⁶ Kirtikar Shukla et al. in their study observed 93 % of the subject population were vit D deficient. The mean 25(OH) vit D level in their population was found to be 21.47 ± 14.4 ng/mL (median 17.7).¹¹

Exposure to sun is the major source of vitamin D in India because of the dietary pattern, mostly being vegetarians. Though fortified vitamin D rich foods are available in market but it is not affordable to socio-economically underprivileged populations. Other main cause of vitamin D deficiency in India is the social taboos, various culture playing a major role.¹² Also the change in lifestyle, i.e., being indoors most of the time, has also limited the exposure to sun, thereby increasing the deficit burden.

Furthermore, in the blazing heat of India, the quest to obtain sufficient vitamin D levels takes a backseat and improvement in vitamin D status cannot be attained only by sunlight exposure. Also the desire to obtain a fairer skin

Table 1: Sex wise distribution of the subjects in according to their vitamin D status

Characteristics	VDD (<20ng/mL) N(%)	VDI(21-29ng/mL) N(%)	VDS(30-100ng/mL) N(%)	Total N
Male	77(57.4%)	29(21.6%)	28(21%)	134
Female	264(72.5%)	58(16%)	42 (11.5%)	364

*VDD- Vitamin D deficient, VDI- Vitamin D insufficient, VDS- Vitamin D Sufficient

complexion in females may extinguish any desire for any sun exposure. Duration of sun exposure is also important. The darker Indian skin require greater duration of exposure when compared to individual with fairer skin, as they do not produce significant amount of vitamin D.^{13–15}

Use of sunscreens also affects vitamin D level. Matsuka et al. in their study found that long-term use of sunscreens lowers vitamin D level.¹⁴ This is said to be because of reduced cutaneous absorption of UV-B radiation.

In our study, maximum number of subjects with vitamin D deficiency (<30ng/mL) belonged to the age group of 20-40 years (28.7%) and 41-60 years (28.3%). Romaina Iqbal et al. in their study found, that more severe vitamin D was seen in 19 – 50 years age group.¹⁶ In another study by Niru Chhetri et al., maximum number of subjects was vitamin D deficient in the age group of 21-40 years.⁶ Another study, conducted in Lahore, Pakistan showed 81% of the premenopausal women being Vitamin D.¹⁷ Kirtikar Shukla et al. in their study found vitamin D deficiency in the age group of 41–60 years.¹¹

Various studies have found vitamin D deficiency and insufficiency was more in subjects in the age group 20-40yrs and 41-60years, as probably the large number of these subjects underwent executive health check-up. Most often the elderly has to be confined indoors for prolonged periods of time which further enhances the problem. A study by McLaughlin and Holick revealed that, aging decreases the capacity of skin to produce pre-vitamin D3 by greater than twofold.¹⁸

There are studies showing the effect of vitamin D deficiency with diseases like diabetes, respiratory infections, etc. Presence of vitamin D receptors in many tissues like endocrine glands, cardiovascular tissues, etc is said to be the reason for the different roles played by vitamin D in various diseases. They take part in cell differentiation and production of various cytokines, interleukins. Thus vitamin D has a role to play in various diseases like metabolic syndromes, cardiovascular diseases, etc.¹⁹ In our study, we tried to find the relationship between vitamin D deficiency and various department visit like orthopedics, surgery, medicine, etc. The prospective Intermountain Heart Collaborative Study found significant increase in prevalence of type 2 diabetes mellitus, hypertension, hyperlipidemia, and peripheral vascular disease, coronary artery disease, myocardial infarction, heart failure, and stroke, as well as with incident death, heart failure, coronary artery disease/myocardial infarction with decrease in vitamin D

levels.²⁰The NHANES III study also showed increase in recent upper respiratory tract infections (URTI) with decrease of vitamin D levels.²¹

In our study, the data collected showed 39% of vitamin D deficient subjects visited the orthopedics department, 24% visited in medicine department and other department visits were low. The reason can be high cost of vitamin D testing, which is not affordable by all, especially by people of tribal region in Wayanad. To cut the cost, patients those who present with clinical signs and symptoms are directly treated with vitamin D supplements, which is much cheaper and affordable.

5. Conclusion

Vitamin D deficiency was seen in 85.9% of our study population. This shows that Vitamin D deficiency is a common problem in Wayanad region. Our study also showed that it doesn't spare in age group and more number of females are affected more. Thus routine screening for vitamin deficiency and its supplementation starting at all ages is highly recommended to improve vitamin D status. It can also be prevented by sensible sunlight exposure and food fortification.

6. Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of manuscript.

7. Source of Funding

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Author biography

Vinisha K, Msc, Medical Biochemistry

Vijatha Thomas, Associate Professor

Arun T Mithrasan, Professor and HOD

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