ORIGINAL ARTICLE

Assessment of Serum Vitamin D Levels among Patients Attending Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet, Bangladesh

Kamrun Nahar[1], Muhammad Sirazul Munir[1]

ABSTRACT

Deficiency of vitamin D is a major health problem globally and is associated with different chronic diseases. The aim of this study was to assess serum vitamin D levels according to age and gender at the Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet, Bangladesh. A total 173 patients attending INMAS, Sylhet, for serum vitamin D levels evaluation from July 2022 to June 2023 were included in the study. Patients with vitamin D replacement therapy were excluded from this study. Serum viamin D was determined by Siemens ADVA Centaur XPT chemiluminescence immunoassay (CLIA) System. Patients were classified as vitamin D-deficient, insufficient or sufficient based on the serum vitamin D concentrations of <20 ng/mL, 20-30 ng/mL, or >30 ng/mL, respectively. Among study subjects 122 (70.5%) were female and 51(29.5%) were male. The age of the patients ranged from 05 to 81 years with the mean age was 40.24±15.38 years. Regarding the prevalence of vitamin D deficiency among the study participants, 73.41% were found to be deficient in vitamin D, while 15.03% had insufficient and 11.56% had sufficient levels of vitamin D. Vitamin D deficiency was highly prevalent in the age group of 0–18 years (88.88%), followed by 37–54 (78.57%) and 19–36 years age group (74.64%). Regarding vitamin D deficiency status by gender, females were more in numbers 98(80.32%) having deficient in vitamin D levels compared to its male counterparts 29(56.86%), while in insufficiency status was found in 12(9.84%) females and 14(27.45%) males. Vitamin D deficiency is highly prevalent in this study. We recommend evaluation of causal relationship and other risk factors with vitamin D deficiency in a larger sample size.

Keywords: Serum 25-hydroxyvitamin D, vitamin D deficiency, age, gender, Bangladesh

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INTRODUCTION

Vitamin D is a secosteroid hormone with an important role in calcium metabolism and is described as a part of vitamin D–calcium–parathyroid hormone endocrine axis.[1] 90–95% of the vitamin D in the human body is synthesized in the skin by the effect of sun rays, 25-hydroxyvitamin D (25(OH)D), and 1,25-dihydroxyvitamin D (1,25(OH)2D) with active forms undergoing hydroxylation in liver and kidney.[2] Serum 25-hydroxyvitamin D is generally used as a marker of vitamin D status. Based on the 2011 Endocrine Society Clinical Practice Guidelines, vitamin D status is defined as optimal (i.e., serum 25(OH)D concentration: 30–150 ng/mL) and suboptimal (i.e., serum 25(OH)D concentration <30 ng/mL, hypovitaminosis D). Hypovitaminosis D includes insufficiency and deficiency defined as serum 25(OH)D concentrations 20–30 ng/mL and <20 ng/mL, respectively.[3] Many studies reported that low levels of vitamin D negatively affect bone mineralization causing rickets in children and osteomalacia in adults.[4,5]

1. Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet-3100, Bangladesh.

Correspondence to: Dr. Muhammad Sirazul Munir, Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet-3100, Bangladesh. Email: sirazulmunir69@gmail.com

Due to the physical differences of the human race and the environmental factors, some country-based or even regional metabolic values may vary among individuals. Age is an essential factor that affects vitamin D levels like obesity, gender, and diseases. Generally, elder people are susceptible to vitamin D deficiency due to many risk factors, not only due to reduced skin production of vitamin D with age but also due to decreased sunlight exposure, decreased dietary intake, reduced skin thickness, impaired intestinal absorption, and diminished hydroxylation in the liver and kidney.[6,7] Globally, the deficiency of vitamin D has become an epidemic health problem affecting 70 to 100% of general population.[8]

The current study seeks to determine serum vitamin D level status in relation to age and gender of individuals. As Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet is a major referral center of Sylhet city, the study result assumes to reflect the condition of the population of Sylhet city regarding vitamin D levels in relation to age and gender.

METHODS

A total 173 patients were included in this study who were referred to the Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet, Bangladesh, for serum vitamin D levels assay from July 2022 to June 2023. Serum viamin D levels were determined by Siemens ADVIA Centaur XPT chemiluminescence immunoassay System. Patients were classified as vitamin D-deficient, insufficient or sufficient based on the serum vitamin D concentrations of <20 ng/mL, 20-30 ng/mL, or >30 ng/mL respectively.

Data was scrutinized compiled, edited and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0 for Windows. Data was expressed as frequency and percentage describe the traits of deficiency, sufficiency and insufficiency of vitamin D levels of the study participants.

RESULTS

Among the total 173 study participants, 122(70.5%) were female and 51(29.5%) were male. The age of the patients ranged from 05 to 81 years with the mean age was 40.24±15.38 years. Figure 1 shows prevalence of vitamin D deficiency among the study participants: 73.41% were found to be deficient in vitamin D, while 15.03% had insufficient and 11.56% had sufficient levels of vitamin D. Table 1 displays the distribution of vitamin D levels in different age groups. Vitamin D deficiency was highly prevalent in the age group of 0–18 years (88.88%), followed by 37–54 (78.57%) and 19–36 years age group (74.64%). Vitamin D deficiency and its status in male and female is shown in Figure 2. It was shown that females were more in numbers 98(80.32%) having deficient in vitamin D levels compared to its male counterparts 29(56.86%), while in insufficiency status was found in 12(9.84%) females and 14(27.45%) males.

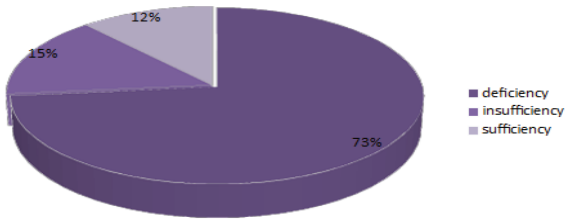
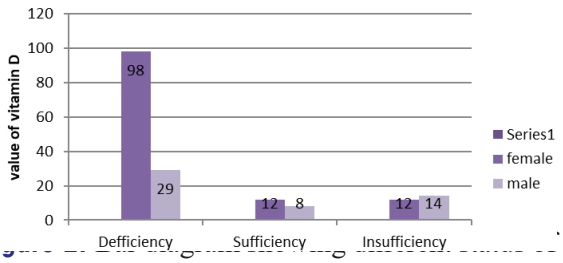


Figure 1: Pie chart showing the prevalence of deficiency of vitamin D levels.

Table 1: Age distribution of vitamin D levels of the study participants (N=173)

Age group (in years)	Deficiency	Sufficiency	Insufficiency
0–18	88.88%	11.11%	-
19–36	74.64%	12.68%	12.68%
37–54	78.57%	10.71%	10.71%
55–72	58.06%	25.81%	16.13%
73–90	66.67%	33.33%	-



vitamin D levels between male and female.

DISCUSSION

Vitamin D status is highly associated with the risks of autoimmune diseases, metabolic syndrome, and neuropathic pain.[9-12] Hypovitaminosis D was recorded in women irrespective of age and lifestyle lying in different regions of in Bangladesh[13,14] and in northern India,[15] which are in consort with our study. This may be due to dress code, occupation, lifestyle and dietary factors. Although our country is located in a geographic region which is sun-drenched throughout the year, low vitamin D levels are prevalent as the sun cannot be used sufficiently. Majority of our people are unable to benefit from the sun because of their religious beliefs.

Agarwal et al.[16] highlighted highest number of patients with vitamin D deficiency (83.7%) followed by 8.7% insufficient and 7.6% with normal levels, and Bhutia et al.[17] also found highest number of 64% patients were found to be deficient in vitamin D followed by 20% insufficient, whereas 15% had sufficient vitamin D; those findings are similar with our study having highest number of subjects with vitamin D deficiency followed by insufficient.

According to the age group, we observed younger population were more susceptible to hypovitaminosis D and our study has been consistent with the findings by Mehta et al.[18] The possible reasons could be due to sedentary lifestyle, diet deficient in vitamin D, and insufficient exposure to sunlight.[19] A similar study done in Sylhet region of Bangladesh showed similar findings of our study, which was done on diabetic and non-diabetic patients.[20]

Differences according to gender and age group may be because of biological differences but might also be due to behavioral differences. There might be gender-specific clothing differences. There also might be that women spend less time outside, resulting in less exposure to the sun.[21,22]

CONCLUSION

Our study evaluated serum vitamin D levels according to age and gender in a local population of north-eastern part of Bangladesh. Most of the patients were found to be vitamin D deficient. There were significantly lower serum vitamin D levels in women compared to men and our study found a higher prevalence of vitamin D deficiency among younger population. Evaluation of serum vitamin D levels with other risk factors and bone metabolism is of great importance.

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Ethical approval: Ethical approval for the study was obtained from the Institute of Nuclear Medicine and Allied Sciences (INMAS), Sylhet, Bangladesh.

Author's contribution: Both authors were equally involved in study design, participant selection, data collection, compilation and analysis as well as manuscript preparation, editing and final submission.

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