ORIGINAL ARTICLE

VITAMIN D DEFICIENCY IN PAKISTAN: TIP OF ICEBERG

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Background: Vitamin D deficiency is becoming a public health problem and involves every segment of the population irrespective of age and gender. This study was conducted to assess its status in patients presenting with generalized body aches and pains. **Methods:** This cross-sectional study was conducted at Ayub Teaching Hospital Abbottabad from March 2015 to October 2016. A sample of 202 patients presenting with generalized body aches and pains were enrolled for the study using convenient sampling technique. Blood samples were taken and serum vitamin D levels were measured. The data was analysed using SPSS-16. **Results:** Out of 202 patients, 165 (81.7%) women and 37 (18.3%) men. The mean age was 42.39±15.89 years. The mean serum vitamin D level was 25.15±18.97 ng/ml with a minimum and maximum value of 9.60 ng/ml and 98.0 ng/ml respectively. Deficient serum vitamin D levels (<20 ng/ml) was found in 128 (63.4%) patients, 30 (14.9%) patients showed insufficiency (20 to 30 ng/ml) while only 44 (21.8%) had normal levels (>30 ng/ml). There was no statistically significant difference in the levels of the vitamin D deficiency with respect to gender and age groups. **Conclusion:** Vitamin D deficiency is affecting the Pakistani population irrespective of age and gender, and the results of this study have demonstrated that vitamin D deficiency in Pakistan is the tip of iceberg.

Keywords: Vitamin D deficiency; Insufficiency; Micronutrient; Musculoskeletal disorders; Rickets; Osteoporosis

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INTRODUCTION

Vitamin D deficiency; a commonly ignored problem is becoming epidemic worldwide affecting over one billion people. Like many countries, vitamin D deficiency in Pakistan is also the sub-merged part of the iceberg affecting 53.5% of the population.[1] Almost all population sub-groups from neonates to elderly people including pregnant women in Pakistan are severely deficient in vitamin D despite abundant sunshine due to its geological position.[2]

The nature has set major source of vitamin D in a process occurring in skin by the action of sunlight. In countries like Pakistan, socio-cultural and economic factors are considered to be the main barrier in obtaining sufficient quantity of this micronutrient from dietary sources.[3] Social customs like confinement to homes of elderly people, women and children coupled with poor diet are the most common causes of vitamin D deficiency in developing countries.[4]

Vitamin D is now known to have a range of functions in the body including regulations of over 200 genes.[4] Bone mineralization requires calcium and its absorption from gut is dependent on 1,25-dihydroxyvitamin D; the active hormonal form. Serum concentration of less than 20 ng/mL or 50 nmol/L of 25-hydroxyvitamin D is considered as insufficient, whereas serum levels <10 ng/mL (25 nmol/L) are marked as deficient. Vitamin D insufficiency is linked with bone de-mineralization, hyperparathyroidism and muscle weakness. Severe bone disorders; rickets and osteomalacia results in long standing vitamin D deficiency.[5]

Although adverse health outcomes of vitamin D deficiency have also been linked with cardiovascular diseases, diabetes and many types of cancer[2,6], its clinical presentation is still manifested by signs and symptoms related with musculoskeletal system. Deficiency of vitamin D is one of the most under-diagnosed and undertreated nutritional disorder particularly in Asian countries due to the assumption that this region enjoys plenty of sunshine.[7] This study was conducted with the aim to determine the serum vitamin D levels in patients complaining generalised body aches and pains of moderate to severe intensity.

MATERIAL AND METHODS

This cross-sectional study was conducted at Medical outpatient department of Ayub Teaching Hospital Abbottabad from March 2015 to October 2016 on patients who complained lethargy, mild to severe body aches with particular emphasis on bone pains. Using convenient sampling technique, a sample of 202 was enrolled for the study.

Verbal informed consent was obtained from all the patients by explaining the aim of the study and ensuring confidentiality of their information. Venous blood amounting 3cc was collected from each patient using aseptic measures. All the blood samples were analysed using Abbott Architect Immunodiagnostics

system using Chemiluminescence Technology. Data was entered and analysed using SPSS version 16.

RESULTS

A total of 202 patients were enrolled for the study. There were 165 (81.7%) women and 37 (18.3%) men. The mean age was 42.39±15.89 years. The mean serum vitamin D level was 25.15±18.97 ng/ml with a minimum and maximum value of 9.60 ng/ml and 98.0 ng/ml respectively. Deficient serum vitamin D levels (<20 ng/ml) was found in 128 (63.4%) patients, 30 (14.9%) patients showed insufficiency (20 to 30 ng/ml) while only 44 (21.8%) had normal levels (>30 ng/ml).

One hundred & fifty-eight (78.2%) of the patients had below normal and only 44 (21.8%) patients had normal levels. The study also did not find statistically significant difference between the mean levels of vitamin D in male and female patients (p=0.774).

Gender-wise status of vitamin D levels showed that out of 165 females, 128 (77.6%) were found deficient and among 37 males, 30 (81.1%) were deficient. These results show that the relative frequency of hypovitaminosis D was more in male patients than female patients, however the difference is not statistically significant ($p = 0.826$).

The patients were categorised into four age groups namely young (up to 25 years), adults (26 to 40 years), middle aged (40–60 years) and old age (above 60 years). Relative frequency of hypovitaminosis D was found high in young and old age groups as 86.7% and 87.1% respectively as shown in Figure 1. However, the results are not statistically significant (p=0.275)

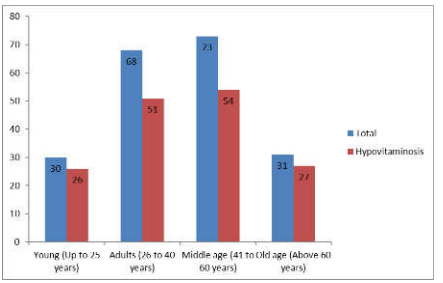

Figure-1: Relative frequency of hypovitaminosis D in different age groups

DISCUSSION

Like other health problems, malnutrition particularly micronutrient malnutrition is one of the challenging public health problems in Pakistan. Iron deficiency anaemia, iodine deficiency disorders and vitamin-A deficiency are the established public health problems of Pakistan, however, vitamin D deficiency as a growing health problem was first highlighted in the National Nutrition Survey conducted in 2011.[8]

Results of this study revealed that a high proportion, i.e., 63.4% of the patients had vitamin D deficiency, 14.9% patients showed insufficiency while only 21.8% had normal serum levels of vitamin D. A study conducted by Riaz *et al* on 4830 randomly selected citizens of Pakistan found that 53.5% had deficient levels, 31.2% were found with insufficient levels and only 15.3% showed normal serum levels of vitamin D.[1] The results prove that hypovitaminosis D is still a public health problem in Pakistan. The high levels of deficiency and insufficiency determined by our study could be the result of the study population as this study enrolled patients suffering from generalized muscular and bone pains. The high prevalence of Vitamin D deficiency seen in our study is at par with the findings of other studies conducted in Pakistan and in the neighbouring countries.[9,10]

The main source of vitamin D for human body is through exposure to sunlight. Keeping in view the socio-cultural and religious factors, it is a common belief that women, children and old aged people are at greater risk of vitamin D deficiency due to their confinement to the four walls of the primitive houses.[4] A study from Pakistan found hypovitaminosis D in 98.86% of the population with statistically significant difference (p=0.0001) between males and females.[11] The results of this study did not find any statistically significant difference in the vitamin D deficiency status with respect to gender and different age groups, and the results are similar to study conducted in Pakistan.[1]

CONCLUSION & RECOMMENDATIONS

Vitamin D deficiency is wide spread in Pakistan and has attained the status of public health problem. This micronutrient deficiency is affecting the population irrespective of age and gender. Keeping in view the magnitude of the problem it is recommended that hypovitaminosis D should be addressed at national level like vitamin A and Iodine supplementation programmes.

AUTHORS' CONTRIBUTION

SAJ: Article write up, Concept and design, collection and assembly of data. AA: data analysis, review, MAA: write-up, data analysis.

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