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VITAMIN D3 STATUS OF WOMEN WITH OSTEPOROSIS ATTENDING A TERTIARY CARE HOSPITAL

Biochemistry

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ABSTRACT

Introduction: Vitamin D deficiency is a major health problem worldwide. Vitamin D is essential for the calcium homeostasis & skeletal metabolism. Vitamin D deficiency is a risk factor of osteoporosis. In women, Vitamin D status is of particular importance. Women in the early menopausal period and post-menopausal period are exposed to greater risk of developing bone abnormalities & other associated disorders due to low Vitamin D levels**. Methodology:** The study was conducted for a period of one year in 100 women aged 40-60 years with osteoporosis. Serum vitamin D3, ionized calcium, phosphorus and ALP were determined. **Result:** Serum Vitamin D level & BMD were significantly reduced in study population with a mean of 20.18± 10.04 SD & -3.25 respectively. Vitamin D deficiency was found in 72% of the study population. Significant association was obtained between Vitamin D level & BMD. **Conclusion:** There is high prevalence of Vitamin D deficiency & low Bone Mineral Density among women with osteoporosis. Vitamin D level & BMD are variables that depends on each other. In women with osteoporosis Vitamin D status is of particular importance. So, it is essential to maintain adequate levels of vitamin D levels among them.

KEYWORDS

Vitamin D3, Bone Mineral Density, Osteoporosis, Ionized Calcium, ALP

INTRODUCTION

Osteoporosis is a systemic skeletal disorder in which bone become weak, thin, brittle and susceptible to fracture. It is common among postmenopausal women. Premenopausal women can have low bone density without fragility fractures or serious risk factors for fracture. It is thus necessary to conduct Bone Mineral Density (BMD) testing among women for the management of low BMD [1]. Bone Mineral density is the major determinant of the risk for osteoporotic fracture and is preferred to diagnose osteoporosis. It is measured by Dual Energy X-Ray Absorptiometry (DEXA), which is now the gold standard to detect osteoporosis [2].

Vitamin D plays an important role in mineralisation of the skeleton at all ages. Vitamin D deficiency has been shown to have adverse effect on calcium metabolism, osteoblastic activity, matrix ossification, bone mineral density and bone remodelling [2]. Vitamin D deficiency and low calcium intake are important risk factors for osteoporosis, osteopenia and fractures due to long standing secondary hyperparathyroidism and increased bone turnover [3]. In India, Vitamin D deficiency is a major public health problem, associated with lack of sunlight exposure in spite of abundant sunshine usually accompanied by reduced dietary intake[4].

The serum 25-hydroxy vitamin D3 [25(OH) D3] level is thought to reflect the vitamin D nutritional status accurately and has been used widely for the assessment. Vitamin D level is influenced by several factors such as the extent of skin exposure to UV radiation, atmospheric pollution, geographic latitude and altitude, season, cloud cover of the sun, time of the day and skin pigmentation [5].

In women low vitamin D can cause osteoporosis. It is a silently progressing disease. Women with osteoporosis are at greater risk of losing bone mass. Therefore, it is essential to determine BMD with Vitamin D levels among them. The aim of my study was to assess the Vitamin D3 status among women in the age group of 40-60 years with osteoporosis.

METHODOLOGY

This cross-sectional study was conducted in Dept. of Physical Medicine and Rehabilitation Centre, Govt. Medical college Thiruvananthapuram. satisfying the inclusion criteria over a period of one year after obtaining ethical clearance from Institutional ethics committee. It involved 100 women of the age group 40 -60 years with osteoporosis. Relevant history of the study population was taken by a preformed detailed questionnaire BMD of the concerned study population were evaluated using DEXA. Venous blood samples were collected using standard aseptic technique. Serum Vitamin D3, Ionized Calcium, Phosphorus and ALP were estimated by standard procedures.

INCLUSION CRITERIA:

Women in the age group 40-60 years with osteoporosis.

EXCLUSION CRITERIA:

Pregnant women, Women taking any vitamin D or Calcium supplements Phosphorus and ALP were estimated by standard procedures.Women with known diseases of bone and mineral metabolism, Women with known hepatic or renal diseases, Women with known malabsorption syndromes, Women on drugs like anti-convulsant, steroids, oestrogen or progesterone.

RESULTS

Table 1: Age-wise Distribution Of The Study Population

Sl No	Age group	Frequency	Percent
1	40 - 45	19	19
2	46 - 50	40	40
3	51 - 55	22	22
4	56 - 60	19	19
	Total	**100**	**100**

Among the study population, highest proportion of study participants (40%) were within the age range of 46 -50 years and lowest proportion (19%) were found among the range of 40- 45 years and 56- 60 years.

Table 2: Distribution Of Age Group Based On Vit D Sufficiency, Insufficiency And Deficiency

Age group	Frequency of Vit D3 Sufficiency	Frequency of Vit D3 Insufficiency	Frequency of Vit D3 Deficiency
40 - 45	0	3	16
46 - 50	4	7	29
51 - 55	1	3	18
56 - 60	4	6	9
Grand Total	**9**	**19**	**72**

Majority of the study population (72%) were Vitamin D deficient. Only a small population (9%) were Vitamin D sufficient.

Table 3: Mean And Standard Deviation Of The Variables

Variables	Mean ± SD	Reference range
Age	49.92 ± 5.64	40 - 60yrs
BMI	26.03 ± 3.58	18.5 - 22.9
T-score	-3.38 ± 0.75	-1 and above (N) -1 to -2.5- osteopenia <-2.5- osteoporosis
Serum ionized calcium	4.9 ± 1.6	4. 6 – 5.3 mg%
Serum phosphorus	3.6 ± 0.8	2.5 - 4.5 mg%
Serum ALP	87.9 ± 27.4	22 –95 U / L
Vit. D3	20.18 ± 10.04	>30 (N)

Table 4: Comparison Of Variables With Osteoporosis

Parameters	χ^2	Level of significance
Age	0.36	0.55
BMI	2.56	0.278
Ionized calcium	24.85	<0.01
phosphorus	47.81	<0.01
ALP	7.72	0.005
Vit D3	5.27	0.022

DISCUSSION

The study included 100 women with osteoporosis in the age range of 40-60 years. In the current study, mean value of Vitamin D was 20.18±10.04 which indicates Vitamin D deficiency in the study population. This finding shows agreement with Prasad S et al [6] .They also obtained an average value of 19.37± 10.2.In the present study, the study groups were divided into 3 categories; Vitamin D deficient (<20 ng/ml), Vitamin D insufficient (20-30 ng/ml) & Vitamin D sufficient group (>30 ng/ml). Among the study group, 72% of the individuals were included in Vitamin D deficient group, 19% were included in Vitamin D insufficient group & only 9% had adequate Vitamin D levels. These were in accordance with study conducted by Harinarayan et al[7] in South India, they obtained a distribution of 76%, 16.5% & 7.5% in the corresponding groups respectively.

Current study also found that the mean value of Bone Mineral Density (T- score) was -3.38, which indicates that incidence of low Bone Mineral Density among the majority of the study population. In the current study showed a statistically significant association between Vitamin D levels and BMD in the study population ($p = < 0.05$). In the present study, mean values of serum Ionized Calcium, Phosphorus and ALP were 4.9 ± 1.6 mg/dL, 3.6 ± 0.8 mg/dL and 87.9 ± 27.4 IU/L respectively.

Mean age of the study population was 49.92±5.64 years. Majority of the study population were within the age range of 46 -50 (40%), followed by 51 - 55(22%) &19 % in the age range of 56-60 and 40-45 years of age.

According to this study, a greater proportion (29%) of the study population with Vitamin D deficiency were in the age group 46-50 and Vitamin D sufficient ones were in the age group 56 - 60years (9%). The current study showed no statistical significant association between body mass index and bone mineral density ($p = 0.278$).

CONCLUSION

The present study findings demonstrate that Serum levels of Vitamin D3 and Bone Mineral Density (BMD) were significantly decreased in women with osteoporosis. A significant association was obtained with Serum Vitamin D3 level & Bone Mineral Density (BMD) among the study population. Vitamin D level & BMD are variables that depends on each other. Thus, Vitamin D deficiency is one of the most important causes for reduction of BMD in women with osteoporosis. Thus, it is very essential to monitor Serum Vitamin D level along with BMD measurement in women with osteoporosis.

In the present scenario, it is very important to give awareness to public about importance of Vitamin D & prescription of diet for the maintenance of adequate level of Vitamin D especially in women.

REFERENCES

1. Aliya Khan. Premenopausal women and low bone density. Canadian Family Physician; Vol 5, June 2006.
2. Dr Lavanya, Dr Srikanth, Satya Chowdary M. Vitamin D, Serum Calcium and Bone Mineral Density in Pre- and Post-menopausal women- a pilot study. Indian Journal of Basic and Applied Medical Research. 2015; 5(1): 371-378.
3. Reginster JY. The high prevalence of inadequate serum vitamin D levels and implications for bone health. Curr Med Res Opin. 2005; 21: 579-586.
4. Nighat Yaseen Sofi, Monika Jain, Umesh Kapil, Vuthaluru Seenu, Lakshmy Ramakrishnan, Chander Prakash Yadav, Ravindra Mohan Pandey. Status of Serum Vitamin D and Calcium Levels in Women of Reproductive Age in National Capital Territory of India. Indian Journal Endocr Metab.2017; 21: 731-3
5. Holmberg L, Larsson A. Seasonal variation of vitamin D3 and 25-hydroxyvitamin D3 in human serum. Clin.Chim.Acta .1980; 100: 173 – 174.
6. Prasad S et al. Evaluation of role of vitamin D level in osteoporosis Int J Adv Med. 2017 Jun;4(3):701-706
7. Harinarayan CV, Sachan A, Reddy PA, SatishKM.PrasadUV, Srivani P et al. (2011) Vitamin statusand bone mineral density in women of reproductive and post-menopausal age groups: a Cross sectional study from south India. J Assoc Physicians India. 56: 698-704