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Original Research

To Evaluate the Vitamin D Deficiency amongst Post-Menopausal Women Presenting with Hip Fracture: An Institutional Based Study

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ABSTRACT

Background: A person with osteoporotic vertebral fracture has 4 to 5 times higher risk of another vertebral fracture and 2 to 3 times higher risk of hip fracture. Hence; we planned the present study to evaluate the Vitamin D Deficiency amongst Post-Menopausal Women Presenting with Hip Fracture. **Materials & methods:** The present study included evaluation of vitamin D deficiency amongst post-menopausal women presenting with hip fracture. A total of 50 subjects were included in the present study after meeting the inclusion and exclusion criteria. Detailed demographic and clinical details of all the subjects were obtained. Assessment of bone mineral density of the hip region of all the subjects was done using auto-analyser. Estimation of serum 25-hydroxy vitamin D was done using immunoassay. All the results obtained were then compiled in Microsoft excel sheet and were evaluated by SPSS software. **Results:** Mean serum 25-OH vitamin D levels of the subjects of the present study was 1.01 ng/ml. 43 patients with hip fractures had vitamin D deficiency while only 7 patients with hip fractures had sufficient vitamin D status. **Conclusion:** Postmenopausal women with hip fractures have high incidence of vitamin D deficiency.

Key words: Hip fracture, Postmenopausal, Vitamin D

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INTRODUCTION

Vitamin D deficiency is common in elderly patients in Western countries, especially in the early spring due to reduced cutaneous synthesis during winter months, in housebound individuals, and in medical inpatients. The prevalence of vitamin D deficiency is even higher in elderly patients with fragility fractures. A person with osteoporotic vertebral fracture has 4 to 5 times higher risk of another vertebral fracture and 2 to 3 times higher risk of hip fracture.¹⁻³ In addition to the well-established role for vitamin D in calcium homeostasis, recent data show that vitamin D is important for muscle function. For example, there are receptors for vitamin D on muscle cells that decrease with advancing age.⁴

Genetic factors exert a strong and perhaps predominant influence on peak bone mass, but physiological, environmental, and modifiable lifestyle factors can also play a significant role. Among these are adequate nutrition and body weight, exposure to sex hormones at puberty, and physical activity.⁵⁻⁷ Hence; we planned

the present study to evaluate the Vitamin D Deficiency amongst Post-Menopausal Women Presenting with Hip Fracture.

MATERIALS & METHODS

The present study was planned in the department of Orthopaedics, American International Institute of Medical sciences, Udaipur, Rajasthan, and in department of obstetrics & gynaecology, R.N.T. Medical College, Udaipur, Rajasthan. It included evaluation of vitamin D deficiency amongst post-menopausal women presenting with hip fracture. Inclusion criteria for the present study included:

- Subjects with post-menopausal status for at least two years,
- Subjects affected with osteoporosis
- Subjects presenting with hip fracture

Exclusion criteria for the present study included:

- Subjects affected with any other co-morbidity,
- Subjects on hormonal replacement therapy,

- Subjects with any other metabolic disorder

A total of 50 subjects were included in the present study after meeting the inclusion and exclusion criteria. Detailed demographic and clinical details of all the subjects were obtained. For evaluation of haematological parameters, blood samples were collected from all the subjects. Assessment of bone mineral density of the hip region of all the subjects was done using auto-analyser. Estimation of serum 25-hydroxy vitamin D was done using immunoassay. All the results obtained were then compiled in Microsoft excel sheet and were evaluated by SPSS software. Chi-square test and student test were used for assessment of level of significance.

RESULTS

Mean age of the subjects included in the present study was 53.1 years. Mean BMI and hip BMD of the subjects of the present study was 27.6 kg/m² and 0.83 gm/cm² respectively.

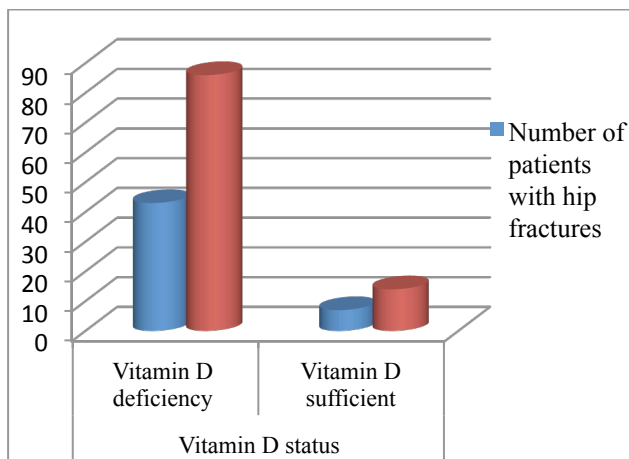
Table 1: Details of patients

Parameter	Mean value
Mean age (years)	53.1
Mean BMI (Kg/m ²)	27.6
Hip BMD (gm/cm ²)	0.83
Serum 25-OH vitamin D (ng/ml)	1.01

Table 2: Prevalence of Vitamin D deficiency in postmenopausal women with hip fractures

Parameter	Vitamin D status	
	Vitamin D deficiency	Vitamin D sufficient
Number of patients with hip fractures	43	7
Percentage of patients with hip fractures	86	14

Graph 2: Prevalence of Vitamin D deficiency in postmenopausal women with hip fractures



DISCUSSION

In the present study, Mean serum 25-OH vitamin D levels of the subjects of the present study was 1.01 ng/ml. 43 patients with hip fractures had vitamin D deficiency while only 7 patients with hip fractures had sufficient vitamin D status. Narula R et al estimated the prevalence of vitamin D deficiency among postmenopausal women with osteoporosis. One hundred and ninety postmenopausal osteoporotic women were enrolled and the clinical information was collected along with the assessment of biochemical parameters. Serum vitamin D was found to be deficient in two third of patients. A significant correlation was observed between body mass index and bone mineral density at lumbar spine. Prevention and early detection of hypovitaminosis D is the key to reduce the incidence of osteoporosis among postmenopausal women.⁸

Gómez-de-Tejada Romero MJ *et al* assessed 25-OH vitamin D levels of osteoporosis, vertebral fractures and hypovitaminosis D in postmenopausal women living in a rural environment. 1229 postmenopausal women were studied, of whom 390 (31.7%), were living in rural areas and 839 (68.3%), in urban areas. Data regarding risk factors related to osteoporosis were obtained, and, among other biochemical measures, 25 hydroxyvitamin D and parathyroid hormone were determined. The women who lived in rural areas were older, shorter, heavier and had a higher body mass index than those from urban areas. Among the women from rural areas there was a higher prevalence of poverty, and higher levels of obesity, arterial hypertension and diabetes mellitus were observed, as well as a higher prevalence of densitometric osteoporosis. The rural women had lower values of bone mineral density in the lumbar spine and a higher prevalence of vertebral fractures and hypovitaminosis D. The variables which were associated independently with living in rural areas were poverty, obesity, vertebral fractures, BMD in the lumbar spine and levels of 25 hydroxyvitamin D. In their study, postmenopausal women who live in rural populations have more poverty, lower values of vitamin D, lower BMD in the lumbar spine and a higher prevalence of vertebral fractures and of osteoporosis.⁹ Glowacki J *et al* assessed the vitamin-D status and other risk factors for low bone density in osteoarthritic subjects with and without osteoporosis. The bone mineral density of the spine, the proximal part of the femur, and the total body was measured with dual-energy x-ray absorptiometry in sixty-eight postmenopausal white women who were scheduled to undergo total hip replacement for advanced osteoarthritis. The serum levels of 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D, intact parathyroid hormone, osteocalcin, and bone-specific alkaline phosphatase and the urinary level of N-telopeptide were measured. Information from validated lifestyle, dietary, and demographic questionnaires was also evaluated. Seventeen (25%) of the sixty-eight women had occult osteoporosis (as indicated by a T score of less than -2.5). Fifteen (22%) of the sixty-eight subjects had vitamin-D deficiency, and three (4%) had an elevated serum parathyroid hormone level. Only two of the seventeen osteoporotic women had vitamin-D deficiency. On the basis of these numbers, vitamin-D status was not correlated with bone density (p = 0.32). Analysis of the relationship between the number of years since menopause and osteoporosis or markers of elevated bone turnover showed that osteoporosis was detected throughout the postmenopausal period. A substantial portion of these sixty-eight white women with osteoarthritis of the hip had occult osteoporosis and hypovitaminosis D.¹⁰ Ramason R *et al*

ascertained the prevalence of vitamin D deficiency and risk factors associated with vitamin D deficiency in hospitalized elderly patients with hip fracture in Singapore. They prospectively studied 485 patients with hip fracture admitted to the orthopedic department over a 1-year period. Nonfragility fractures and younger patients (patients <60 years and those with high-impact injuries) were excluded. Data on patient demographics, comorbidities, functional status, and serum 25-hydroxyvitamin D3 levels were collected. Vitamin D deficiency was defined using Holick classification. Vitamin D levels were available for 412 patients. Vitamin D deficiency was present in 57.5% (n = 237). Prevalence of vitamin D insufficiency was 34.5%, with only 8% of patients having normal vitamin D levels. Univariate analyses showed Malay race and functional factors (being housebound, requiring bathing and dressing assistance) to be associated with vitamin D deficiency. However, only ethnicity and housebound patients were significant in the multivariate model. Vitamin D deficiency and insufficiency are common in patients with hip fracture in Singapore.¹¹

CONCLUSION

Under the light of above obtained results, the authors concluded that postmenopausal women with hip fractures have high incidence of vitamin D deficiency. However; further studies are recommended.

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