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Original Article

Vitamin D levels in Adults in Northern Pakistan

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ABSTRACT

Objective

To determine the magnitude of vitamin D deficiency in adults in the outpatient setting.

Methods

This observational study was conducted in the Department of Medicine, Shifa International Hospital, Islamabad, Pakistan from 2007 to 2009. A total of 168 adult patients who were seen in outpatient clinic had Vitamins D levels measured. Patients with underlying illnesses such as chronic renal failure, known osteomalacia and rickets were excluded from the study. Vitamin D deficiency was defined as serum 25-OH Vitamin D levels less than 20ng/ml. Those with Vitamin D levels in the range of 21-29 were categorized as having with Vitamin D insufficiency and levels 30 ng/ml or more were determined to have adequate levels. Vitamin D intoxication was defined as levels greater than 150 ng/ml.

Results

The mean age was 49.4±13.4 years, with female to male ratio of 4:1. Of 168 patients, 89.3% had low Vitamin D levels: 73.2% had vitamin D deficiency and 16.1% were found to have

Vitamin D insufficiency. Only 10.7% had adequate levels. Mean serum 25-OH Vitamin D levels were 17.85 ng/dl (range 3.00-81.65). 73.2 % of these patients were asymptomatic.

Conclusion

Marked subclinical vitamin D deficiency was seen in our patients. Serum 25-OH Vitamin D level is the most reliable test to evaluate Vitamin D deficiency. (Rawal Med J 2012;37:2-5).

Key Word

Vitamin D, osteomalacia, rickets, hypovitaminosis D.

INTRODUCTION

Besides maintaining calcium homeostasis, vitamin D has steroid hormonal effects which can produce various clinical symptoms and signs. In Asians, vitamin D deficiency has been shown to be a risk factor for several disease like diabetes, ischemic heart disease and tuberculosis.[1,2] Much debate has taken place over the definition of vitamin D deficiency. Most agree that a 25(OH) vitamin D concentration <50 nmol/L, or 20 ng/mL, is an indication of vitamin D deficiency, whereas a 25(OH) vitamin D concentration of 51-74 nmol/L, or 21–29 ng/mL, is considered to indicate insufficiency; while concentrations >30 ng/mL are considered to be sufficient.[3] In children, Vitamin D deficiency has been known to cause growth retardation and classic features of rickets.[4] In adults, deficiency can result in both osteopenia and osteoporosis and increases the risk of fracture.[5] Local or generalized bone discomfort along with aches and pains in joints and muscles are frequently seen in patients with vitamin D deficiency and patients may be misdiagnosed with fibromyalgia, dysthymia, degenerative joint disease, arthritis, chronic fatigue syndrome, and other diseases.[6]

Evidence supported strong association between vitamin D status and risk of chronic disease that can now be linked to vitamin D intake and reduced sun exposure.[7] Vitamin D deficiency has been extensively reported in nursing home patients[8,9] and post menopausal women have been shown to benefit from its replacement.[9] In the early 1970's marked vitamin D deficiency was first reported amongst Pakistani immigrants to UK, with the assumption that people living in Pakistan will have adequate vitamin D levels due to abundant supply of UV light in Pakistan. The expression of vitamin D deficiency after immigration to UK was considered to be a result of environmental factors not a genetically determined factor.[10] However, in 1997, Indian Asians were found to have altered vitamin D metabolism resulting in the excessive formation of an inactive metabolite of vitamin D, 24, 25 (OH)2D, instead of an active 1, 25 (OH) vitamin D.[11] Osteomalacia in Pakistani women has been well documented[12,13] but scant evidence exists regarding prevalence of vitamin D status in asymptomatic patient population. In Pakistan, studies evaluating healthy volunteers as well as ambulatory patients seen at a tertiary care hospital setting in Karachi have shown a high incidence of vitamin D deficiency.[14,15] The aim of this study was to determine the frequency of vitamin D deficiency in patients presenting to a tertiary care hospital in Northern Pakistan.

PATIENTS AND METHODS

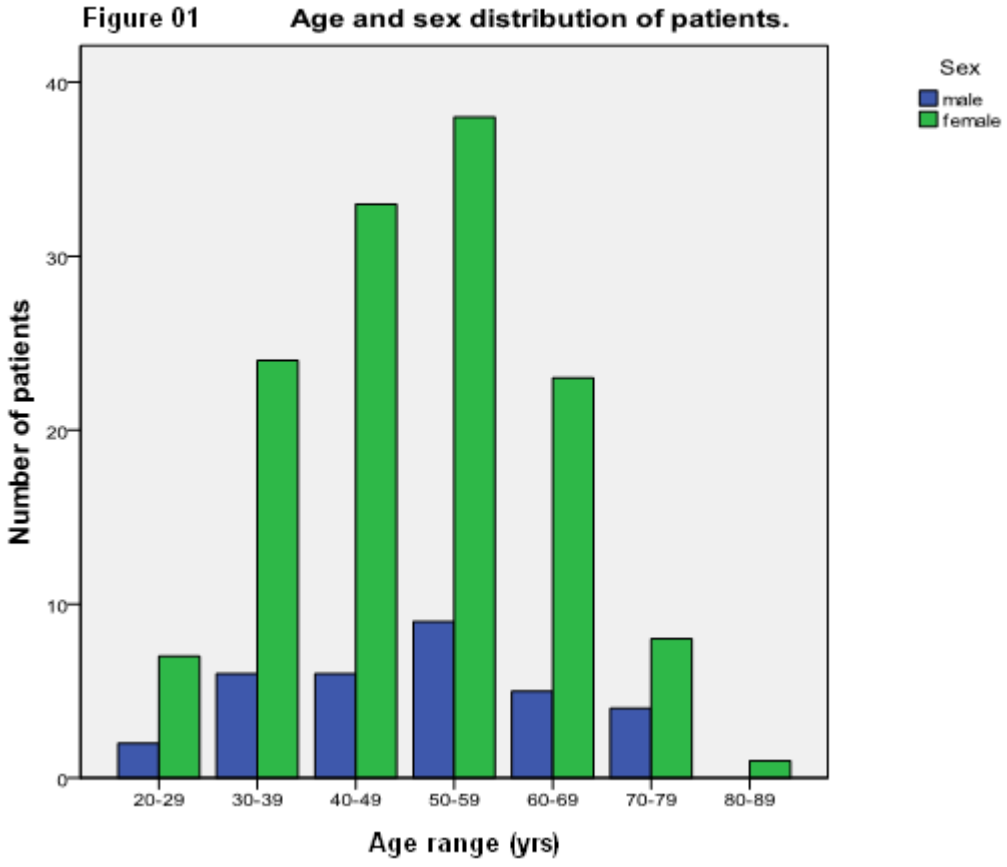
This retrospective study involved review of records of 168 patients seen at the outpatient services between 2007 and 2009. Shifa International Hospital is a 550 bed tertiary care teaching hospital where patients seen at the outpatient services comprise of not only local people from the twin cities of Rawalpindi and Islamabad, but also those referred from neighboring areas like Mirpur, Abbotabad, Mardan, Attock, Jehlum, etc.

Patients whose 25 OH vitamin D level, (Architect CI 4100 Abbott by Chemi luminescent method) were tested at our hospital were included in this study. The data derived from charts included details regarding age, BMI, symptom and signs, duration and severity of illness, associated illnesses and intake of steroids or anticonvulsants. For the details not available in the medical chart, an attempt was made to contact the patients on telephone or in person to get complete information. The data was analyzed using SPSS 17.

RESULTS

A total of 168 patients were included in the study. Their mean age was 48.9±13.9 years with female to male ratio of 4:1 (79.8:20.2). Mean value of Body Mass Index (BMI) of female patients was 28.9 whereas in males it was 28.6. Majority of patients were in 30-70 years range (Fig 1).

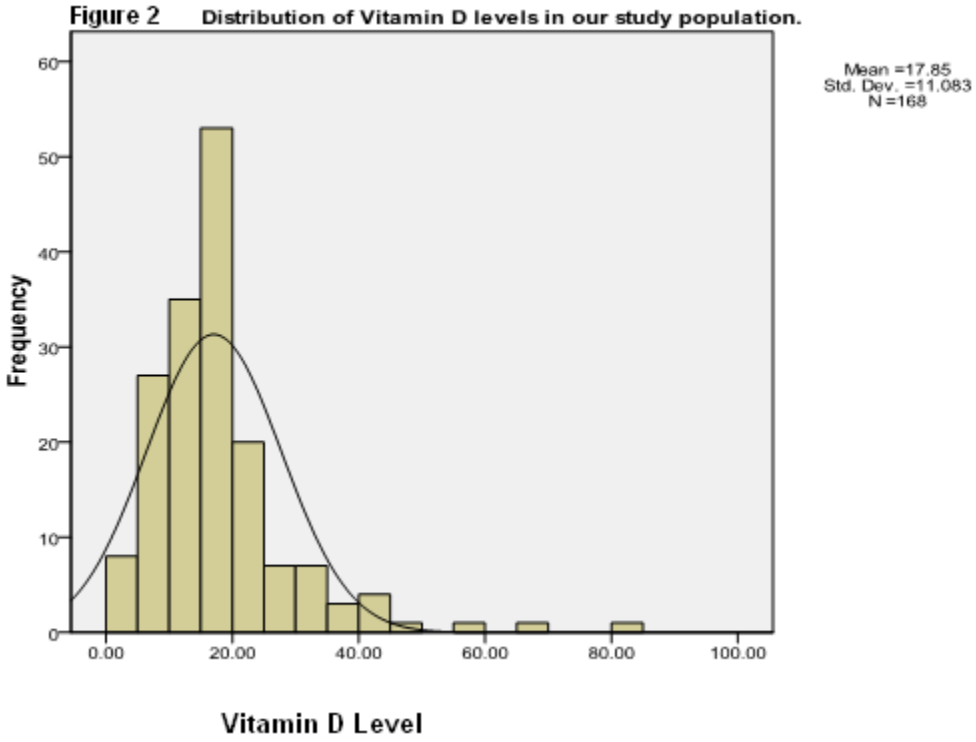
Figure 01 **Age and sex distribution of patients.**



Fifty-six percent patients were asymptomatic. The most common presenting complaint was back pain (9.6%) followed by generalized body aches and lower limb pain in 6.8% of the patients. 3.4% of these patients had back pain along with limitation of movement and 1.3% had a combination of generalized body pains and lower limb pain. 18.3% had more than two symptoms.

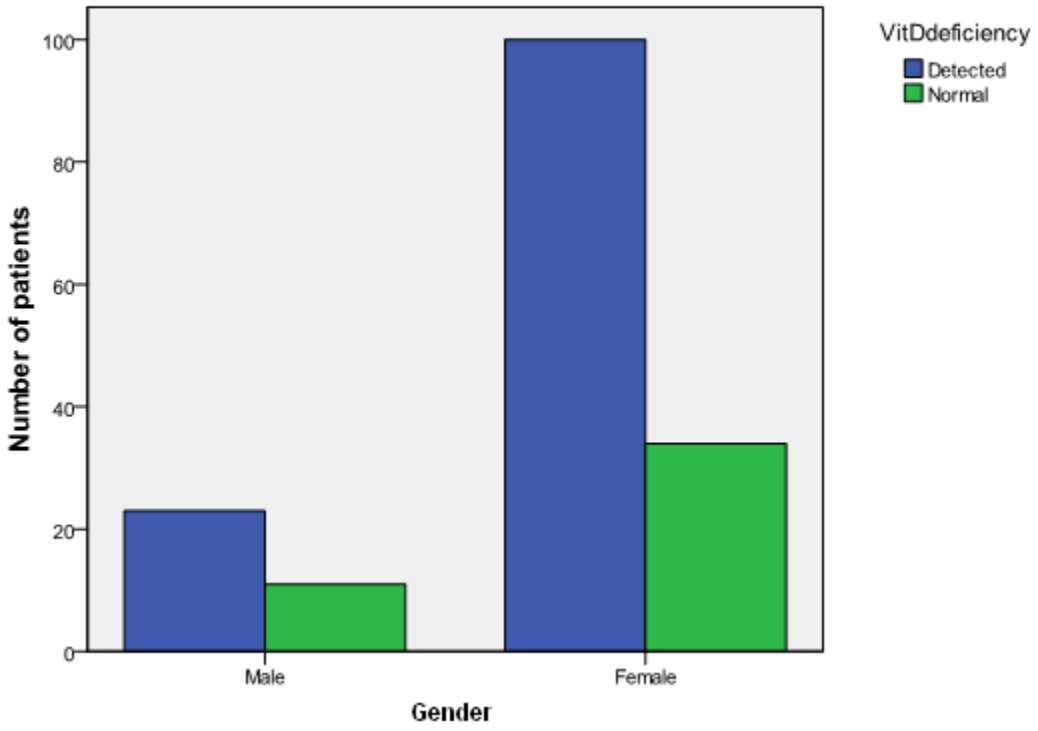
Regarding comorbids, 25.6% were diabetic, 32.8% suffered from hypertension and 2.4% had hypothyroidism. The mean hemoglobin level was 13.1±1.53 gm/dl, mean serum albumin 4.18±0.55 mg/dl, mean serum calcium 9.76±0.889, mean serum phosphate 3.68±0.47 and mean alkaline phosphatase level was 109.25 (range 52-315). The median TSH and PTH hormone levels were 1.6 and 61.5mg/dl respectively.

Almost 89.3% of these patients had low vitamin D levels, out of these 73.2% had vitamin D deficiency whereas 16.1% had vitamin D insufficiency (Fig 2).



Out of 34 male patients 23 (67.6%) were vitamin D deficient while, out of 134 female patients 100 (74.6%) were found to be vitamin D deficient (Fig 3). However, a statistically significant association could not be established between sex and vitamin D deficiency (p= 0.412)

Figure 3 **Comparison of Vitamin D deficiency with sex.**



In the female population, a significant association was established between age and low vitamin D levels ($p = 0.023$). Among lab values in the female patients, low vitamin D levels and Alkaline Phosphatase levels showed a significant association ($p < 0.01$). A statistically significant association could not be established between serum calcium and serum phosphate with low vitamin D levels.

DISCUSSION

Vitamin D deficiency has been found to be related to various medical conditions including cardiovascular disease.[2] The use of vitamin D and calcium supplementation has been found to reduce the risks of fractures in appropriately given doses. However, benefit or harm of vitamin D supplementation for prevention of cancer has not been clarified.[5] Our study showed that large number of patients were in the hypovitaminosis range. Similar findings have been reported from other parts of Pakistan.[16-20] 92% of patient had low vitamin D level in a study from Karachi.[16] Urban well fed population from Lahore was grossly deficient and many, like in our study, were asymptomatic.[20] A study from Saudi Arabia showed that 97% females studied were low in vitamin D.[21]

Various causes for the low vitamin D has been postulated and these include lack of sun exposure, drinking of unfortified milk, and absence of dietary supplementation with vitamin D.[17,22,23] In addition, poverty and cultural habits have been thought to a reasons also.[21]

CONCLUSION

We found 89% patients in our study had low vitamin D level. There is need for measures to increase the awareness of health care professional and public about the importance of vitamin D for health, specifically need for exposure to sunlight and adequate dietary intake of vitamin D and fortification of selected food items.

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