

# Vitamin D Deficiency in Patients presented in Medical OPD with Fibromyalgia

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## ABSTRACT

**Objectives:** To determine the prevalence of vitamin D deficiency in patients presented in medical OPD with fibromyalgia/body aches and pains. **Study Design:** A prospective observational cohort study. **Place and Duration of Study:** Medical OPD of DHQ teaching hospital Sahiwal from July 2013 to June 2014 **Material and Methods:** 120 patients 80(66.67%) female and 40(33.33%) male coming to medical OPD of DHQ teaching hospital Sahiwal complaining of body aches and pains and diagnosed as Fibromyalgia according to American College of Rheumatology (ACR) criteria. Patients were not suffering from systemic illness on examination. The reports of serum calcium, phosphate, alkaline phosphatase, CBC and ESR, were normal. Serum level of 25(OH) vitamin D was estimated by Enzyme Linked Fluorescent assay (ELFA technique) using commercially available kit VIDAS®25(OH) vitamin D total (VITD). **Results:** Out of 120 patients, 80(66.67%) were

female and 40(33.33%) male patients. 56(70%) out of 80 female patients had vitamin D deficiency (<20 ng/mL) and 14(17.5%) out of 80 patients had vitamin D insufficiency (21-29 ng/mL). 25(62.5%) out of 40 male patients had vitamin D deficiency (<20 ng/mL) and 8(20%) out of 40 male patients had vitamin D insufficiency (21-29 ng/mL). So, out of 120 patients 81(67.5%) had vitamin D deficiency (<20 ng/mL) and 22(18.33%) patients had vitamin D insufficiency (21-29 ng/mL). Total 103(85.83%) out of 120 patients were suffering from vitamin D deficiency/insufficiency (<30 ng/mL). 17 (14.13%) out of 120 patients had sufficient levels of vitamin D (>30 ng/mL). **Conclusion:** Fortification of food especially milk and ghee should be done with vitamin D to improve vitamin D deficiency state in the people. Government health authorities should ensure this practice for decreasing the bony problems in the community. **Keywords:** Fibromyalgia, Body aches and pains, Vitamin D deficiency, OPD patients.

## INTRODUCTION

Fat soluble vitamin D is a steroid pro hormone. Deficiency of vitamin D is the cause of development of secondary hyperparathyroidism which leads to rickets in the children and osteoporosis and osteomalacia in adults due to disturbance in the metabolism of calcium. A link has been established in vitamin D deficiency and the development of diabetes, autoimmune diseases,

ischemic cardiac problems, rheumatoid arthritis and cancer<sup>1-8</sup>. The level of vitamin D is an index of bone and general health<sup>9</sup>. Vitamin D is present in the body as vitamin D<sub>2</sub> (ergocalciferol) and vitamin D<sub>3</sub> (cholecalciferol). Mushrooms and vegetables are the source of vitamin D<sub>2</sub> (ergocalciferol). In the skin by the action of solar ultraviolet radiations vitamin D<sub>3</sub> (cholecalciferol) is synthesized from 7-dehydrocholesterol. It can also be obtained from the fatty fish taken in food. In the body, vitamin D<sub>2</sub> and D<sub>3</sub> are identically metabolized. 25-(OH) D is the main form of vitamin D in the human plasma and serum and it is tested in these fluids by the biochemical assays<sup>10</sup>. So the main test of vitamin D status is the biochemical assay of 25-(OH) D in the blood<sup>11</sup>. Calcitriol (1,25-(OH)<sub>2</sub> D) is the highly active form of the vitamin D. It is formed by two successive

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hydroxylation of vitamin D molecule. First hydroxylation occurs in the liver to form 25-(OH) vitamin D (calcidiol). Second hydroxylation occurs in the kidneys to form 1, 25-(OH)<sub>2</sub> vitamin D (calcitriol).

Deficiency of vitamin D is known to be present in the whole world causing mobilization of calcium from the bones resulting in thinning of the bones and disturbance of its microarchitecture resulting in decreased bone mineral density (BMD) causing frequent osteoporotic fractures<sup>12</sup> particularly in women. The decrease in BMD (osteoporosis) causes body aches and pains in patients suffering from vitamin D deficiency<sup>13</sup> presented in medical OPD and are diagnosed to be suffering from fibromyalgia.

Less exposure to sunlight causing decreased synthesis of vitamin D from the skin and foods deficient in vitamin D result in low level of vitamin D dependent absorption of calcium from gastrointestinal tract, and are the main causes of vitamin D deficiency/insufficiency (<30ng/mL) in different regions of the world<sup>14,15</sup>. Vitamin D is said to be deficient if it is <20ng/mL and insufficient if the level is between 20ng/mL to 29ng/mL. Serum levels between 30ng/mL to 100ng/mL are considered sufficient. Levels above 100ng/mL are labeled as vitamin D toxicosis<sup>16</sup>. More than 85% of the people in our region are reported to be suffering from vitamin D deficiency/insufficiency (<30ng/mL)<sup>17-20</sup>.

## **MATERIALS & METHODS**

This study was done at Medical OPD of DHQ teaching hospital Sahiwal from July 2013 to June 2014 on 120 patients complaining of body aches and pains and diagnosed as Fibromyalgia according to American College of Rheumatology (ACR) criteria. Patients were not suffering from systemic illness on examination. The reports of serum calcium, phosphate, alkaline phosphatase, CBC and ESR, were normal. Serum level of 25(OH) vitamin D was estimated by Enzyme Linked Fluorescent assay (ELFA technique) using commercially available kit VIDAS<sup>®</sup>25(OH) vitamin D total (VITD). Patients taking calcium and/or vitamin D supplementation, HRT (hormone-replacement therapy), steroids, renal diseases, diuretic use, gastrointestinal disorders

and pregnant and lactating women were excluded. Patients taking multivitamin and mineral supplements or drugs that affect bone metabolism were also excluded from the study.

At initial evaluation of the patients a detailed history was obtained, focusing on dietary habits, body area exposed to sun, and hours per week to sunlight. Patients were interviewed by 24 hour diet recall and their nutritional status was assessed for vitamin D and calcium intake by using a semi-quantitative food frequency questionnaire<sup>38</sup>. Physical activity was also documented at the same time.

Blood samples for 25 (OH) D were taken. Venostasis was avoided. The serum was refrigerated and stored until sent for analysis; samples were collected throughout the year of study.

## **RESULTS**

Out of 120 patients, 80(66.67%) were female and 40(33.33%) male patients. 56(70%) out of 80 female patients had vitamin D deficiency (<20 ng/mL) and 14(17.5%) out of 80 patients had vitamin D insufficiency (21-29 ng/mL). 25(62.5%) out of 40 male patients had vitamin D deficiency (<20 ng/mL) and 8(20%) out of 40 male patients had vitamin D insufficiency (21-29 ng/mL). So, out of total 120 patients 81(67.5%) had vitamin D deficiency (<20 ng/mL) and 22(18.33%) patients had vitamin D insufficiency (21-29 ng/mL). Total 103(85.83%) out of 120 patients were suffering from vitamin D deficiency/insufficiency (<30 ng/mL). 17(14.13%) out of 120 patients had sufficient levels of vitamin D (≥30 ng/dL).

## **DISCUSSION**

Vitamin D deficiency/insufficiency (<30ng/mL) was found in 85.83%, female (87.5%) and male (82.5%) patients in this study on 120 people. All patients were suffering from body aches and pains and were diagnosed as suffering from fibromyalgia. American College of Rheumatology (ACR) criteria was used to diagnose these patients presented in the medical OPD of DHQ teaching hospital Sahiwal from July 2013 to June 2014. The high percentage of patients suffering from vitamin D deficiency/insufficiency is a serious situation because it shows that majority of the

population is not benefited by the proven advantages of vitamin D. Metabolism and level of vitamin D is regulated by various factors. These factors include BMI ( $>30\text{kg/m}^2$ ), age ( $>80$  years) and race (non white). Lack of daily exercise, diet low in vitamin D supplementation ( $<400$  IU/day), education status and socio economic factors were affecting vitamin D deficiency in 45% to 90% subjects<sup>21</sup>. In Pakistan poor or absent fortification of food with vitamin D and a traditional diet lacking in vitamin D are among the dietary factors contributing to low vitamin D level. Skin pigment in black people cause low synthesis of vitamin D<sup>22,23</sup>. In this study, the level of 85.83% patients having vitamin D deficiency/insufficiency is comparable to studies reported by Mansoor et al. and Zuberi et al<sup>17,18</sup>. Vitamin D level was sufficient ( $\geq 30\text{ng/mL}$ ) in 17(14.13%) out of 120 patients in this study. 8.9% and 8% patients were previously reported by Mansoor et al and Zuberi et al<sup>17,18</sup> respectively to have sufficient levels ( $\geq 30\text{ng/mL}$ ) of vitamin D. The highest percentage of 14.13% of patients having sufficient vitamin D can be due to OPD patients in this study while the other two studies were performed on hospitalized patients. Moreover, Sahiwal is famous for its buffaloes and high milk production containing vitamin D and calcium.

81(67.5%) out of 120 patients in our study had vitamin D deficiency ( $<20\text{ng/mL}$ ). A study done in Tripurti South India<sup>24</sup> showed that 69% patients were suffering from vitamin D deficiency which is slightly higher but near to our study. This difference can be due to various dietary factors involved in different regions and due to diet contents of vitamin D.

In our study 56 (70%) out of 80 female patients had vitamin D deficiency ( $<20\text{ng/mL}$ ) and 14(17.5%) out of 80 female patients had vitamin D insufficiency. These patients were presented with body aches and pains in medical OPD and were diagnosed as fibromyalgia. With the slight difference, these results can be compared, also slightly less than the study done by Bhatti et al<sup>25</sup> in 40 female patients presented in medical OPD with fibromyalgia with the results of 80% and 20% of the patients suffering from vitamin D deficiency and insufficiency respectively. This slight difference may be due to smaller size of the

study. In our study the results of vitamin D deficiency in female 56 (70%) out of 80 patients were also comparable with the study done by Ali et al<sup>26</sup> in which vitamin D deficiency was present in 53(74%) out of 75 women having tibial tenderness and generalized aches and pains in premenopausal age presented at tertiary care center in Lahore, Pakistan.

In South Asian countries and India with sufficient sunlight, still high prevalence of vitamin D deficiency has been reported<sup>27-30</sup>. In a study done on healthy hospital staff in urban North Indian region<sup>30</sup>, vitamin D deficiency has been reported in two thirds of the patients. Another study performed on school going children in Delhi showed that vitamin D deficiency is present in 35.7% children; in low socio economic status the percentage was high up to 42.3% as compared to 27% in high socio economic status<sup>31</sup>. Low levels of vitamin D were reported in quarter of postmenopausal osteoporotic women in central and southern Europe<sup>32</sup>. 82% of Asian adults in UK have been reported to have very low levels of vitamin D which increases to 94% in winter.

In light of the above discussion it is recommended that vitamin D fortification in the food should be done in Pakistan, diet containing vitamin D especially fish once per week should be included in the menu and sun exposure to the skin should be made for sufficient period of time and physical activity and healthy lifestyle should be adopted early in the life.

## CONCLUSION

In this study, high number of patients female  $>$  male are suffering from vitamin D deficiency in spite of abundant sunlight and high milk producing agriculture area of the study. This is an alarming situation because vitamin D is involved in maintaining calcium homeostasis and bone health. Government health authorities should take appropriate action to improve the food fortification with vitamin D particularly in milk and ghee used by the people to resolve this problem.

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