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ORIGINAL ARTICLE

Vitamin D Levels in Patients Presenting with Comprehensive Body Pain Complaints to Family Medicine Clinic

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Abstract

Introduction: Vitamin D is among the fat-soluble vitamins and is also a group of sterols that are hormones because they are synthesized endogenously. It has an effect on calcium, phosphorus metabolism and bone mineralization and is also crucial for general health and well-being. 25-hydroxyvitamin D [25(OH)D] level should be checked to evaluate the vitamin D level. The aim of the study was to determine whether there is vitamin D deficiency in patients with generalized body pain who applied to our hospital and to determine the difference between 25(OH)D levels according to age and gender.

Methods: The patients who applied to the specialist family medicine outpatient clinic of our hospital between 01.04.2018 and 30.11.2018 with available 25(OH)D levels were studied retrospectively. Patients with generalized body pain (n=473) participating in the study were classified according to age groups and gender. Number Cruncher Statistical System 2007 (Kaysville, Utah) program was used for statistical analysis.

Results: Severe vitamin D deficiency was observed in 13.5% (n=64) of the cases, vitamin D deficiency was observed in 51.6% (n=244), and vitamin D insufficiency was observed in 26.9% (n=127) of the cases. A statistically significant difference was found between vitamin D levels according to gender, and the measurements of women were found to be lower than men (p=0.001; p<0.01). There was no significant difference between the groups in terms of age (r: 0.051; p=0.271; p>0.05).

Discussion and Conclusion: The mean 25(OH)D levels of 473 patients with generalized body pain were found to be below 30 ng/mL. Considering that this situation is related to insufficient benefit from sunlight and dietary factors, it is appropriate to supplement people with vitamin D.

Keywords: Age; gender; generalized body pain; vitamin D.

Vitamin D has important effects on calcium and phosphorus homeostasis and bone metabolism in the body [1,2]. If 25-OH D level is lower than 20 ng/mL, it is considered as vitamin D deficiency, between 21 and 29 ng/mL as vitamin D insufficiency, and if higher than 30 ng/mL, it is considered as adequate level[3,4]. Although it is synthesized in the skin after exposure to sunlight (vitamin D3), it is also exogenous in dietary intake (Vitamin D3 and Vitamin D2)[5,6]. Sunlight is the main source and there is no need to take vitamin D from the diet if it is sufficiently benefited. Vitamin D is found mostly in fish, liver and egg yolk from animal products. Active vitamin D has an effect on calcium absorption from the intestine, mineralization in bone, and contractile activity in muscle tissue[7,8]. Since vitamin D deficiency causes deterioration in bone formation, proximal muscle weakness and deterioration in neuromuscular coordination, it increases the susceptibility to falls, causes bone fractures, pain and functional limitation, negatively affecting the quality of life. Patients with vitamin D deficiency often complain of generalized

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Table 1. Distribution of descriptive features

		n (%)
Age (years)	Min-Max (Median)	9-89 (62)
	Mean±SD	61.41±15.24
Gender	Female	361 (76.3)
	Male	112 (23.7)
Vitamin D (ng/ml)	Min-Max (Median)	4.3-96.5 (16.7)
	Mean±SD	18.27±9.44
	Severe vitamin D deficiency	64 (13,5)
	Vitamin D deficiency	244 (51.6)
	Vitamin D insufficiency	127 (26.9)
	Adequate vitamin D level	38 (8.0)

Min: Minimum; Max: Maximum; SD: Standard deviation.

body aches[8]. Serum 25-OH D measurement is usually performed to evaluate the vitamin D level of the individual. This study was conducted to determine vitamin D deficiency in patients who applied to our hospital with the complaint of generalized body ache, and to investigate whether there is a significant difference between 25-OH D levels according to age and gender.

Materials and Methods

Among 3656 patients who applied to the specialist family medicine outpatient clinic of our hospital between 01.04.2018 and 30.11.2018, patients with generalized body ache and 25-OH D levels were analyzed retrospectively. Cases diagnosed with malignancy, neuromuscular disease, parathyroid dysfunction, secondary osteoporosis, using antiepileptic and steroid drugs were not included in the study. The 25-OH D values of the patients were recorded through the hospital laboratory results system. Patients participating in the study were classified according to gender and age groups. The study was conducted with a total of 473 cases, aged between 9 and 89, including 361 females and 112 males. The number of cases was reached as a result of eliminating patients who did not meet the study criteria. According to the Metabolic Bone Diseases Diagnosis and Treatment Guide published by the Turkish Society of Endocrinology and Metabolism in 2018, vitamin D levels were categorized in 4 groups as follows: Serum 25-OH D concentration <10 ng/mL: severe vitamin D deficiency, <20ng/mL: vitamin D deficiency, betweeb 20-30 ng/mL: vitamin D insufficiency, >30 ng/mL: adequate vitamin D[9].

NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. While evaluating the study data, Student's t-test was used for two-group comparisons of normally distributed variables in comparison of quantitative data, as well as descriptive statistical methods (Mean, Standard Deviation, Median, Frequency, Ratio, Minimum, Maximum). One-way Anova Test was used for comparisons of normally distributed groups of three or more, and Bonferroni test was used for pairwise comparisons. Pearson Correlation Analysis was used to evaluate the relationships between variables. Pearson Chi-Square test was used to compare qualitative data. Significance was evaluated at the $p<0.05$ level.

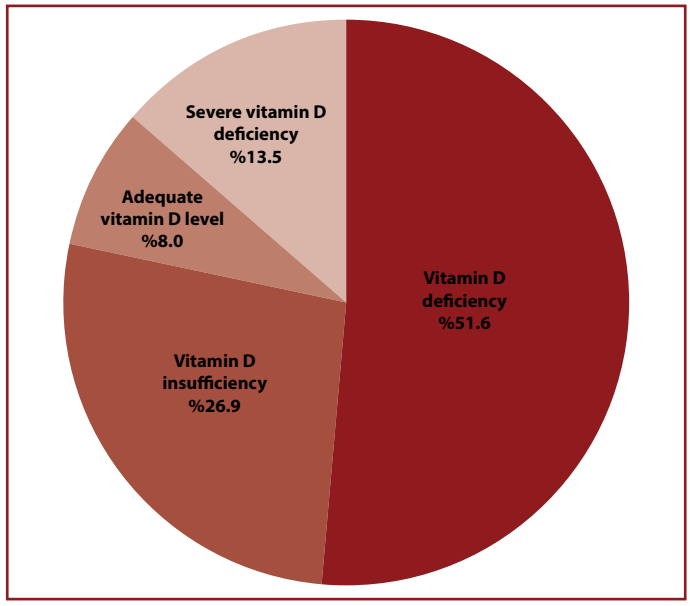

Figure 1. Distribution of vitamin D levels.

Results

The study was carried out with a total of 473 cases (76.3% (n=361) female and 23.7% (n=112) male), who applied to the specialist family medicine outpatient clinic of our hospital between 01.04.2018 and 30.11.2018. The ages of the cases ranged from 9 to 89, with a mean age of 61.41±15.24 years (Table 1).

Vitamin D measurements varied between 4.3 and 96.5 ng/mL, with an mean value of 18.27±9.44 ng/ml. Severe vitamin D deficiency was observed in 13.5% (n=64) of the cases, vitamin D deficiency was observed in 51.6% (n=244), and vitamin D insufficiency was observed in 26.9% (n=127) cases. 8% had adequate vitamin D levels (n=38) (Fig. 1) (Table 2).

Relationship Between Gender and Vitamin D

A statistically significant difference was found between vitamin D measurements according to gender, and the measurements of women were found to be lower than of men

Table 2. Evaluation of vitamin D levels by age and gender

		Gender		Age (years)	
		Female	Male	Min-Max (Median)	Mean±SD
Vitamin D (ng/ml)	Min-Max (Median)	4.3-87.8 (15.5)	4.7-96.5 (20.4)	r:0.051	
	Meant±SD	17.30±8.98	21.43±10.24		
	p	[a]0.001**		[b]0.271	
	Severe vitamin D deficiency	58 (16.1)	6 (5.4)	23-88 (59)	60.25±14.93
	Vitamin D deficiency	197 (54.6)	47 (42.0)	18-88 (63)	61.61±15.08
	Vitamin D insufficiency	82 (22.7)	45 (40.1)	9-88 (63)	61.15±15.70
	Adequate vitamin D level	24 (6.6)	14 (12.5)	21-89 (62)	63.03±15.62
	p	[c]0.001**		[d]0.832	

Min: Minimum; Max: Maximum; SD: Standard deviation.

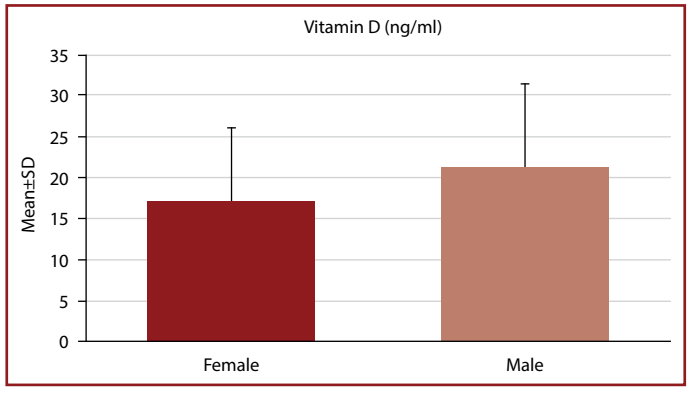

Figure 2. Distribution of vitamin D measurements by gender.

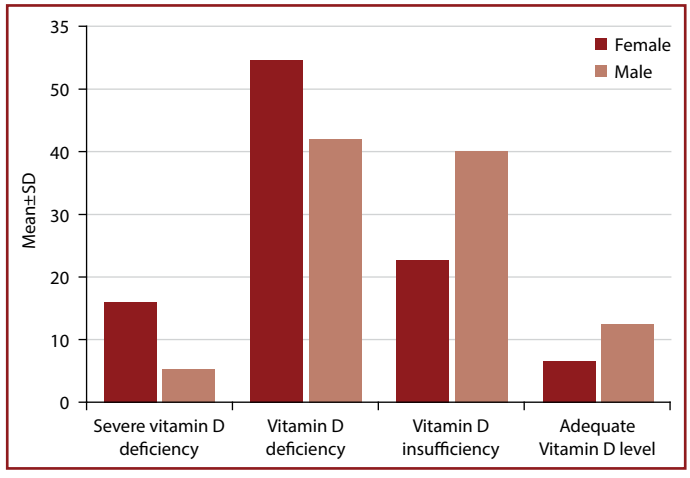

Figure 3. Distribution of vitamin D levels by gender.

(p=0.001; p<0.01) (Fig. 2). Vitamin D levels differed statistically by gender (p=0.001; p<0.01). Severe vitamin D deficiency and vitamin D deficiency were higher in women than in men. Vitamin D insufficiency and adequate vitamin D levels were higher in men than in women (Fig. 3).

Relationship Between Age and Vitamin D

No statistically significant correlation was found between age and vitamin D measurements (r:0.051; p=0.271; p>0.05). No statistically significant difference was found between the mean ages according to vitamin D status (p=0.832; p>0.05).

Discussion

Vitamin D deficiency has become a pandemic today[4]. Vitamin D is a vitamin that is also classified as a steroid hormone and increases the absorption of calcium and phosphate from the intestine. It is an important factor for the regulation of muscle and skeletal functions[7,8]. With vitamin D supplementation, muscle strength can be increased and dynamic and postural balance can be achieved[10,11]. Severe vitamin D deficiency causes rickets in the growing skeleton and demineralization in the adult skeleton, leading to osteomalacia[12]. There is a significant correlation between 25-OH vitamin D levels and falls in the elderly. Vitamin D supplementation has been shown to increase muscle strength, walking distance and functional abilities in the elderly population with vitamin D deficiency[13]. One study found that 3 months of use of 1alpha hydroxy vitamin D increased the number and volume of type II muscle fibers in elderly women[14]. In a study conducted by Memet Kurt et al.[15] in 940 patients followed up between 2003 and 2011 from our country, vitamin D deficiency was found in most of the patients who applied to physical therapy outpatient clinics with the complaint of generalized body ache. In this study, vitamin D deficiency was observed in 308 of 473 patients with generalized body ache. Vitamin D deficiency may occur alone in patients with chronic pain[16]. Although it is rarely considered in rehabilitation clinics, it has been reported that it is important to consider vitamin D deficiency in the differential diagnosis of musculoskeletal pain and to eliminate vitamin D deficiency in the treat-

ment of these patients[17]. In these studies, the prevalence of hypovitaminosis D was found to be quite high in patients with chronic, nonspecific musculoskeletal pain[18,19]. Akkuş et al.[20] reported that in a case of osteomalacia resembling ankylosing spondylitis clinic, with only vitamin D treatment, the patient's symptoms improved, waist and hip range of motion limitation returned to normal dramatically. In another study, vitamin D deficiency was detected in some of the patients diagnosed with previously unexplained musculoskeletal pain, chronic low back pain, and somatization, and it was reported that the symptoms improved within 3 months with vitamin D treatment[21]. In a published review[22] it was stated that these patients are mistakenly diagnosed with fibromyalgia because vitamin D deficiency causes symptoms similar to fibromyalgia.

Even in tropical countries such as China, Turkey, India, Iran and Saudi Arabia, studies conducted in the last two decades have concluded that high rates of vitamin D deficiency are observed[23,24]. In our study, vitamin D deficiency was found in 51.6% (n=244) and vitamin D insufficiency in 26.9% (n=127) of the patients who applied to the specialist family medicine outpatient clinic of our hospital. In the adult population, vitamin D deficiency is more common in women[25–27]. In our study, severe vitamin D deficiency and vitamin D deficiency were higher in women than in men. The results found in this study are in the same direction.

Conclusion

As a result, active vitamin D shows its effects by binding to vitamin D receptors in target organs. Muscle cells are one of the target organs for vitamin D, and the vitamin D receptor has been isolated in skeletal muscle cells[28]. Vitamin D regulates the uptake of Ca in the muscle cell, thus it has an effect on muscle contraction and relaxation. It stimulates the uptake and storage of P, which is used in ATP synthesis and plays a role in energy metabolism. Osteomalacic myopathy in muscle occurs in vitamin D deficiency. Generalized muscle pain, proximal muscle weakness, difficulty getting up from a chair and climbing stairs are seen. It is characterized by atrophy of type 2 fibers, fat infiltration, and fibrosis in muscle biopsies[29]. Severe vitamin D deficiency was observed in 13.5% (n=64) of the patients who applied to our hospital with complaints of generalized body ache, vitamin D deficiency in 51.6% (n=244), vitamin D insufficiency in 26.9% (n=127), and considering that this situation will be related to limited sunlight exposure and dietary factors, we think that it would be appropriate to supplement people with vitamin D. It would be useful to conduct prospective studies to better define the relationship between generalized musculoskeletal pain and vitamin D deficiency. This research revealed that vitamin D deficiency is a problem in patients with generalized musculoskeletal pain, especially in women. In this context, it should be taken into account that patients who apply to our polyclinics with generalized body pain may have vitamin D deficiency. The limitation of this article is that the study was carried out retrospectively and the improvement in the complaints of patients with generalized body ache could not be followed up after vitamin D treatment.

Ethics Committee Approval: Retrospective study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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References

1. Vogeser M. Quantification of circulating 25-hydroxyvitamin D by liquid chromatography-tandem mass spectrometry. J Steroid Biochem Mol Biol 2010;121:565–73. [CrossRef]
2. Moy FM, Bulgiba A. High prevalence of vitamin D insufficiency and its association with obesity and metabolic syndrome among Malay adults in Kuala Lumpur, Malaysia. Public Health 2011;11:735. [CrossRef]
3. Wacker M, Holick MF. Vitamin D - effects on skeletal and extraskeletal health and the need for supplementation. Nutrients 2013;5:111–48. [CrossRef]
4. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab 2011;96:1911–30 [CrossRef]
5. van der Meer IM, Middelkoop BJ, Boeke AJ, Lips P. Prevalence of vitamin D deficiency among Turkish, Moroccan, Indian and sub-Sahara African populations in Europe and their countries of origin: an overview. Osteoporos Int 2011;22:1009–21. [CrossRef]
6. Shea MK, Houston DK, Tooze JA, Davis CC, Johnson MA, Hausman DB, et al. Correlates and prevalence of insufficient 25-hydroxyvitamin D status in black and white older adults: the health, aging and body composition study. J Am Geriatr Soc 2011;59:1165–74. [CrossRef]
7. Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. Am J Clin Nutr 2004;80(Suppl 6):1678S–88S. [CrossRef]
8. Holick MF. Resurrection of vitamin D deficiency and rickets. J Clin Invest 2006;116:2062–72. [CrossRef]
9. Gogas Yavuz D, Akalın A, Alış M, Altun B, Atmaca A, Aydın H ve ark. Vitamin D eksikliği. İçinde: Osteoporoz ve Diğer Metabolik Kemik Hastalıkları Çalışma Grubu (editörler). Osteoporoz ve metabolik kemik hastalıkları tanı ve tedavi kılavuzu. 13.baskı. İstanbul: Bayt Yayınevi, 2018:119–27. [Turkish]

10. Bischoff-Ferrari HA. Relevance of vitamin D in muscle health. Rev Endocr Metab Disord 2012;13:71–7. [CrossRef]
11. Bischoff-Ferrari HA, Dietrich T, Orav EJ, Hu FB, Zhang Y, Karlson EW, et al. Higher 25-hydroxyvitamin D concentrations are associated with better lower-extremity function in both active and inactive persons aged > or =60 y. Am J Clin Nutr 2004;80:752–8. [CrossRef]
12. Zittermann A. Vitamin D in preventive medicine: are we ignoring the evidence? Br J Nutr 2003;89:552–72. [CrossRef]
13. Janssen HC, Samson MM, Verhaar HJ. Vitamin D deficiency, muscle function, and falls in elderly people. Am J Clin Nutr 2002;75:611–5. [CrossRef]
14. Sørensen OH, Lund B, Saltin B, Lund B, Andersen RB, Hjorth L, et al. Myopathy in bone loss of ageing: improvement by treatment with 1 alpha-hydroxycholecalciferol and calcium. Clin Sci (Lond) 1979;56:157–61. [CrossRef]
15. Kurt M, Cömertoğlu İ, Sarp Ü, Yalçın P, Dinçer G. Vitamin D levels in patients with osteoporosis. Turk J Osteoporos 2011;17:68–70. [Turkish]
16. Cannell JJ, Hollis BW, Zasloff M, Heaney RP. Diagnosis and treatment of vitamin D deficiency. Expert Opin Pharmacother 2008;9:107–18. [CrossRef]
17. Heath KM, Elovic EP. Vitamin D deficiency: implications in the rehabilitation setting. Am J Phys Med Rehabil 2006;85:916–23.
18. Plotnikoff GA, Quigley JM. Prevalence of severe hypovitaminosis D in patients with persistent, nonspecific musculoskeletal pain. Mayo Clin Proc 2003;78:1463–70. [CrossRef]
19. Mascarenhas R, Mobarhan S. Hypovitaminosis D-induced pain. Nutr Rev 2004;62:354–9. [CrossRef]
20. Akkus S, Tamer MN, Yorgancigil H. A case of osteomalacia mimicking ankylosing spondylitis. Rheumatol Int 2001;20:239–42.
21. de Torrenté de la Jara G, Pécoud A, Favrat B. Musculoskeletal pain in female asylum seekers and hypovitaminosis D3. BMJ 2004;329:156–7. [CrossRef]
22. Holick MF. Too little vitamin D in premenopausal women: why should we care? Am J Clin Nutr. 2002;76:3–4. [CrossRef]
23. van Schoor NM, Lips P. Worldwide vitamin D status. Best Pract Res Clin Endocrinol Metab 2011;25:671–80. [CrossRef]
24. Mansoor S, Habib A, Ghani F, Fatmi Z, Badruddin S, Mansoor S, et al. Prevalence and significance of vitamin D deficiency and insufficiency among apparently healthy adults. Clin Biochem 2010;43:1431–5. [CrossRef]
25. Brot C, Vestergaard P, Kolthoff N, Gram J, Hermann AP, Sorensen OH, et al. Vitamin D status and its adequacy in healthy Danish perimenopausal women: relationships to dietary intake, sun exposure and serum parathyroid hormone. Br J Nutr 2001;86:97–103 [CrossRef]
26. Heidari B, Haji Mirghassemi MB. Seasonal variations in serum vitamin D according to age and sex. Caspian J Intern Med 2012;3:535–40.
27. Hovsepian S, Amini M, Aminorroaya A, Amini P, Iraj B. Prevalence of vitamin D deficiency among adult population of Isfahan City, Iran. J Health Popul Nutr 2011;29:149–55. [CrossRef]
28. Bischoff HA, Borchers M, Gudat F, Duermueller U, Theiler R, Stahelin HB, Dick W. In situ detection of 1,25-dihydroxyvitamin d3 receptor in human skeletal muscle tissue. The Histochemical journal. 2001;33:19–24 [CrossRef]
29. Pfeifer M, Begerow B, Minne HW. Vitamin D and muscle function. Osteoporos Int 2002;13187–94. [CrossRef]