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ORIGINAL ARTICLE

The relationship between vitamin D deficiencies and life quality of FMS patients

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Abstract

Aim: Fibromyalgia syndrome (FMS) is a chronic musculoskeletal system disease characterized by widespread pain. Nonspecific skeletal pain can also be seen in patients with vitamin D deficiency. The association between low levels of vitamin D and non-specific musculoskeletal pain, including FMS, is controversial. The aim of this study is to assess the relationship between vitamin D deficiencies and disease activity, life quality of FMS patients.

Materials and Methods: Patients with Fibromyalgia (FMS) classified according to American College of Rheumatology (ACR) criteria. 25-OH vitamin D levels below 20 ng/ml were accepted as vitamin D deficiency. Study groups classified as first group; patient with isolated FMS (n:36), second group; isolated vitamin D deficiency (n:41) and third group was FMS in together with vitamin D deficiency (n:70). Pain level was measured by the visual analog scale (VAS). Functional and life quality assessments were determined by using Short Form Heath Survey 36 (SF-36) and Fibromyalgia Impact Index (FIQ).

Results: In isolated FMS group, vitamin D level was found higher than other two groups ($p>0.05$). At the assessment of quality of life, VAS and FIQ scores in FMS group were significantly higher than ones found in vitamin D deficiency group ($p<0.001$). In terms of SF-36 subgroups, scores were much worse in vitamin D deficiency and FMS than isolated FMS group. However, some of subgroups reached statistically significance. Negative and moderate correlation was detected between vitamin D level and FIQ scores.

Conclusion: Vitamin D level should be kept in mind as one of the factors negatively affecting quality of life in FMS. More extensive studies should be conducted to clarify this subject.

Keywords: Fibromyalgia; Vitamin D; Disease Activity; life quality.

INTRODUCTION

Fibromyalgia syndrome (FMS) is a rheumatologic disease of unknown etiology characterized by pain throughout the body and sensitive points in specific areas (1). Other important symptoms accompanying FMS are tiredness, sleep disorders, psychological discomfort and cognitive impairments (2). FMS is seen in 1-2% of the general population and 9 times more in females than males (3). Several previous studies have shown the quality of life of FMS patients to be negatively affected (4). Vitamin D is an important modulator of the immune system and is defined as an important element in the pathogenesis of various autoimmune diseases (5).

Vitamin D deficiency is related to treatment-resistant musculoskeletal system pain and neuromuscular dysfunctions (6).

In the studies, which examined the effect of vitamin D level on quality of life by questioning physical and social functions in sub groups, the vitamin D levels were found to be much worse compared to normal individuals (7).

As there are no specific laboratory or radiological findings of FMS (8), it has been suggested that the occurrence of symptoms similar to those of vitamin D deficiency has caused incorrect diagnosis in these patients (9).

Low levels of vitamin D have been shown to be common in individuals with fibromyalgia and non-specific musculoskeletal system pain (10).

The relationship between low vitamin D level and FMS pathophysiology is controversial. While in some studies it is indicated that there is no difference between vitamin D levels of healthy controls and vitamin D levels of FMS patients (11-14), others studies reported a relationship between widespread pain and low vitamin D levels (2,10,15).

Although there are many studies which have separately evaluated the level of vitamin D in FMS and quality of life in FMS and examined the effect of vitamin D on quality of life, there has been limited research on the effect of vitamin D level on quality of life in FMS.

In this study ıt was aimed to assess the relationship between vitamin D deficiencies and the pain, disease activity, life quality of FMS patients.

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MATERIALS and METHODS

Patient selection

Ethical approval for the study was obtained from the Ethics Committee of the Namik Kemal University. Written informed consent was obtained from all study participants prior to the study.

Patients evaluated in three groups.

1. Isolated vitamin D deficiency (Vitamin D deficiency was defined as serum 25-OHD levels <20 ng/ml)

2. Isolated FMS:

3. FMS and vitamin D deficiency

Inclusion criteria, according to revised American College of Rheumatology (ACR) preliminary diagnostic criteria (16), were diagnosis as primary FMS and acceptance to participate in the study.

Exclusion criteria were chronic inflammatory disorders, hypertension, hypercholesterolemia, or diabetes, to be undergoing anti-coagulant therapy, or being predisposed to thrombotic or bleeding disorders and calcium metabolic disorders. All included patients were nonsmokers and were not taking calcium or vitamin D supplements, consuming alcohol, or using drugs.

Body mass index, age, and demographic characteristics were recorded for all patients and controls. Tenderness was evaluated by applying pressure (4 kg/cm^2) over 18 specific body points, and the number of tender points was recorded. FMS patients completed visual analog scales (VAS) to evaluate their level of pain and were evaluated with the FMS Impact Questionnaire (FIQ).

The validated version of the FIQ (17) is a specific instrument assessing disease impact on daily living in FMS patients. This instrument measures "physical functioning," "overall impact" (missed work days and job difficulty), and "symptoms" (depression, anxiety, morning tiredness, pain, stiffness, fatigue, and well-being over the past week). The maximum score for the FIQ is 100, with higher values indicating greater severity. In the severity analysis, a total FIQ score from 0 to <39 was found to represent a mild effect, from ≥39 to <59 a moderate effect, and from ≥59–100 a severe effect (18).

The Turkish version of the FIQ was validated by Sarmer (19).

Blood samples

The best indicator of vitamin D status is serum 25(OH)D3 concentration because it reflects both dietary intake and coetaneous synthesis of vitamin D. Therefore, we examined serum 25(OH)D3 concentration. The serum 25(OH)D3 levels were analyzed with the ELISA (EUROIMMUN, D-23560 Lübeck, Seekamp 31, Germany) method.

The definition of serum vitamin D status was summarized as severe, deficient, and insufficient when the concentration of 25-hydroxyvitamin (OH)-D <10, 10-20, >20, ng/mL respectively (20).

Statistical analyses

SPSS for Windows version 17.0 software was used for statistical analyses of our study data. Mean +/- standard deviations (SD) were used to identify the data related to the continuous variables, and the number was used to identify the ones related to the categorical variables. In order to compare continuous variables, when normality conditions were met according to normality test (Shipiro-Wilk), for more than two groups ANOVA, and for the two group's student-T test was used. When normality conditions could not be met for more than two groups comparison Krusskal-Wallis, for two groups comparison Mann-Whitney U test were used. In the categorical variables comparison used Ki-square test. For the evaluation of the correlation between variables, according to normality state, Pearson or Spearman test were performed.

A p-value < 0.05 was considered statistically significant. Considering $\alpha = 0.05$ 1-β (power)= 0.80 in the power analysis, it was calculated in the study titled 'Relationship between mean platelet volume and vitamin D deficiency in fibromyalgia' that at least 99 subjects should be taken from each group so that the mean variation of Vitamin D in the FMS group in comparison to the control group can be 0.6 units.

RESULTS

Demographic and laboratory characteristics of groups were summarized in Table 1. In isolated FMS group, vitamin D level was found higher than other two groups (Isolated FMS vs Isolated vitamin D deficiency p>0.05; Isolated FMS vs FMS and vitamin D deficiency p>0.05).

Table 1. Patient's laboratory and demographic characteristics

Parameters, mean±SD	Group-1 (n: 32)	Group-2 (n: 36)	Group-3 (n: 70)
Age, year	47±11.0	44 ±6.5	46±8.1
Sex , Female %	27, 63.2	33, 70.5	64, 70.0
ESR, mm/h	13±6.5	17±8.6	16±7.1
CRP, mg/L	3.2±1.4	3.7±2.1	3.6±1.4
25-Hidroksi vitD, ng/ml	12.1±5.3	30.0±9.7	13.3±8.4
Ca, mg/dl	8.9±0.3	9.1±0.2	8.8±0.3
P, mg/dl	3.3±0.4	3.4±0.5	3.6±1.1
PTH, pg/ml	54±10.0	52±9.9	52±15.1
ALP, IU/L	77±11.2	68±12.2	79±14.5

ESR: Erythrocyte Sedimentation Rate; CRP: C reactive protein; Ca: Calcium; P: Phosphorus; PTH: Parathyroid Hormone; ALP: Alkaline Phosphatase; SD: Standard Deviation

At the assessment of quality of life, VAS and FIQ scores in FMS group were significantly higher than ones found in vitamin D deficiency group (p<0.001) (Table 2). In terms of SF-36 subgroups, scores were much worse in vitamin D deficiency and FMS than isolated FMS group. However, some of subgroups reached statistically significance (Table 2).

Table 2. SF-36 and VAS, FIQ results in FMS groups

Parameters, mean±SD	Group-1 (n: 36)	Group-3 (n: 70)	p
VAS, mm	58.7±22	75±11	**<0.001**
FIQ	51.7±15.2	71.5±13.6	**<0.001**
Physical Function	44.6±25.3	34.4±22.6	**<0.05**
Social Function	58± 27.9	51.0±25.6	>0.05
Role Limitations Due to Physical Health	22.2±19.8	21.2±16.7	>0.05
Role Limitations Due to Emotional Health	41.8±22.5	31.9±22.4	**<0.05**
Emotional well-being	56.4±26.8	43.7±25.1	**<0.05**
Energy/Fatigue	48.4±26.3	41.5±24.5	>0.05
Pain	26.0±26.2	23.0±25.4	**<0.05**
General Health	42.4±31.9	36.6±19.2	>0.05

SF-36: Short Form Health Survey-36; FIQ: Fibromyalgia Impact Questionnaire; SD: Standard Deviation

Negative and moderate correlation was detected between vitamin D level and FIQ scores (Table 3).

Table 3. Factors associated to vitamin D levels

	Vitamin D level	
Risk factors	R	P
FIQ	-0.584	**<0.001**

FIQ: Fibromyalgia Impact Questionnaire

DISCUSSION

The result of the study negative correlation was found between vitamin D levels and FIQ. Many studies which have evaluated the relationship between fibromyalgia and vitamin D level have presented conflicting results. In a study by Al-Allaff et al comparing the Vitamin D levels of premenopausal women with FMS with those of a control group, the vitamin D levels of the FMS group were determined to be at a significantly low level compared to those of the control group (3). Although Plotnikoff and Quigley found deficient levels of serum 25-OH-D3 in 93% of individuals with chronic non-specific pain, it was suggested that the reason for the widespread pain could have been a low level of vitamin D. It was emphasized in that it was necessary to examine serum 25-OH-D3 levels when evaluating patients with non-specific musculoskeletal pain (10). A different study which researched the relationship between non-specific musculoskeletal pain, including FMS, and 25-OH-D, determined a significant correlation between vitamin D levels and widespread pain (21). Vitamin D levels were evaluated in FMS patients in a study by Bhatty and a significantly high rate of vitamin D deficiency was determined (22). Okumuş et al compared vitamin D levels in a group of 40 premenopausal females with FMS and an age-matched control group and no statistically significant difference was determined (12). Similarly, in a study by Ulusoy, the vitamin D levels of FMS patients showed no difference when compared with a healthy control group (13).

In FMS patients who have vitamin D deficiency, SF-36 subgroups were detected to be at much more lower score. In each of this two group the score was significantly lower than the whole country mean (23).

Although there are many studies which have separately evaluated the level of vitamin D in FMS and quality of life in FMS and examined the effect of vitamin D on quality of life, (24-28) there has been limited research on the effect of vitamin D level on quality of life in FMS.

In a study by Wepner, in which 30 fibromyalgia patients determined with low levels of vitamin D, were administered with vitamin D supplements and using the SF-36 and FIQ questionnaires, vitamin D was determined to have a positive effect on quality of life (29). In another study by Armstrong et al, FMS patients were separated into 2 groups of low level vitamin D (<25 nmol/ml) and high level vitamin D (≥25 nmol/ml). To evaluate the disease activity between the two groups, the FIQ was used and no difference was determined between the low and high vitamin D level cases in terms of FIQ (30). In a study by Okumuş et al, 40 premenopausal FMS patients were compared with an age-matched healthy control group in respect of FIQ and physical functional capacity and a negative correlation was determined between low vitamin D levels and quality of life (12).

CONCLUSION

It is known that widespread pain, tiredness, sleep disorders and psychiatric symptoms have a disruptive effect on quality of life in FMS. Determining the other factors which affect quality of life seems to be important at the stage of directing treatment of the disease. Consideration of all these studies suggests that there may be a relationship between low quality of life in FMS and vitamin D level. However, there are few studies which have researched the relationship between quality of life and vitamin D level in FMS and clear results have not be obtained. Therefore, there is a need for further studies on this subject. In the light of all these findings, vitamin D level should be kept in mind as one of the factors negatively affecting quality of life in FMS. More extensive studies should be conducted to clarify this subject.

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