TÜRKİYE'DE İÇ ANADOLU BÖLGESİ'NDE D VİTAMİNİ DÜZEYİ İLE SOSYO-EKONOMİK VE EĞİTİM FAKTÖRLERİ ARASINDA BİR İLİŞKİ VAR MIDIR?

Is there a relationship between Vitamin D level and socio-economic and education factors in Central Anatolia in Turkey?

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ÖZET

Amaç: Çalışmamızda Yozgat ilindeki erişkin kadın hastalarda vitamin D eksiklik düzeyi [25(OH2) D] ile sosyo-ekonomik ve eğitim faktörleri arasındaki ilişkiyi araştırmak istedik.

Gereç ve yöntemler: Kasım 2016 ile Aralık 2017 tarihleri arasında Fiziksel Tıp ve Rehabilitasyon Polikliniği'ne ağrı şikayeti ile başvuran, D vitamin düzeyi düşük bulunan kadın hastaların kayıtları retrospektif olarak incelendi. Hastaların demografik bilgileri (yaş, ikamet yeri, eğitim düzeyi, meslek, şikayet süresi) ve 25(OH)D düzeyleri kaydedildi. Hastalar 25(OH)D seviyesine göre 3 gruba ayrıldı. Demografik veriler gruplara göre karşılaştırıldı.

Bulgular: Çalışmaya yaş ortalaması 37.52 ± 5.5 yıl (min:25 max:49) olan toplam 173 kadın hasta alındı. Eğitim düzeyi ve şikayet süresi vitamin D düzeyleri ile anlamlı olarak korele idi (sırasıyla p <0,05, r = 0,183, p <0,001, r = -0,249).

Sonuç: Bu çalışma vitamin D seviyesi ile eğitim düzeyi ve şikayetlerin süresi arasında anlamlı bir ilişki olduğunu göstermiştir.

Anahtar Sözcükler: *D vitamini eksikliği; Halk sağlığı; Güneş ışığı; Eğitim*

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ABSTRACT

Purpose: In our study, we wanted to investigate the relationship between vitamin D [25(OH)D] deficiency and socio-economic and education factors in adult female patients in Yozgat province in Turkey.

Material method: A retrospective examination was made of the records of female patients with low levels of vitamin D who presented at the Physical Medicine and Rehabilitation Polyclinic with complaints of pain between November 2016 and December 2017. Demographic data of the patients (age, place of residence, education level, occupation, duration of complaint) and 25(OH)D levels were recorded. The patients were separated into 3 groups according to the 25(OH)D levels. Demographic data were compared according to the groups.

Result: A total of 173 female patients were included in the study with a mean age of 37.52±5.5 years (range, 25-49 years). Education and duration of complaint were significantly correlated with vitamin D levels (respectively p <0,05 ,r = 0,183, p <0,001, r = -0,249).

Conclusion: This study showed a significant correlation between vitamin D level and educational level, duration of the complaints.

Keywords: *Vitamin D deficiency; Public health; Sunlight; Educational*

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INTRODUCTION

Although Turkey is a country with high rate of sunlight, just as in other countries of geographical location with high rates of sunlight, Vitamin D deficiency affects all age groups in society. Due to changes in the lifestyle of women, less time spent outside during the day and nutritional deficiencies, vitamin D deficiency has become a significant public health problem in urban and rural areas (1, 2). Approximately 90% of vitamin D is synthesised in the skin with sunlight and 10% is taken from nutritional intake. With exposure to sunlight, 7-dehydrocholesterol, which is an endogenous precursor in the epidermis, is activated and previtamin D3 is formed (3). In this respect, ultraviolet-B (UVB) rays are the primary source of vitamin D for most people (4).

Previtamin D3 is then transported to the liver by the blood and is there hydroxylised to 25 hydroxyvitamin D (25(OH)D) and is then carried to the kidneys where it is again hydroxylised to the 1.25(OH)D form, which is also known as calcitriol. It is well known that this form has a role in calcium metabolism (3). The intake of vitamin D in the diet is limited, as the most vitamin D is found in egg yolks and oily fish such as salmon, mackerel and sardines (4). In addition to bones, vitamin D has an effect on many tissues in the body. While this vitamin regulates bone and mineral metabolism, it also has effects on immunity, cell growth and the expression of hormones. Deficiency causes several diseases with cardiac, vascular, hematological, immunological, hormonal and metabolic effects (5-8).

Since the effects of many diseases are life threatening; 15 minutes exposure to the sun; considering that 25% of the sunlight or consuming the required food is sufficient for synthesis; it can be foreseen that the lack will be less visible (9). However, low awareness, insufficiencies in nutrition and changes in lifestyle all cause low vitamin D levels. The aim of this study was to investigate the relationship of vitamin D deficiency, which is a significant public health problem, with educational, socio-economic levels in the province of Yozgat in the Central Anatolia region.

MATERIAL and METHOD

A retrospective examination was made of the records of female patients with low levels of vitamin D who presented at the Physical Medicine and Rehabilitation Polyclinic with complaints of pain between November 2016 and December 2017. Patients with complete records of data compatible with the study criteria were included in the study. Demographic data of the patients (age, place of residence, education level, occupation, duration of complaint) and 25(OH)D levels were recorded. The patients were separated into 3 groups according to the 25(OH)D levels. Group 1 comprised those with 25(OH)D level <10 ng/mL, Group 2 with 10 - <20 ng/mL and Group 3 with 20-30 ng/mL. The 3 groups were compared in respect of demographic data.

This study was approved by Bozok University medical faculty Ethics Review Board (189_2018.04.11.03). This research complied with the principles of the Declaration of Helsinki.

Exclusion Criteria:

Patients were excluded; if they had any autoimmune or chronic inflammatory disease (rheumatoid arthritis, ankylosing spondylitis etc), systemic chronic disease (chronic kidney or liver disease), disease causing malabsorption (coeliac disease or radiation enteritis), active infection, cancer, thyroid or parathyroid disease, if they were taking glucocorticoids, hormone replacement therapy, anti-epileptic treatment or if they were pregnant.

Vitamin D measurement

Serum 25(OH)D level measurements were made using chemiluminescence microparticle immunoassay (CMIA) technology with an Architect i2000 device (Abbott, Diagnostics, Wiesbaden, Germany). Serum 25(OH)D level measurements are accepted as the best marker for the evaluation of the general vitamin D profile (8).

Statistical Analysis

The statistical analyses of the data in the study were performed using SPSS 20.0 software (Statistical Package for the Social Sciences SPSS Inc, Chicago, IL, USA). Descriptive statistics were given as mean ±

standard deviation (SD) for continuous variables and as number (n) and percentage (%) for categorical variables. Comparisons of continuous variables between independent groups were made using the t-test and for categorical variables, the Chi-square test. Correlations between vitamin D and variables were evaluated with the Pearson Correlation test. Values of $p<0.001$ and $p<0.05$ were accepted as statistically significant.

RESULTS

A total of 173 female patients were included in the study with a mean age of 37.52±5.5 years (range, 25-49 years). Looking at the marital status; 84.3% were married, 13.8% were single and 1.7% were divorced. The place of residence was the city in 64.1% of the patients, a town in 23.6% and a village in 12.1%. When the level of education is examined; 3.4% were illiterate, 47.9% were primary school graduates, 35.5% were high school graduates and 15% of university graduates. Of the total participants, 89.5% were not employed outside the home, 6.9% had clerical work and 3.4% of physical employment. The duration of the complaints was recorded as 3 weeks in 22.5% of, 3-6 weeks in 36.9% of, 6-12 weeks in 22.5% of and longer than 12 weeks in 17.9% of the females. Income level was defined as; the minimum wage (MW) was below 1.1%, 46.2% with minimum wage; 17.3% is double the minimum wage; 24.8% were taking up to 3 folds.. The demographic data of the patients are presented in Table 1

Table 1: Demographic data of patients according to vitamin D levels

	D1 10 ng/Ml< N:80 (46,3%)	D2 10-<20 ng/mL N:63 (36,4%)	D3 20-30 ng/mL N:30 (17,3%)	TOTAL N:173
Age (min-max)	37,53(25-49)	37,41(26-47)	37,65(25-46)	37,52(25-49)
25(OH)D ng/mL (min-max)	(2-9)	(10-19)	(20-27)	13,2+-6,3 (2-27)
place of residence n (%)				
City	48 (60)	42 (66,6)	21 (70)	111 (64,1)
Town	18 (22,5)	19 (30,1)	5 (16,6)	41 (23,6)
Village	14 (17,5)	3 (4,4)	4 (13,3)	21 (12,1)
Marital status n (%)				
Married	70 (87,5)	51 (80,9)	25 (83,3)	146 (84,3)
Single	9 (11,2)	11 (17,4)	4 (13,3)	24 (13,8)
Divorced	1 (1,2)	1 (1,58)	1 (3,3)	3 (1,73)
Education n (%)				
Literate	3 (3,7)	0	3 (10)	6 (3,4)
Primary school	40 (50)	24 (38.2)	19 (63,3)	83 (47,9)
High school	27 (33,7)	26 (41,2)	5 (16,6)	58 (33,5)
University	10 (1,2)	13 (20,6)	3 (10)	26 (15)
Work n (%)				
Unemployed	71 (8,7)	57 (90,4)	27 (90,1)	155 (89,5)
Clerical work	5 (6,3)	5 (8)	2 (6,6)	12 (6,9)
Physical employment	4 (5)	1 (1,5)	1 (3,3)	6 (3,4)
Income n (%)				
below MW	9 (11,2)	8 (12,6)	3 (10)	20 (11,5)
MW	41 (51,2)	22 (34,9)	17 (56,6)	80 (46,2)
double MW	11 (13,75)	17 (26,9)	2 (6,6)	30 (17,3)
3-fold MW	19 (23,7)	16 (25,3)	8 (26,6)	43 (24,8)
Duration of the complaint n (%)				
3 weeks	15 (18,7)	18 (28,5)	6 (20)	39 (22,5)
3-6 weeks	25 (31,3)	29 (46)	10 (33,3)	64 (36,9)
6-12 weeks	20 (25)	13 (20,6)	6 (20)	39 (22,5)
Longer 12 weeks	20 (25)	3 (4,7)	8 (26,6)	31 (17,9)

Table 2. Patient's laboratory values

	Dvit Mean±SD	ALP Mean±SD	Ca Mean±SD	P Mean±SD	Parathormon Mean±SD
Mean Minimum Maximum	13,2±6,3 2 27	66,2±15,9 12 99	9,35±0,8 1 10,5	2,19±0,5 1,28 3,80	77,91±21,8 23,5 162
Dvit: 25OHvit D, ALP: Alkalenfosfataz, Ca:Calcium, P:Fosfor,					

The laboratory values of the patients are given in Table 2. The correlations between the demographic data and the vitamin D levels are shown in Table 3.

Table 3. Correlation between vitamin D and variables

	Vitamin D	
Age	p>0,05	r=0,019
Marital status	p>0,05	r=0,052
Education	p<0,05	r=0,183*
Work	p>0,05	r=0,077
Duration of the complaints	p<0,001	r=-0,249**
Income	p>0,05	r=0,043
*Correlation is significant at the 0.05 level		
**Correlation is significant at the 0.01 level		

DISCUSSION

The findings of this study showed a significant correlation between vitamin D levels and educational level, and the duration of the complaint. However, no significant correlation was observed between vitamin D levels and age, marital status, income, work. As a result educational level were identified as significant predictors of low vitamin D levels.

Turkey is one of the countries where vitamin D deficiency is endemic. In the TURDEP-II study, which was the most extensive study conducted in Turkey, 9560 adults were examined and vitamin D was found to be <20 ng/mL in 93% of the samples (10). Vitamin D deficiency may be related to low intake in the diet, incorrect use of sun protection and low exposure to sunlight. Although Turkey is a country with high rates of sunlight, studies have shown that vitamin D deficiency is extremely common (2).

The productivity and economic development of a society is dependent on healthy individuals. The daily requirement of vitamin D varies according to age and individual conditions. The serum vitamin D level necessary for bone health and for protection against several previously mentioned diseases the level has been reported to be >30 ng/ml. The required level can be met easily, practically and cost-free in a short time with vitamin D intake from food and sunlight (6,8,9).

Low vitamin D levels are seen in individuals with hard working conditions, who cannot benefit from sunlight and who cannot reach a sufficient nutritional source socio-economically. It was thought that the vitamin D levels of the patients included in the study could be considered an important parameter to give an idea of the sociocultural, economic and educational levels of the patients.

According to the 2015 standard of living index of the Turkish Statistics Institution (TUIK), in the province of Yozgat the employment rate is 47.1%, average monthly income is 1770 TL, and the number of households in the low income group is 74%. In the current study, the highest number of those with low vitamin D levels was in the minimum wage group. Again according to the 2015 TUIK standard of living index values and rankings of provinces in Turkey, the province of Yozgat was ranked 59th in the income and wealth index, 58th in the education index and 76th in the social life index (11). In the current study, 83 (47.9%) patients had an education level of primary school and low vitamin D levels. In a study by Taşkıran B et al, vitamin D levels were reported to be lower in those with a sedentary lifestyle compared to active individuals and this was associated with more time being spent in the home

(12). As 155 of the current study participants were not employed outside the home, it can be thought that more time is spent indoors and they do not benefit from sunlight. In support of the findings, sociocultural features, traditional lifestyles and level of education can be considered as factors affecting vitamin D levels. Furthermore, the level of vitamin D is closely associated with an individual's nutritional selection, economic parameters, environmental factors and age, gender and genetic factors. In previous studies in literature, traditional lifestyles, high altitude, low socio-economic status, female gender and insufficient oral vitamin D intake from food have generally been held responsible for low levels of vitamin D (1-4). The results of the current study were found to be consistent with these findings in literature.

In conclusion, it is known that the vast majority of vitamin D is synthesised in the body with sunlight and minimum part is obtained from food. Pain and accompanying diseases increase the frequency of patients presenting at hospitals with vitamin D deficiency, and the drugs used in treatment increase healthcare costs and cause economic and time losses. Providing new structures to raise educational, sociocultural and economic levels of patients and the development of awareness of healthy nutrition and especially to prevent vitamin D deficiency will be effective methods to overcome this problem.

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