

An Analysis of Albumin Level and Vitamin D Deficiency in Patients Treated in Palliative Care Centers

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ABSTRACT

Objectives: The main objective of palliative care is to keep symptoms under control and to increase the quality of life. The present study aimed this study is to define the serum albumin and vitamin 25-hydroxy D (25 [OH] D) levels in patients who receive palliative care.

Material/Method: This study has been carried out in a descriptive-retrospective manner. Demographic data and laboratory results of 41 patients hospitalized in a State Hospital Palliative Care Center were analyzed.

Results: A ratio of 48.8% of the participants was female, 51.2% was male and the average age was 74.21 ± 2.21 (Min: 40-Max: 96). A rate of 22% of the patients suffered from cerebrovascular disease, 19.5% from alzheimer, 9.8% from heart failure, 7.3% from oral intake disorders. The serum albumin levels were found to be low in 80.5% of the patients, the serum calcium levels were normal in 70.7%. A lack of Vitamin D was found in 63.4% of the patients and 19.5% suffered from vitamin D deficiency, while the vitamin D level was found to be normal in only 17.1% of the patients. The average 25 (OH) D level of the patients was found to be 17.1 ± 15.54 ng / mL.

Conclusion: Patients who are followed up within the scope of palliative care are at risk of malnutrition, low serum albumin levels and vitamin D deficiency. Therefore the follow-up and treatment of patients is important in this respect.

Keywords: Albumin, Nutrition, Palliative care, Vitamin D

Palyatif Bakım Merkezinde Tedavi Gören Hastalarda Albümin Düzeyi ve D Vitamini Eksikliğinin İncelenmesi

ÖZET

Amaç: Palyatif bakımın temel amacı semptomların kontrol altına alınması ve yaşam kalitesinin yükseltilmesidir. Bu çalışma palyatif bakımdaki hastaların serum albümin ve 25-hidroksi D (25[OH]D) vitamini düzeyini belirlemek amacıyla tanımlayıcı olarak yapılmıştır.

Materyal/Yöntem: Bu araştırma tanımlayıcı-retrospektif olarak gerçekleştirilmiştir. Bir Devlet Hastanesi Palyatif Bakım Merkezinde yatan 41 hastanın demografik verileri ve laboratuvar sonuçları incelenmiştir.

Bulgular: Katılımcıların %48.8'i kadın, %51.2'si erkektir ve yaş ortalaması 74.21±2.21(Min:40-Max:96)'dir. Hastaların %22'si serebrovasküler hastalık, %19.5'i Alzheimer, %9.8'i kalp yetmezliği, %7.3'ü oral alım bozukluğu tanısı ile takip edilmektedir. Hastaların %80.5'inde serum albümin düzeyi düşük, serum kalsiyum düzeyi %70.7'sinde normal düzeydedir. Hastaların %63.4'ünde vitamin D eksikliği ve %19.5'inde D vitamini yetersizliği tespit edilirken, sadece %17.1 hastada D vitamini seviyesi normal olarak bulunmuştur. Hastaların 25-hidroksi vitamin D seviye ortalamaları 17,1±15,54 ng/mL bulunmuştur.

Sonuç: Palyatif bakım hizmeti alan hastalar malnütrisyon, düşük serum albümin düzeyi ve D vitamini eksikliği açısından risk altında olup, hastaların bu açıdan takip edilerek tedavisinin sağlanması yaşam kalitesinin korunması için önem teşkil etmektedir.

Anahtar Kelimeler: Albümin, Beslenme, D Vitamini, Palyatif bakım,

According to the World Health Organization (WHO), palliative care is defined as the prevention and alleviation of the suffering of adult and pediatric patients (1). The main purpose of palliative care is to approach the symptoms, pain and stress caused by a serious illnesses in such a manner as to provide extra support to the patient along with enhancing the quality of life, dignity and comfort of the individual (2). There is an ongoing need for palliative care in case of chronic health problems that limit life in many parts of the world. According to estimates of the WHO 40 million people need palliative care each year (3).

Patients requiring palliative care generally experience malnutrition due to nutritional disorders (4). Vitamin deficiency due to nutritional disorders causes symptoms such as pain, weakness, fatigue and depression which reduce the quality of life in patients (2). Nutrition in elderly patients can be evaluated by anthropometric measurements, laboratory evaluations, clinical evaluation and assessment of the diet. It is known that low serum albumin levels in elderly individuals are associated with malnutrition and mortality (5).

Vitamin D is a prohormone that is vital for the calcium/phosphate balance, bone structure and physiological functioning. It is absorbed by the skin when exposed to ultraviolet B and obtained when consuming synthesized foods (6). Vitamin D deficiency is an important public health problem that is seen in approximately one out of 7 people worldwide (7,8). Vitamin D deficiency affects almost 50% of the global population and is recognized as a public health problem that affects not only the elderly but people in all life stages (8). A study conducted in the United Kingdom found that Asian 53.7% and black 34.9% participants had a higher proportion of vitamin D deficiency than white participants 12% (9).

Its clinical effects have been documented in many studies. VDD has been associated with cardiovascular diseases, increased risk of fractures, dyslipidemia, increased inflammation, glucose metabolism disorders, weight gain, infectious diseases, multiple sclerosis, mood disorders, cognitive dysfunction, impaired physical functions and mortality rates connected to all types of reasons (10).

Although palliative care differs from country to country worldwide, palliative care in our country has a short history. Palliative care services have been provided since the publication of the directive of the Ministry of Health of our

country in 2015 (11). Palliative care has been neglected in our country due to reasons such as the Turkish family structure, the culture, the absence of expertise in the field of palliative care and the lack of this subject in education. Although the number of palliative care centers has increased over time, their number is actually quite small (12). According to data over the year 2019, there are 365 palliative care centers in our country (11).

Since malnutrition is common in palliative patients and low vitamin D and albumin levels are an important benchmark in the occurrence of this condition, this study has been carried out to prevent malnutrition in palliative patients, to determine the level of vitamin D and albumin, to reveal the requirements and to determine the opinions and suggestions in order to shape the planned care and treatment in this regard.

MATERIALS AND METHODS

Design, Population and Sample

In this descriptive study, the clinical files of 41 patients between the ages of 18 and 45, treated in a Palliative Care Center in Turkey between the 01st of June and 31st of December were retrospectively drafted. The 41 patients who stayed in the palliative care center for two consecutive days were included in the study. The 4 patients who deceased the same day they were admitted, were not included. The demographic data (age, gender, social security) and blood (serum 25 (OH) D, calcium, albumin levels, hemoglobin, vitamin B12 and some laboratory findings) values of patients were retrospectively obtained from observation files. The serum 25 (OH) D, calcium, albumin levels and some laboratory findings of all patients who received a diagnosis for admission to the palliative care center were analyzed. In clinical practice the serum 25 (OH) D concentration is used for the evaluation of vitamin D levels. Vitamin D deficiency (VDD) is defined as a 25 (OH) D level below 20 ng/mL (50 nmol/L) and vitamin D insufficiency as a level between 21-29 ng/mL (525-725 nmol) (13). The frame of reference for albumin in this study is 3.5-5.2 gr/dL, for vitamin B12 it is 180-900 pg/mL, for calcium it is 8.4-10.6 mg/dL, for leukocytes it is (4-10) $10^3/uL$, for lymphocyte it is (0.8-4) $10^3/uL$, for hemoglobin it is (12-16) g/dL, for hematocrit it is (35-47) %, for CRP it is (0-5) mg/L.

Statistical Analysis

The SPSS 21 statistics program was used for the evaluation of the data and the numbers, percentages, mean, standard deviation and chi-square test have been used

in the analysis. A value of $p < 0.05$ was considered to be significant.

RESULTS

In this study, in which the records of 41 patients who received treatment at the Palliative Care Center in X city were examined, the average age of the patients was 74.21 ± 2.21 (Min:40-Max:96). A rate of 48.8% of the patients was male and 51.2% was female. Patients under the age of 65 years formed 29.3% of the group, whereas 70.7% was 65 years or older. The majority of the patients had social security (92.6%). The average hemoglobin level of the patients was 11.0 ± 2.0 g/dL. The hemoglobin levels were found to be below normal and insufficient in 73.2% of the admitted patients, as was the case for the hematocrit levels in 63.4% of the patients, the serum albumin levels in 80.5% of the patients and the serum calcium levels in 26.8% of the patients. The leukocyte levels in one third of the patients were found to be above normal and high, as was the case for the CRP levels of 95.1% of the patients, glucose levels of 48.8% of the patients and BUN levels of 56.1% of the patients (Table 1).

When the diagnoses of the patients are examined, cerebrovascular disease with 22%, Alzheimer's with 19.5%, malignant diseases with 19.5%, heart failure with 9.8% and oral intake disorders with 7.3% are the most common. A statistically significant difference was found between the sexes of the patients and their diagnosis ($p < 0.05$) (Table 2).

The mean 25-OH D level was found to be 15.4 ± 14.6 ng/ml in women and 18.2 ± 12.4 ng/ml in men. When the relationship between the sex of patients and their vitamin D and albumin levels were examined, no significant difference was found, although albumin and vitamin D levels in women were found to be lower than in men (Table 3).

It was observed that 26 of the patients (63.4%) were deficient in 25 (OH) vitamin D. The majority of patients (87.9%) had vitamin D levels < 30 ng/mL. Vitamin D deficiency is statistically more common in men than in women but no significant relationship was found between them. It was determined that there was no statistically significant difference between the ages, sexes and diagnoses of the patients in terms of vitamin D deficiency and insufficiency (Table 4).

Table 1. Some Socio-Demographic Specifications of Participants and Clinical Data (n=41)

	n	%	Mean \pm SD
Age			
≤ 65	12	29,3	74.21 \pm 2.21
> 65	29	70,7	
Sex			
Male	21	48,8	
Female	20	51,2	
Social security			
Yes	38	92,6	
No	3	7,4	
Vitamin D			
Deficient	26	63,4	17.18 \pm 15.54
Insufficient	8	19,5	
Normal	7	17,1	
CRP			
Normal	2	4,9	65,68 \pm 45.28
High	39	95,1	
Calcium			
Low	11	26,8	8.78 \pm 0.95
Normal	29	70,7	
High	1	2,4	
Hemoglobin			
Low	30	73,7	11.01 \pm 2.06
Normal	10	24,4	
High	1	2,4	
Hematocrit			
Low	26	63,4	34.12 \pm 6.16
Normal	14	34,1	
High	1	2,4	
Lymphocyte			
Low	9	22,0	1.40 \pm 0.65
Normal	32	78,0	
Leukocyte			
Low	2	4,9	8.69 \pm 3.32
Normal	26	63,4	
High	13	31,7	
Albumin			
Low	33	80,5	3.01 \pm 0.51
Normal	8	19,5	
Vitamin B12			
Low	10	24,4	516,24 \pm 72,53
Normal	24	58,5	
High	7	17,1	

Table 2. Comparison of the Reasons for Receiving Palliative Care on the Basis of the Sex of Patients

Patient diagnosis	Female		Male		Total		X ²	p
	n	%	n	%	n	%		
CVD	7	77.8	2	22.2	9	22.0	18,598	0,046
Alzheimer	1	12.5	7	87.5	8	19.5		
Malignant diseases	4	50.0	4	50.0	8	19.5		
Heart failure	4	100.0	0	0.0	4	19.5		
Oral intake disorders	1	33.3	2	66.7	3	7.3		
COPD	1	50.0	1	50.0	2	4,9		
Huntington disease	0	0.0	2	100.0	2	4,9		
Prostate hypertrophy	0	0.0	2	100.0	2	4.9		
Soft tissue disorders	1	100.0	0	0.0	1	2.4		
Pressure ulcer	0	0.0	1	100.0	1	2.4		
Acute kidney failure	1	100.0	0	0.0	1	2.4		
Total	20	51.2	21	48.8	41	100.0		

Table 3. Comparison of Albumin and Vitamin D Levels on the Basis of the Sex of Patients

	Sex						X ²	p
	Female		Male		Total			
	n	%	n	%	n	%		
Vitamin D								
Deficient (20ng/ml and below)	12	46,2	14	53.8	26	100.0	0,773	0,680
Insufficient (between 21-29ng/ml)	5	62,5	3	37.5	8	100.0		
Normal (30ng/ml and higher)	3	42,9	4	57.1	7	100.0		
Albumin								
Low levels (below 3.5gr/dL)	17	51.5	16	48.5	33	100.0	0,697	0,377
Normal levels (between 3.5gr-5.2gr/dL)	3	37.5	5	62.5	8	10.0		

Table 4. Comparison between Patients Who Suffer From Vitamin D Deficiency and Insufficiency

	Vitamin D <20 ng/mL		Vitamin D ≥20 ng/mL		X ²	p	Vitamin D <30 ng/mL		Vitamin D ≥30 ng/mL		X ²	p
	n	%	n	%			n	%	n	%		
n=41	n	%	n	%			n	%	n	%		
Percentage of patients	26	63,4	15	36,6			34	87,9	7	17,1		
Sex												
Female	12	60.0	8	40.0	0,196	0,453	17	85.0	3	15.0	0,119	0,529
Male	14	66.7	7	33.3			17	81.0	4	19.0		
Age												
Younger than 65	8	66.7	4	33.3	0,077	0,536	9	75.0	3	25.0	0,753	0,328
65 And older	18	62.1	11	37.9			25	86.2	4	13,80		
Diagnosis												
CVD	5	55,6	4	44,4	5,381	0,864	8	89,9	1	11,1	14,42	0,155
Alzheimer	5	62,5	3	37,5			8	100	0	0		
Cancer	6	75	2	25			7	87,5	1	12,5		
Heart failure	2	50	2	50			2	50	2	50		
Oral intake disorders	1	66,7	1	33,3								
COPD	1	50	1	50			1	50	1	50		
Huntington disease	2	100	0	0			2	100	0	0		
Prostate hypertrophy	1	50	1	50			1	50	1	50		
Soft tissue disorders	1	100	0	0.0			1	100	0	0		
Pressure ulcer	1	100	0	0.0			1	100	0	0		
Acute kidney failure	0	0.0	1	100			0	0	1	100		

DISCUSSION

With an aging population and an increasing number of individuals with chronic, life-threatening and incurable health problems, the need for palliative care continues to rise (3,14). When the literature is examined it is seen that malnutrition, malabsorption due to insufficient food intake or metabolic disorders are observed in patients receiving palliative care (15,16). Therefore, this study has been carried out to examine certain blood values associated with many diseases in patients receiving palliative care.

When the reasons for patients receiving palliative care were examined in this study, it was found that 22% suffered from cerebrovascular disease, 19.5% from Alzheimer's, 19.5% from malignant diseases, 9.8% from heart failure, 7.3% from oral intake disorders, 4.9% from chronic obstructive pulmonary disease, 4.9% from huntingon's disease, 4.9% from prostate hypertrophy, 2.4% from soft tissue disorders, 2.4% from pressure ulcers and 2.4% from acute renal failure. In a similar study conducted by Çınar et al., it was observed that the group of patients in a palliative care center that required the most care suffered from alzheimer's (33.3%) and 16.7% from cerebrovascular diseases, which is similar to our study (17). In our study, approximately one-fifth of those who needed palliative care suffered from cancer. The WHO has stated that most adults in need of palliative care have chronic diseases such as cardiovascular diseases (38.5%), cancer (34%), chronic respiratory diseases (10.3%), AIDS (5.7%) and diabetes (4.6%) and that patients with many other conditions such as kidney failure, rheumatoid arthritis, chronic liver disease, congenital anomalies drug-resistant tuberculosis and neurological diseases such as multiple sclerosis, parkinson's disease, dementia may require palliative care (3). It was reported that approximately one-third of those in need of palliative care were cancer patients (1). This result shows that not only cancer patients but those suffering from other diseases may need palliative care as well.

Evaluation of the nutrition of patients receiving palliative care and support when necessary is one of the most important approaches of palliative treatment (16). Studies indicate that vitamin D supplementation in patients requiring palliative care, including cancer patients, shows significant improvements in pain and depression problems (18). In this study, 63.4% of the patients suffered from vitamin D deficiency and 19.5% suffered from vitamin D insufficiency, which amounts to a very high frequency of 82.9% of the patients being vitamin D deficient and insufficient. Vitamin D levels were found to be normal in only

17.1% of the patients. In the study of Dev et al. (19) on a group of cancer patients, the rate of vitamin D deficiency was found to be 47%. Lovell et al. (20) found that 88% of palliative care patients suffered from vitamin D deficiency, Vollbrach (15) found that 79.7% of palliative patients suffered from vitamin D deficiency and Yılmaz and Toprak (21) found that 70.3% of domiciliary care patients suffered from vitamin D deficiency. The findings in our study were similar to these studies.

Patients requiring palliative care are at greater risk for vitamin D deficiency/insufficiency as a result of less exposure to sunlight, lower oral intake and a decreased ability to absorb dietary vitamin D (19,22). In addition, studies mentioned in the literature have found a relationship between vitamin 25(OH)D and extremity functions, muscle strength and physical activity and it has been determined that vitamin D deficiency may increase the risk of falling in the elderly (10,13). In a cross-sectional study conducted on 30 palliative cancer patients in Spain, a statistically significant relationship was found between 25-OHD vitamin levels and the general quality of life (23). The conclusions drawn in the literature were found to be of importance for palliative patients in the geriatric age group in our study, as vitamin D deficiency is also a risk factor for osteoporosis, falls and fractures.

The palliative care process requires multidisciplinary approaches that aim to protect and increase the quality of life by focusing on the relief of symptoms experienced by patients and to increase the vital functions by considering the priorities of patients and their families. In addition to the treatments, palliative patients should benefit from nursing services in order to maintain a higher quality of life and enjoy an extended life span. In this regard, nurses should encourage palliative patients to engage in physical activity along with observing vitamin D supplementation.

Malnutrition due to protein energy deficiency is the most common nutritional disorder in the elderly (24). With age, the need for vitamins such as protein, calcium, vitamin D, B12 and folate increases and the need for calories decreases (25). One of the auxiliary biochemical markers in detecting malnutrition is albumin (5). Çevik et al. determined the malnutrition level of patients using the nutritional screening guidelines on the elderly and found that as malnutrition increased and deepened, serum albumin and total protein levels decreased. In addition, they reported that this decrease was not significant in the early stages of malnutrition (26). In their prospective cohort studies, Nuvenna et al. (27) drew attention to the higher effect of albumin on mortality than malnutrition.

In this study, the serum albumin level was found to be low in 80.5% of the palliative patients, with a mean of 3.01 ± 0.51 . In 2018, Dilekci et al. found low serum albumin levels in domiciliary care patients with an average of 3.66 ± 0.64 . (28). The findings in our study revealed that palliative patients in the geriatric age group had physical dependencies and nutritional deficiencies due to chronic problems and were therefore at risk of malnutrition.

Studies show that albumin levels are the most important indicator in determining the prognosis in elderly patients (29,30). Nurses who provide palliative care should monitor and support the nutrition of patients and the necessary observations will be important in preventing risks. Preservation of albumin levels in these patients will contribute significantly to facilitating the wound healing process, preventing infections and maintaining metabolic functions.

Limitations of the Study

This study has certain limitations. Patient registers of palliative centers of hospitals have been included in the study. The study data only include hospital registries of patients who participated in the study. Therefore the results of our study cannot be generalized to all patients in palliative centers. The absence of some data in the existing registries such as anthropometric measurements and daily nutritional content, as well as the fact that the study was conducted in only one city in Turkey may limit the generalizability of the findings. Therefore more research is needed to explore national trends.

CONCLUSION

The literature suggests that cognizance should be taken of vitamin D and albumin levels of patients treated in palliative care centers and that these levels should be supplemented. For this reason, it is important that nurses involved in palliative patient care identify the needs of patients, ensure that they receive qualified care, provide the necessary support in nutrition and physical activity, encourage the patient and play a team-based active role.

The results obtained within the scope of this study support the existing literature and contribute to new literature. Focusing on improving the quality of life, dignity and comfort of palliative patients, it is recommended to prevent malnutrition and support it in both curative and life-prolonging treatments. It is suggested that the nurse maintains a coordinating role at every stage of the disease trajectory and in all aspects of care.

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Conflicts of Interest

The authors declare that they have no competing financial interests or personal relationships that may affect the work reported in this article.

Ethical Considerations

The institutional permission for the study was given by the X State Hospital on 02.03.2020. Permission was granted by the Ethics Board of the XXX University for carrying out this study (number: 2020.02, date: March 03, 2020).

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