



Malnutrition in Home Care Patients

Evde Bakım Hastalarında Malnütrisyon

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ABSTRACT

Introduction: The studies on malnutrition are conducted in elderly with the prevalence ranging from 1% to 83%. The present study aimed to investigate the prevalence of malnutrition and the associated factors in the patients receiving homecare. **Method:** The participants followed at home-care unit between January 2015 and June 2015 were enrolled into the study. Socio-demographic characteristics, comorbid conditions, laboratory markers, and the scores of mini nutritional assessment short form (MNA-SF) and mini nutritional assessment (MNA) scales were retrospectively retrieved from the patient's files for all participants. MNA-SF is used as a screening test to assess the nutritional status, and the participants having a score of <12 are subjected to the complete MNA test. According to the MNA scores, the participants are classified as following: >23 normal nutritional status, 17-23 risk of malnutrition, and <17 malnutrition. **Results:** A total of 146 participants were enrolled. The MNA-SF score was <12 in 105 (71.9%) of the participants. Based on the MNA scores, normal nutrition was detected in 51 (34.9%), risk of malnutrition was detected in 53 (36.3%), and malnutrition was detected in 42 (28.8%) of the participants. Being completely bedridden, having decubitus ulcers, and using enteral nutrition support products were significantly higher in the participants with malnutrition (p<0.001, p<0.001 and p<0.001, respectively). Nevertheless, while 26 (61.9%) of malnutrition participants have been using enteral nutrition support product, only 3 (5.7%) of the participants with the risk of malnutrition have been using enteral nutrition support product. Moreover, albumin was significantly lower but creatinine was significantly higher in those with malnutrition (p=0.003 and p=0.001, respectively). **Conclusion:** Malnutrition is frequently seen in the individuals receiving homecare and it becomes an important health problem as it begins insidiously and treated not properly. Such participants need to be screened regularly for malnutrition and treated early as soon as the risk emerges.

Key words: Home care services, protein-energy malnutrition, nutrition status, enteral nutrition

ÖZET

Giriş: Malnütrisyon ile ilgili çalışmalar genellikle yaşlı bireylerde yapılmakta ve sıklığı %1'den %83'e kadar değişmektedir. Bu çalışmada evde sağlık hizmetlerine başvuran bireylerin malnütrisyon sıklığı ve ilişkili faktörlerin araştırılması amaçlanmaktadır. **Yöntem:** Bu çalışmaya Ocak 2015 ile Haziran 2015 tarihleri arasında evde sağlık biriminde takip edilen bireyler dahil edilmiştir. Tüm katılımcıların takip dosyalarından sosyodemografik özellikleri, eşlik eden hastalıkları, laboratuvar tetkikleri, mini beslenme değerlendirmesi kısa formu (MND-SF) ve mini beslenme değerlendirmesi (MND) testi puanları geriye dönük olarak değerlendirilmiştir. MND-SF beslenme durumunun değerlendirilmesinde tarama testi olarak kullanılmakta ve 12 puan altı bireylerde MND testinin tamamı uygulanmaktadır. MND puanına göre 23 üzeri normal nütrisyon, 17-23 arası malnütrisyon riski ve 17 altı malnütrisyon olarak sınıflandırılmaktadır. **Bulgular:** Toplam 146 katılımcı çalışmaya dahil edilmiştir. MND-SF puanına göre katılımcıların 105 (%71,9)'i 12 puan altında bulunmuştur. Katılımcıların MND puanına göre 51 (%34,9)'inde normal nütrisyon, 53 (%36,3)'ünde malnütrisyon riski ve 42 (%28,8)'sinde malnütrisyon saptanmıştır. Malnütrisyon olanlarda yatağa tam bağımlılık, dekübit ülseri ve enteral beslenme destek ürünü kullanımı anlamlı yüksek gözlenmiştir (sırasıyla p<0.001, p<0.001 ve p<0.001). Bununla beraber, malnütrisyon olanların 26 (%61,9)'i enteral beslenme destek ürünü kullanırken, malnütrisyon riski olanların sadece 3 (%5,7)'ünün enteral beslenme destek ürünü kullandığı tespit edilmiştir. Ayrıca, malnütrisyon olanlarda albumin anlamlı düşük iken, kreatinin düzeyi anlamlı yüksek saptanmıştır (sırasıyla p=0.003 ve p=0.001). **Sonuç:** Malnütrisyon evde sağlık hizmeti alan bireylerde sık gözlenmekte ve sinsi başlaması, yeterli tedavi edilmemesi nedeniyle önemli bir sağlık sorunudur. Bu bireylerde malnütrisyon düzenli olarak taranmalı ve risk geliştiğinde erken tedavi edilmelidir.

Anahtar kelimeler: Evde bakım hizmetleri, protein-enerji malnütrisyonu, beslenme durumu, enteral beslenme

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INTRODUCTION

Malnutrition is a state of nutritional lack or imbalance resulting in the progression of chronic conditions such as cardiovascular diseases, osteoporosis, dementia and mental disorders as well as the development of acute health problems such as infection and dehydration.¹⁻³ The prevalence of malnutrition is much higher in the homecare patients as compared to the normal population.^{4,5} The studies on malnutrition are mostly conducted in the elderly, and its prevalence varies.⁴⁻⁸ The prevalence of malnutrition in elderly changes between 2-32% for those living in the population and 1-18% for those staying at inpatient treatment facilities.⁵ A study in this age group reported the prevalence of 5.8% for those living in the population, 13.8% for those living in nursing homes, and 38.7% for those staying at the hospitals.⁴ Among the elderly people receiving ambulatory care, the prevalence of malnutrition changes between 2.1 and 13.0% and the risk of malnutrition is 14.3 and 31%.^{7,8} Studies carried out in people receiving homecare determined the prevalence for malnutrition risk as 38.2-39.3% and whereas the prevalence of malnutrition as 33.1 to 48.3%.^{9,10}

Nutritional status is assessed using body mass index (BMI), serum albumin level, nutrition assessment forms, and recordings of nutritional content.⁹ Guidelines for nutrition recommend the use of Mini Nutritional Assessment Short Form (MNA-SF) and Mini Nutritional Assessment (MNA) test for the screening of nutrition particularly in elderly.^{1,7,9}

Although individuals receiving homecare are under the serious risk of malnutrition, the prevalence of malnutrition varies widely depending on several factors.⁵⁻¹⁰ The present study aimed to determine the prevalence of malnutrition and the related factors in the patients utilizing homecare services.

METHOD

Study sample

The participants followed by the Unit of Home Healthcare Services between January and June 2015 were included in the study, and patient files were retrospectively evaluated in terms of age, gender and other socio-demographic characteristics as well as comorbid conditions, medications, scores of MNA-SF and MNA test and laboratory analyses. The study was approved by the XXXX Ethics

Committee (Approval No:89513307/1009/509, Decision no:90).

Study measurement tools

Nutritional status of all participants was screened by MNA-SF, consists of 6 questions, and MNA test was performed in those having a MNA-SF score of <12.1 According to MNA test, which is valid and reliable for Turkish population, score of ≥ 23.5 is considered as normal nutritional status, 17 to 23 is considered as the risk of malnutrition, and <17 is considered as malnutrition.^{1,11}

Study exclusion criteria

Since there are measurement of four limbs in the MNA test, participants with an extremity amputated for any reason and the participants with documented muscular disorder were excluded.

Statistical analysis

Statistical analyses were done by using IBM SPSS 22.0 software. Descriptive data was presented in frequency, percentage, mean and standard deviation, median, minimum and maximum. In addition, the differences between groups was evaluated by One-way ANOVA test for the variables showing normal distribution and by Kruskal Wallis test and Mann Whitney U test for the variables not showing normal distribution. Categorical variables were analyzed using Pearson Chi-square test. Statistical significance was accepted as $p < 0.05$.

RESULTS

A total of 146 participants receiving homecare were enrolled into the study. The socio-demographic characteristics of the participants according to the nutritional status are summarized in Table 1.

The MNA-SF score was <12 in 105 (71.9%) of the participants and the mean score was 8.79 ± 3.44 . In addition, the mean MNA score of the participants was 17.41 ± 5.21 ; according to the MNA score, 51 participants (34.9%) have normal nutritional status, 53 participants (36.3%) have the risk of malnutrition, and 42 participants (28.8%) have malnutrition. The mean age of the participants according to the nutritional status was as follows: 81.13 ± 13.10 years in those with normal nutrition, 81.20 ± 9.76 years in those with the risk of malnutrition, and 77.23 ± 15.10 years in those with malnutrition ($p = 0.239$). General health status of the participants according to the nutritional status are summarized in Table 2.

		Normal Nutrition (n=51)	Risk of Malnutrition (n=53)	Malnutrition (n=42)	p
Age, year	<65	4 (7.8)	4 (7.5)	6 (14.3)	0.472
	≥65	47 (92.2)	49 (92.5)	36 (85.7)	
Sex	Male	17 (33.3)	16 (30.2)	13 (30.9)	0.938
	Female	34 (66.7)	37 (69.8)	29 (69.1)	
Education	Illiterate	11 (21.6)	14 (26.4)	13 (30.9)	0.889
	Primary school	27 (52.9)	24 (45.3)	17 (40.5)	
	Middle school	4 (7.8)	6 (11.3)	2 (4.8)	
	High school	6 (11.8)	6 (11.3)	6 (14.3)	
	University	3 (5.9)	3 (5.7)	4 (9.5)	
Marital Status	Single/Widowed/Divorced	38 (74.5)	34 (64.2)	31 (73.8)	0.440
	Married	13 (25.5)	19 (35.8)	11 (26.2)	
Caregiver	Nurse	7 (13.7)	3 (5.6)	3 (7.1)	0.729
	Spouse	5 (9.8)	8 (15.1)	7 (16.7)	
	Children	34 (66.7)	37 (69.8)	30 (71.4)	
	Parents	2 (3.9)	1 (1.9)	2 (4.8)	
	Spouse and children	2 (3.9)	2 (3.8)	0 (0.00)	
	Sibling	1 (2.0)	2 (3.8)	0 (0.00)	
Assistant caregiver	No	38 (74.5)	42 (79.3)	32 (76.2)	0.846
	Yes	13 (25.5)	11 (20.7)	10 (23.8)	

*Data are presented as number (%).
Pearson Chi-square test.

		Normal Nutrition (n=51)	Risk of Malnutrition (n=53)	Malnutrition (n=42)	p
Degree of dependency	Independent	17 (33.3)	4 (7.6)	1 (2.4)	<0.001*
	Partially bedridden	31 (60.8)	31 (58.5)	14 (33.3)	
	Completely bedridden	3 (5.9)	18 (33.9)	27 (64.3)	
Orientation-cooperation	No	4 (7.8)	21 (39.6)	25 (59.5)	<0.001*
	Yes	47 (92.2)	32 (60.4)	17 (40.5)	
Enteral nutrition support product	No	51(100.0)	50 (94.3)	16 (38.1)	<0.001*
	Yes	0(0.0)	3 (5.7)	26 (61.9)	
Decubitus ulcer	No	49 (96.1)	46 (86.8)	28 (66.7)	<0.001*
	Yes	2 (3.9)	7 (13.2)	14 (33.3)	
Number of medications/day		(0.00-19.00) 1.00	(1.00-15.00) 1.00	(0.00-15.00) 1.00	0.118**
Duration of homecare, year		(0.00-3.00)	(0.00-2.00)	(0.00-5.00)	0.164**

Pearson Chi-square test, **Kruskal Wallis test

		Normal Nutrition (n=51)	Risk of Malnutrition (n=53)	Malnutrition (n=42)	p
Diabetes Mellitus	No	31 (60.8)	35 (66.0)	30 (71.4)	0.559
	Yes	20 (39.2)	18 (34.0)	12 (28.6)	
Hypertension	No	8 (15.7)	11 (20.8)	11 (26.2)	0.459
	Yes	43 (84.3)	42 (79.2)	31 (73.8)	
CKD	No	44 (86.3)	45 (84.9)	37 (88.1)	0.904
	Yes	7 (13.7)	8 (15.1)	5 (11.9)	
Neurological diseases	No	32 (62.8)	31 (58.5)	22 (52.4)	0.601
	Yes	19 (37.2)	22 (41.5)	20 (47.6)	
CAD	No	35 (68.6)	34 (64.2)	34 (80.9)	0.190
	Yes	16 (31.4)	19 (35.8)	8 (19.1)	
Dementia	No	36 (70.6)	21 (39.6)	19 (45.2)	0.004
	Yes	15 (29.4)	32 (60.4)	23 (54.8)	
Oncologic diseases	No	47 (92.2)	47 (88.7)	33 (78.6)	0.112

*Data are presented as number (%).

CAD; Coronary Artery Disease, CKD; Chronic Kidney Disease

Pearson chi-square test

	Normal Nutrition (n=51)	Risk of Malnutrition (n=53)	Malnutrition (n=42)	p
Albumin (g/dL)	3.82±0.38	3.66±0.44	3.50±0.49	0.003*
Hemoglobin (g/dL)	12.20±1.46	11.90±1.93	11.79±1.88	0.507*
Hematocrit (%)	37.61±4.35	36.72±5.79	36.33±5.91	0.502*
Creatinine (mg/dL)	0.86 (0.45-2.14)	0.78 (0.30-4.20)	0.66 (0.32-3.78)	0.001**
TSH (uIU/mL)	1.33 (0.18-4.88)	1.33(0.01-15.62)	1.48(0.04-17.97)	0.975**
Vitamin D (ng/mL)	18.85(3.00-63.45)	11.89(0.00-65.45)	22.47(3.13-70.00)	0.255**
Vitamin B12(pg/mL)	315.00 (120.00-1078.00)	312.00(119.00-1500.00)	399.50 (143.00-1500.00)	0.071**

Data are presented as mean±standard deviation and median (minimum-maximum), where appropriate.

TSH, Thyroid Stimulating Hormone

*One-way ANOVA test, **Kruskal Wallis test

Daily amount of enteral nutritional support product used by the participants according to the nutritional status was 4.00 (2.00-5.00) items/day in those with the risk of malnutrition and 2.00 (1.00-8.00) items/day in those with malnutrition ($p=0.483$).

With regard to the presence of the chronic diseases, at least one chronic disease was present in 49 (96.1%) of the participants with normal nutrition, in 50 (94.3%) of the participants with the risk of malnutrition, and in 39 (92.9%) of the participants with malnutrition ($p=0.792$). Chronic disease status of the participants according to the nutritional status is summarized in Table 3.

When anthropometric measurements of the participants are evaluated, mean value of the arm circumference was 30.19 ± 4.88 cm in those with normal nutrition, 27.19 ± 3.96 cm in those with the risk of malnutrition, and 23.69 ± 4.70 cm in those with malnutrition ($p<0.001$). Mean value of the calf circumference was 49.55 ± 8.55 cm in those with normal nutrition, 44.83 ± 6.42 cm in those with the risk of malnutrition, and 37.59 ± 7.73 cm in those with malnutrition ($p<0.001$). Some biochemical markers of the participants according to the nutritional status are summarized in Table 4.

In terms of serum albumin levels, there was no significant difference between the participants with normal nutritional status and those under the risk of malnutrition, whereas the difference was significant between those with normal nutritional status and in malnutrition ($p=0.053$, $p=0.104$ and $p=0.001$, respectively). While there was no significant difference between the participants with normal nutritional status and under the risk of malnutrition in terms of serum creatinine level, significant difference was determined between those under the risk of malnutrition and in malnutrition ($p=0.408$ and $p=0.008$, respectively).

DISCUSSION

Malnutrition, which is common in the people utilizing homecare service, is an important risk factor for morbidity and mortality.^{1,9,10} The present study evaluated the malnutrition prevalence and the associated factors in the home healthcare service.

The prevalence of malnutrition shows quite variation between the studies, however, these studies have been usually carried out in elderly.^{6,12,13} In the earlier studies, the prevalence of malnutrition in elderly ranges from 2-to-22.8%,

and the risk of malnutrition ranges from 24-to-47.3%.^{4,6,12,13} A study conducted in primary healthcare unit determined malnutrition in 11% and the risk of malnutrition in 25% of elderly individuals.¹⁴ In Turkey, the prevalence of malnutrition and the risk of malnutrition among old outpatients is found to be 2.1-13% and 14.3-31% respectively.^{7,8,15} The reason of high prevalence of malnutrition in the present study may be the inclusion of participants receiving home healthcare services. The prevalence of malnutrition was 5.8% in elderly living in the population, 13.8% in those living in nursing homes, 38.7% in those staying at hospitals, and 50.5% in those staying at rehabilitation centers.⁴ On the other hand, according to the European Seneca study, which was a multinational study, the prevalence of severe protein-energy malnutrition was reported 10-38% in healthy old people, 5-12% in old people receiving homecare, 26-65% in old people staying in a hospital, and 5-85% in old people staying in nursing homes.¹⁶ In another study, the risk of malnutrition and the prevalence of malnutrition among the participants staying in nursing homes were found to be 68.8% and 10.3%, respectively.³ In Turkey, the studies carried out with the patients receiving homecare reported the prevalence of malnutrition of 33.1-48.3% and the risk of malnutrition of 38.2-39.3%.^{9,10} Another study determined malnutrition in 3% and risk of malnutrition in 48% of the individuals receiving homecare.¹⁷ In the present study, malnutrition was present in 53 (36.30%) and the risk of malnutrition was present in 42 (28.8%) of the participants. The prevalence of malnutrition and malnutrition risk of individuals receiving homecare was high consistent with the previous studies. Therefore, early determination and treatment of individuals under the risk of malnutrition may play an important role in the prevention of malnutrition.

Enteral nutrition support products are among the options preferred for the treatment of malnutrition.¹ In a study conducted with the individuals receiving homecare, increase in weight and BMI was determined in the 3rd and 6th months in the group receiving oral nutrition support product as compared to the standard care group.¹⁸ In the present study, the rate of using enteral nutrition support products was significantly high in the participants having malnutrition. Nevertheless, while 61.9% of the participants with malnutrition have been using enteral nutrition support product, only 5.7% of the participants under the risk of malnutrition have been using enteral nutrition support product. One of the most common

problems associated with malnutrition is its insidious onset and accordingly, the probability of being overlooked.⁹ Inadequate treatment is the other critical problem.⁹ For these reasons, people utilizing homecare services need to be regularly screened and followed for malnutrition and treated early as soon as the risk of malnutrition appeared.^{9,17}

While some of the studies conducted in elderly observed that the risk and prevalence of malnutrition are increased with age, some studies failed to determine this relationship.^{3,6,10,12,14,15} In addition, earlier studies showed no relationship between nutritional status and gender, but a study found that the risk of malnutrition is higher in females.^{6,9,10,12,14,15} With regard to the relation of nutritional status with education and marital status, one of the studies determined no relationship, whereas another study found that the risk and prevalence of malnutrition increase with decreasing education level.^{3,12} In the present study, no significant difference was determined between the nutritional states in terms of age, gender, education level and marital status.

Earlier studies determined high prevalence and risk of malnutrition among bedridden participants.^{10,14} In the present study as well, the prevalence of malnutrition was high in completely bedridden participants, whereas the risk of malnutrition was higher in the partially bedridden participants. Malnutrition is one of the most important risk factors playing a role in both the development and healing of decubitus ulcers.¹⁹ Studies from Turkey determined the risk of malnutrition to be high in old participants with decubitus ulcers.^{10,15} Likewise, in the present study, decubitus ulcers were significantly more common in the malnutrition participants.

The earlier studies revealed controversial outcomes regarding the relationship between nutritional status and presence of chronic diseases.^{7,8,15} While some studies determined no relationship between nutritional status and the presence of chronic disease, one study demonstrated a relationship.^{3,6-8,10,15} Nevertheless, some earlier studies found a relationship between malnutrition, the risk of malnutrition and hypertension, coronary artery disease, type-2 diabetes mellitus, dementia, depression and congestive heart failure, whereas some studies failed to demonstrate such relationship.^{3,8,10,15} In the present study, no significant relationship was determined between the

nutritional status and presence of chronic disease, however, the risk of malnutrition was high in the participants with dementia. Earlier studies shown that dementia and depression are risk factors for malnutrition.^{8,15} Besides, similar to the present study, some studies have found no relationship between malnutrition and all chronic diseases.⁶⁻⁸

Measurement of serum albumin level is one of the methods used for the assessment of malnutrition.⁹ In some studies conducted with old people, albumin level was found to be low in those with malnutrition, whereas some studies failed to determine significant difference in albumin levels between the nutritional states.^{7,8,10,15} In the present study, albumin level was found low in malnourished participants as compared to the participants without malnutrition. Earlier studies determined no relationship between creatinine level and nutritional status, whereas the present study found significantly lower creatinine level in participants with malnutrition.^{9,10,15} This difference might have arisen from the fact that, daily fluid requirement is calculated and replaced when malnutrition is developed in the participants followed by our homecare unit. There is no documented relationship between nutritional status and hemoglobin or hematocrit concentration. In some earlier studies, hemoglobin and hematocrit concentrations were low in malnourished individuals, whereas some studies failed to demonstrate such relationship.^{7-10,15} In the present study, no relationship was determined between nutritional status and hemoglobin or hematocrit concentration, which might have resulted from necessary supportive treatment provided in those with low hemoglobin and hematocrit concentration. Similar to the present study, another study determined no relationship between nutritional status and TSH level.⁹ In addition, in one of the studies evaluating the relationship between nutritional status and Vitamin B12 concentration, Vitamin B12 was found to be low in participants with malnutrition, whereas the other studies determined no difference.^{7-9,15} In the present study, although Vitamin B12 was high in malnourished participants, the difference was not statistically significant. High B12 level in the present study may be resulted from necessary supportive treatment provided in the participants developing malnutrition.

One of the limitations of the present study is using the MNA test to assess the nutritional status also in the participants under 65 years of age. However, MNA is a more appropriate test for the

assessment of nutritional status in geriatric participants.⁴ Another limitation is the evaluation of the relationship between laboratory parameters and nutritional status while the supportive treatment was going on. The other limitation is not to evaluate participants in terms of depression, which is one of the risk factors for malnutrition, because the participants with normal orientation and cooperation, who are diagnosed with depression during earlier follow-up have been receiving antidepressant therapy.

In conclusion, the risk of malnutrition was detected in 53 (36.3%) and malnutrition was detected in 42 (28.8%) of the participants. While the prevalence of using enteral nutrition support product was high in malnutrition participants, it was only 5.7% in the participants with the risk of malnutrition. In addition, the prevalence of malnutrition was high in the participants who are completely bedridden and having decubitus ulcers. Regular screening and follow-up and early treatment as soon as malnutrition is developed are of critical importance in the participants receiving homecare, which are at greater risk of malnutrition.

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