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Nutritional status and anxiety-depression relationship in hemodialysis patients

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The ethics committee approval was obtained for the study from Harran University Medical School (74059997-050.04.04/ HRU/19.01.20)
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Abstract

Background/Aim: Malnutrition is one of the determinants of most morbidity and mortality in end-stage renal failure (ESRD) patients receiving hemodialysis (HD). Depression is the most common psychological complication among these patients. This study aimed to determine the nutritional status and anxiety-depression level in hemodialysis patients and evaluate the relationship between the two.
Methods: This cross-sectional study included 55 routine hemodialysis patients over 18 years of age who were treated in the Department of Internal Diseases of a university hospital between November 2019 and January 2020. Two patients were excluded from the study due to renal transplantation. All patients filled out a two-part Hospital-Anxiety Depression Scale (HAD) and a two-part Mini Nutritional Assessment (MNA) questionnaire. The MNA-short form (MNA-SF) was first used to evaluate the malnutrition status of patients. Those who were identified as at-risk or malnourished with the MNA-SF were also asked to complete the long form. The HAD scale was used to evaluate the levels of depression and anxiety. SPSS 20 statistical package program for statistical analysis. $P<0.05$ was considered statistically significant.
Results: The mean age of the patients was 56.2 (15.9) years; 36 (66%) were female and 18 (34%) were male. Among all, 55.8% and 26.9% of the patients were at risk in terms of depression and anxiety, respectively. Depression prevalence was higher in patients with low MNA-SF scores ($P=0.001$) and comorbidities ($P=0.007$). In those with a low MNA-SF score ($P=0.001$), comorbidities ($P=0.008$), and high urea levels ($P=0.003$), anxiety was more common. In patients with an elevated risk of anxiety ($P=0.001$) and depression ($P=0.007$), malnutrition risk was significantly higher.
Conclusion: Depression is closely related to nutritional status in patients receiving chronic hemodialysis therapy and considered an independent risk factor for malnutrition. Early diagnosis and treatment of hemodialysis patients' psychological problems and regulation and control of nutrition programs can be practical interventions to improve the quality of life of these patients.

Keywords: Malnutrition, Hemodialysis, Anxiety-depression

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Introduction

More than 1.5 million individuals worldwide require dialysis treatment because of chronic kidney disease. CKD patients have a higher mortality rate than the general population [1]. Patients receiving long-term renal replacement therapy are also at increased risk of complications or even death during dialysis due to malnutrition [2]. Malnutrition in dialysis patients is a common and complex condition that occurs because of renal disease and comorbidities. The rate of malnutrition varies between 18-75% in hemodialysis patients and 10-50% in peritoneal dialysis patients, depending on the criteria with which the patient is evaluated [3,4]. The presence of malnutrition is one of the determinants of most morbidity and mortality in end-term renal failure (ESRD) patients receiving hemodialysis (HD). Malnutrition is associated with delays in recovery, increased hospitalization, and susceptibility to infection [5].

There is consensus that the first step in assessing nutritional status is to identify the "at-risk" condition using approved screening tools [6-8]. Malnutrition is an important problem in the rehabilitation and treatment process. One of the methods that can reveal the risk of malnutrition is the standard nutrition questionnaire [9]. A useful method for preliminary assessment of patients' nutritional status is the use of standard scales that assess nutritional levels. Such scales are completed easily and quickly, do not require any special equipment, and are therefore easily applicable by medical personnel [10].

Depression and anxiety are the most common psychological disorders in patients undergoing hemodialysis. The incidences of depression and anxiety range between 19-60% and 12-52%, respectively, in dialysis patients [11, 12]. Depression is associated with poor quality of life, concomitant diseases, increased risk of hospitalization, cardiovascular disease, malnutrition, poor patient compliance, mortality [13-15].

This study aimed to determine the nutritional status and anxiety-depression levels of patients with ESRD in a chronic hemodialysis treatment program and evaluate the relationship between the two.

Materials and methods

Study design

This cross-sectional study was conducted at a university hospital between November 2019 and January 2020 on dialysis patients (n=55) over the age of 18 years who received treatment in the Dialysis Unit. Two patients were excluded from the study due to renal transplantation. No sample was selected for the study, all patients were included (n=53). All patients received a Hospital-Anxiety Depression Inventory (HAD) and a Mini Nutritional Assessment (MNA), both consisting of two parts.

Mini Nutritional Assessment (MNA)

MNA consists of two parts, long and short. It evaluates four aspects of the nutritional/health status, including diet, anthropometry, global, and status of self-rating [16]. The MNA-SF was first used to evaluate the malnutrition status of patients. Those who were identified as at-risk or malnourished with the MNA-short form were also asked to complete the long form. The validity and reliability test of the Turkish version was conducted by Sarikaya in 2013. Kappa compliance of the scale was 0.801 [17].

Hospital-Anxiety Depression Scale (HAD)

It is a scale developed by Zigmond et al. [18] in 1983. The scale consists of 14 questions. The anxiety and depression levels of the patients are evaluated by 7 questions each. The validity and reliability study of the scale was performed in 1997 by Aydemir et al. [19]. Cronbach alpha coefficients were 0.85 for the anxiety subscale and 0.78 for the depression subscale.

Statistical analysis

SPSS 20 statistical package program was used for statistical analyses and $P<0.05$ was considered statistically significant. Conformity tests were conducted to evaluate the distribution of data with regards to normality. The socio-demographic characteristics, anxiety-depression levels, nutritional statuses of the participants were evaluated, and the relationship between the latter two were examined with Chi-square and Mann-Whitney U tests.

Ethical permission

Ethics committee approval was obtained for the study from Harran University Medical School (Dated 07/01/2019 and HRU / 19.1.20 decision No). The Hospital-Anxiety Depression Scale is valid, reliable, and open to general use. Permission was obtained for the use of the Mini Nutritional Test-Short Form. Oral and written information were given to each participant, and their written consents were obtained.

Results

The mean age of 53 patients included in the study was 56.2(15.9) years; 36 (66%) were female and 18 (34%) were male. Anthropometric measurements such as body mass and height were obtained, with which the body mass index (BMI) values were calculated. The mean duration of kidney disease was 6.5 (5.5) years, and the mean duration of dialysis treatment was 4.5 (4.2) years. Among all, 56.6% of the patients were illiterate, 71.7% were unemployed and 54.7% had comorbidities. The socio-demographic characteristics of the patients are shown in Table 1.

Table 1: Socio-demographic characteristics of the patients

Socio-demographic characteristics	Categories	Number (n)	Percentage (%)
Gender	Female / Male	35/18	66.0/34.0
Age group	49 years and below	14	26.4
	Between 50-59 years	19	35.8
	60 years and above	20	37.7
Educational status	Illiterate / Literate	30/23	56.6/44.4
Occupation	Worker / Unemployed	15/38	28.3/71.2
Marital status	Married / Single	36/17	67.9/32.1
Total		53	100.0

In terms of depression and anxiety, 55.8% and 26.9% of the patients, respectively, were at risk. The relationship between the anxiety-depression levels and socio-demographic, biochemical, clinical, and anthropometric data of the participants were examined. A statistically significant increase was found in the frequency of depression and anxiety in patients with low MNA-SF scores ($P=0.001$ and X^2: 24.66, and $P=0.001$ and X^2: 6.96, respectively) and comorbidities ($P=0.007$ and X^2: 6.96, and $P=0.008$ and X^2: 7.36, respectively). Anxiety was also significantly increased among patients with high urea levels ($P=0.003$ and MWU: 28.5).

Based on MNA-SF, fourteen patients (27.5%) were found risky in terms of malnutrition, who were then evaluated

with MNA-LF. Among them, 12 (71.4%) were at risk for malnutrition and 2 (14.3%) were malnourished. The patients did not differ in terms of socio-demographic and clinical characteristics according to nutritional status (Tables 2 and 3).

Table 2: Relationship of patients' nutritional status with some socio-demographic and clinical data

Characteristics	Categories	Nutrition Status		Statistical analysis	
		Normal (%)	At-risk (%)	*P*-value	X^2
Gender	Female / Male	73.5/70.6	26.5/29.4	0.53	0.04
Education	Illiterate / Literate	67.9/78.3	32.1/21.7	0.40	0.68
Occupation	Worker / Unemployed	73.3/72.2	26.7/27.8	0.61	0.07
Marital status	Married / Single	71.4/75.0	28.6/25.0	0.53	0.07
Smoking	Smoker/ Not smoker	75.8/66.7	24.2/33.3	0.45	0.48
Presence of comorbidity	Yes / No	75.0/69.6	25.0/30.4	0.66	0.18
Body mass index	Low/ Normal/ High	70.0/84.2/66.7	30.0/15.8/33.3	0.42	1.70
Blood pressure	Normal/ High	69.2/90.0	30.8/10.0	0.18	1.76

Table 3: Relationship of clinical data of patients with nutrition status

Characteristics	Nutrition Status		Statistical analysis	
	Normal	Vulnerable	*P*-value	MWU
Age (years)	57.3 (15.2)	55.9(16.2)	0.90	253.0
Kidney Disease Duration (years)	6.6 (5.1)	5.5 (5.9)	0.82	98.5
Dialysis Duration (years)	5.1 (4.4)	3.6 (3.5)	0.90	183.0
Kt/V	1.6 (0.3)	1.5 (0.3)	0.14	209.5
Hemoglobin (gr/dL)	10.6 (1.7)	10.0 (1.5)	0.49	196.5
Hematocrit (%)	33.9 (3.6)	35.9 (3.6)	0.39	217.5
Urea (mg/dL)	128.2 (37.9)	102.1 (47.5)	0.19	185.5
Creatinine (mg/dL)	13.6 (29.7)	6.8 (3.3)	0.90	182.0
Albumin (g/dL)	3.8 (0.6)	3.8 (0.3)	0.90	231.5
Calcium (mg/dL)	8.2 (0.9)	8.4 (0.8)	0.69	214.0
Phosphorus (mg/dL)	4.5 (1.4)	3.9 (1.5)	0.07	190.0
C-reactive protein (mg/dL)	1.1 (1.3)	1.4 (0.8)	0.90	235.5
Hemoglobin A1c (%)	7.2 (2.0)	6.5 (1.5)	0.38	52.0
High Density Lipoprotein (mg/dL)	33.0 (10.9)	36.5 (12.5)	0.68	218.5
Low Density Lipoprotein (mg/dL)	84.0 (22.0)	85.3 (35.0)	0.69	254.0
Triglycerides (mg/dL)	170.2 (98.1)	161.3 (135.0)	0.39	221.0
Vitamin D (ng/mL)	7.9 (4.1)	9.9 (8.9)	0.69	112.5
Vitamin B12 (pg/mL)	418.1 (347.5)	446.3 (188.5)	0.07	98.5
Folic acid (ng/mL)	10.5 (12.7)	7.0 (4.8)	0.85	150.0
Glucose (mg/dL)	133.5 (81.1)	148.1 (98.3)	0.69	243.0
Ferritin (ng/mL)	580.5 (460.2)	799.6 (1127.7)	0.82	258.0
Thyroid Stimulating Hormone (mIU/L)	1.9 (0.8)	1.7 (1.2)	0.39	185.5

The relationship between patients' anxiety-depression statuses and nutrition is shown in Table 4. The risk of malnutrition was significantly increased among patients who are at risk for anxiety (P=0.001) and depression (P=0.007).

Table 4: Relationship between patients' anxiety-depression status and nutrition

Characteristics	Categories	Nutrition Status		Statistical analysis	
		Normal (%)	At-risk (%)	*P*-value	X^2
Anxiety	Healthy	91.7	21.4	0.00	24.66
	Vulnerable	8.3	78.6		
Depression	Healthy	90.9	57.1	0.00	6.96
	Vulnerable	9.1	42.9		

Discussion

CKD and HD are important and global public health problems due to increased incidence, high treatment costs, and negative impact on the quality of life. Malnutrition, a common finding in individuals with CKD, is associated with increased mortality and morbidity. Malnutrition, by itself, also has a negative impact on anxiety and depression. Prevention of malnutrition may reduce the risk of anxiety and depression in patients [20]. Although nutritional status is assessed by various biochemical and physical parameters or nutritional assessment scores, most of these methods are not suitable for routine repetitive follow-up in dialysis patients as they are expensive or impractical. MNA is a common tool to rate the risk of malnutrition [21]. It is effective for screening and evaluating the risk of malnutrition in various settings (community, nursing homes, or institutions) or various health conditions (mental illness, cognitive impairment, dementia, stroke rehabilitation, cancer patients, or hemodialysis treatment patients) [22]. Most scoring systems for malnutrition use less reliable or less representative parameters in dialysis patients, and its association with mortality in this population may be unreasonable. The most striking example is the obesity paradox in which high BMI appears to be protective in dialysis patients [23]. In this study, we did not find a significant relationship between body mass index (BMI) and malnutrition risk.

The prevalence of malnutrition in patients with CKD is between 18-75% in HD patients and 10-50% in peritoneal dialysis patients, depending on the criteria with which the patient is evaluated. Malnutrition in chronic kidney failure usually results from decreased energy intake associated with uremic syndrome and systemic chronic inflammation [24]. In our study, 27.5% of the patients were at risk for malnutrition, similar to the literature. It is thought that the relationship between serum albumin and nutritional status is not clear, which reduces its effectiveness as a marker of malnutrition [25-27]. We found that the relationship between nutritional status and serum albumin was not statistically significant.

Depression is the most common psychological disorder among HD patients. Research has shown that depressive HD patients have high mortality rates and depressive symptoms are one of the important factors that determine the overall quality of life of patients. Similarly, in our study, we found that 26.9% and 55.8% of the patients had a risk of anxiety and depression, respectively [28]. Various factors are thought to contribute to this problem, including stress, sleep disturbance, anemia, and treatment methods [29]. Similarly, in this study, there was a significant relationship between malnutrition and anxiety-depression. In this context, it is thought that the risk of malnutrition will be reduced by early diagnosis and treatment of patients with depression and anxiety disorders.

Limitations

This study has some limitations, such as the lack of comparison with healthy controls and the sparse number of patients. It may be strengthened by comparing the variables of HD patients with a control group with normal kidney functions and increasing the number of patients. More studies are needed to help examine the risk of anxiety and depression in hemodialysis patients and identify factors that contribute to the associated outcomes.

Conclusions

Depression and anxiety are common psychological problems in patients receiving chronic hemodialysis. This is closely related to their nutritional status. Early diagnosis and treatment of psychological problems of hemodialysis patients and regulation and control of nutritional programs can be practical interventions to improve their quality of life.

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