ORIGINAL ARTICLE

The relationship between malnutrition and quality of life in haemodialysis and peritoneal dialysis patients

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SUMMARY

BACKGROUND: *One of the most important factors affecting the quality of life of chronic kidney disease (CKD) patients is nutrition. Prevention of malnutrition increases patients' quality and length of life. In this study, we aimed to determine the frequency of malnutrition, quality of life, and the relationship between them in patients with end-stage renal disease (ESRD).*

METHOD: *The study was conducted with a total of 60 CKD patients including 50 haemodialysis patients and 10 peritoneal dialysis patients. Patients' data associated with socio-demographics, body mass index (BMI), waist circumference, triceps skin-fold thickness (TSFT), pre-dialysis systolic and diastolic blood pressure, Kt/V and urea reduction ratio (URR) values, laboratory parameters, Mini-Nutritional Assessment-Short Form (MNA-SF) and European Quality of Life 5-Dimensions (EQ5D) scale were recorded.*

FINDINGS: *Of the total 60 patients; 27 were male (45%), 33 were female (55%), 83.3% were receiving haemodialysis treatment (HD), and 16.7% were receiving peritoneal dialysis treatment (PD). The mean MNA-SF score was 10.4 ± 2.8 in the HD group and 10.5 ± 2.9 in the PD group; there was no difference between the scores of the HD and PD groups. The mean EQ5D score was 0.60 ± 0.29 in the HD group and 0.68 ± 0.33 in the PD group, no significant difference was found between the HD group and the PD group. The quality of life was found lower in malnourished group (p=0.001).*

CONCLUSION: *The quality of life needs to be increased by early diagnosis and treatment of malnutrition in patients at risk.*

KEYWORDS: *Renal insufficiency, chronic. Malnutrition. Quality of life. Nutrition assessment. Nutrition surveys. Surveys and questionnaires.*

INTRODUCTION

Malnutrition is a frequent finding in patients with chronic kidney disease (CKD). The incidence of malnutrition is between 18-75% in haemodialysis patients and 10-50% in peritoneal dialysis patients, depending on the criterion that the patient is assessed by[1,2]. Malnutrition is associated with delayed recovery and an increase in hospitalization, susceptibility to infection, mortality, and morbidity[3-5]. Chronic diseases are often associated with chronic functional impairment and adversely affect the quality of life[6]. Malnutrition is one of the factors affecting the quality of life[7,8]. Early intervention in patients with malnutrition increases the quality of life and reduces mortality [9]. It has been emphasized in previous studies that the quality of life of malnourished patients is worse and thus the

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early diagnosis and treatment of malnutrition is important[10-12]. Recent studies have led to the conclusion that the effects on improving the quality of life as well as on the long-term survival should be considered when evaluating the effectiveness of the treatment in chronic diseases[13]. There was a close relationship between the quality of life, morbidity, and mortality in patients with end-stage renal disease (ESRD). Therefore, treatment options that will increase patients' quality of life should be focused on[14-18].

This study was aimed to evaluate the nutritional parameters, anthropometric parameters, and malnutrition status in order to determine the levels of the quality of life and to determine the relationship between malnutrition and the quality of life in patients with CKD.

METHODS

This study was planned as a descriptive cross-sectional study and was conducted in İzmir Tepecik Training and Research Hospital between May 2016 and August 2016 following its approval by the local ethics committee. No sampling was done for the study; a total of 60 patients, including 50 haemodialysis patients and 10 peritoneal haemodialysis patients, who received routine haemodialysis services at the Hospital, were over 18 years old, and volunteered were included in the study. A questionnaire consisting of three sections was applied to all patients. The first section included the socio-demographic data, anthropometric measurements, and laboratory parameters; the second section included the Mini Nutritional Assessment-Short Form (MNA-SF) scale; and the third section included the European Quality of Life 5-Dimensions (EQ-5D) general quality of life scale.

Mini Nutritional Assessment-Short Form (MNA-SF)

The MNA-SF scale was used to determine the patients' malnutrition levels. MNA-SF is performed using verbal interrogation and anthropometric measurements[19].

The MNA, developed by Guigoz et al.[20], contains eighteen questions. Patients are categorized as normal nutritional status, malnutrition risk, or malnutrition based on the result of evaluation. Several studies have shown that MNA correlates well with nutritional intake, anthropometry, laboratory data, functional status, morbidity, mortality, and length of hospital stay[20,21]. In 2001, Cohendy et al.[22] reviewed the MNA and developed a 6-item MNA-SF, a short form of the MNA, which was found to have high correlation in nutritional evaluation. The validity and reliability test of MNA-SF were done by Kaiser et al. in 2009. The validity and reliability test of the Turkish version was done by Sarikaya[23], in 2013.

European Quality of Life 5-Dimensions (EQ-5D) General Quality of Life Scale

In various diseases, the quality of life can be measured by using general health scales and/or disease-specific scales. The EQ-5D was developed in 1987 by EuroQol, the Western European Quality of Life Research Society. The EQ-5D general health scale has been translated into more than 60 languages, including Turkish, by the EuroQol group. It was first published in 1990 and has maintained the same features (5 dimensions) since 1991. The scale consists of two parts [24].

The EQ-5D index scale consists of five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. In each dimension, the answer is one of the three options: there is no problem, there are some problems, and there are major problems. Thus, it is possible to define 243 (3^5=243) different health outcomes with the scale. An index score ranging from -0.59 to 1 is calculated from the five dimensions of the scale. In the score function, a value of 0 indicates death and 1 indicates perfect health while negative values represent living unconscious, dependent on bed, etc. The coefficients produced by Dolan et al. [25] are used in calculating the index score in the EQ-5D[24].

EQ-5D VAS scale is a visual analogue scale where individuals grade their current health status and mark it on a thermometer-like scale. Thus, a quality of life score ranging from 0 to 100 is obtained. Turkish validity and reliability study for the EQ-5D general quality of life scale was conducted by Süt[26], in 2011; Cronbach alpha value of the scale was found 0.86. EQ-5D has been successfully applied in chronic dialysis patients while being a general health measure used in measuring quality of life[27].

All data were transferred to electronic medium and statistically analysed using SPSSv22. The descriptive statistics were given as counts and per-

centages for categorical variables, and as mean and standard deviation for numerical variables. For multiple-independent group comparisons with numerical variables, analysis of variance (ANOVA) was used when the normal distribution was satisfied; Kruskal Wallis test was used when the normal distribution was not satisfied. For two-independent group comparisons, t test was used when the normal distribution was satisfied; Mann Whitney U test was used when not. For the categorical variables, Chi-square test was used for multiple and two-group comparisons when conditions were satisfied. Pearson test was used for correlations between normal-distributed numerical data; Spearman's rho test was used when not. The level of statistical significance was considered to be $p<0.05$.

RESULTS

A total of 60 patients were included in the study, 83.3% were haemodialysis (HD) and 16.7% peritoneal dialysis (PD) patients. Socio-demographics of the patients are shown in Table 1.

The clinical and anthropometric characteristics of the patients are shown in Table 2. The average triceps skin-fold thickness (TSFT) was found significantly higher in the PD group than the HD group (p=0.033). The presence of comorbid disease was significantly higher in the PD group than in the HD group (p=0.037). The frequency of hypertension as a comorbid disease was higher in the PD patients than in the HD patients (p=0.023).

When biochemical parameters were considered, the levels of parathormone (pth p=0.041), alkaline

TABLE 1: SOCIO-DEMOGRAPHICS AND BIOCHEMICAL DATA OF HD AND PD PATIENTS.

		HD (%83, n:50)	PD (%16.7, n:10)	p value
Age (years)		50±18,9	52,4±15,1	0.71
Gender (%)	Male Female	46 54	40 60	0.728
Education (%)	None Elementary Middle School High School	44.0 36.0 16.0 4.0	40.0 30.0 10.0 20.0	
Marital Status (%)	Married Single Widow Separated-Divorced	50.0 26.0 18.0 6.0	70.0 20.0 10.0 0	0.834
Monthly Income (%)	< 1,300 TL 1,300 TL 1,300-2,000 TL > 2,000 TL	76.0 22.0 0 2	50.0 40.0 10.0 0	0.096
Smoking (%)		26	10	0.427
Compliance with Diet (%)		36	80	0,015
Haemoglobin (gr/dL)		10.5±1.24	10.4±0.8	0.900
C-reactive protein (CRP) (mg/L)		19.4±25.2	13.8±13.5	0.641
Urea (mg/dL)		123±30.6	121±16.6	0.761
Creatinine (mg/dL)		7.8±2.0	8.8±1.7	0.168
Calcium (mg/dL)		8.8±0.7	9.8±1.2	0.002
Phosphorus (mg/dL)		5.1±1.5	5.8±0.8	0.141
Parathormone (pg/mL)		421±332	245±105	0.041
Albumin (g/dL)		3.6±0.3	3.4±0.6	0.302
ALP (u/L)		173±110	109±36	0.047
Total protein (g/dL)		6.9±0.5	6.8±0.3	0.365
Total cholesterol (mg/dL)		176±39.5	210±60.2	0.024
High density lipoprotein (mg/dL)		41.9±11.3	48.4±11	0.107
Low density lipoprotein (mg/dL)		98.6±29	120.8±46.2	0.174
Sodium (mmol/L)		135±2.7	135±3.1	0.697
Potassium (mmol/L)		4.9±0.5	4.5±0.4	0.041
TIBC (ug/dL)		188±34	233±41	0.001
Transferrin (mg/dL)		107±27	144±33	0.001

phosphatase (alp, p=0.047), and potassium (p=0.041), were higher in the HD group while the levels of calcium (p=0.002), total cholesterol (p=0.024), total iron binding capacity (TIBC) (p=0.001), and transferrin (p=0.001) levels were higher in the PD group. Patients' biochemical data are summarized in Table 1.

Prevalence of malnutrition

In the HD group, malnutrition risk was 34% and malnutrition was 20% while they were 30% and 10% in the PD group, respectively. The mean MNA-SF score was 10.4 ± 2.8 in the HD group and 10.5 ± 2.9 in the PD group. There was no significant difference between HD and PD groups in terms of malnutrition (p=0.936). The comparison of various aspects of the patients in terms of the malnutrition classification is shown in Table 3. Correlation between malnutrition score and TSFT and BMI show in figure 1. (p<0.001, p<0.001).

Quality of life

The mean EQ5D index score was found 0.60 ± 0.29 (min -0.086, max 1) in the HD group while it was 0.68 ± 0.33 (min -0.166, max 1) in the PD group. The EQ5D VAS score was 66.7 ± 22.3 (min 20, max 100) in the HD group while it was 58.1 ± 13.1 (min30 max 76) in the PD group. No significant difference was found between the HD group and the PD group in terms of quality of life.

When the answers to the EQ-5D scale were examined in terms of comorbidity, it was found that the patients with comorbid coronary artery disease (CAD) had significantly more complaints than the non-CAD patients only in terms of mobility (p=0.007) and usual activities (p=0.028).

There was a negative correlation between EQ-5D score and age (r=-0,459 p<0,001). There was a positive correlation between EQ-5D score and Kt/V ratio (r=0,262 p=0,043). There was no correlation between EQ-5D score and duration of CKD/ duration of dialysis/ haemoglobin/ albumin / phosphorus/ calcium (r=-0.013 p=0.920, r=-0.012 p=0.926, r=-0.108 p=0.413, r=0.189 p=0.147, r=0.202 p=0.122, r=0.203 p=0.119)

Malnutrition - quality of life relationship

The mean EQ5D index score was 0.71 ± 0.22 in the normal-nutrition group, 0.64 ± 0.28 in the malnutrition-risk group, and 0.32 ± 0.33 in the malnutrition group according to the MNA-SF classification. There was a significant difference between the EQ5D index scores of the groups (p=0.001).

The mean EQ5D VAS score was 71.8 ± 17.5 in the normal-nutrition group, 63.5 ± 21.5 in the malnutrition-risk group, and 51.1 ± 23.7 in the malnutrition group according to the MNA-SF classification. There was a significant difference between the EQ5D VAS scores of the groups (p=0.017).

DISCUSSION

Chronic kidney disease (CKD) is an important global public health problem because of the increasing prevalence, high cost of treatment, and its negative impact on the quality of life. As well as being a

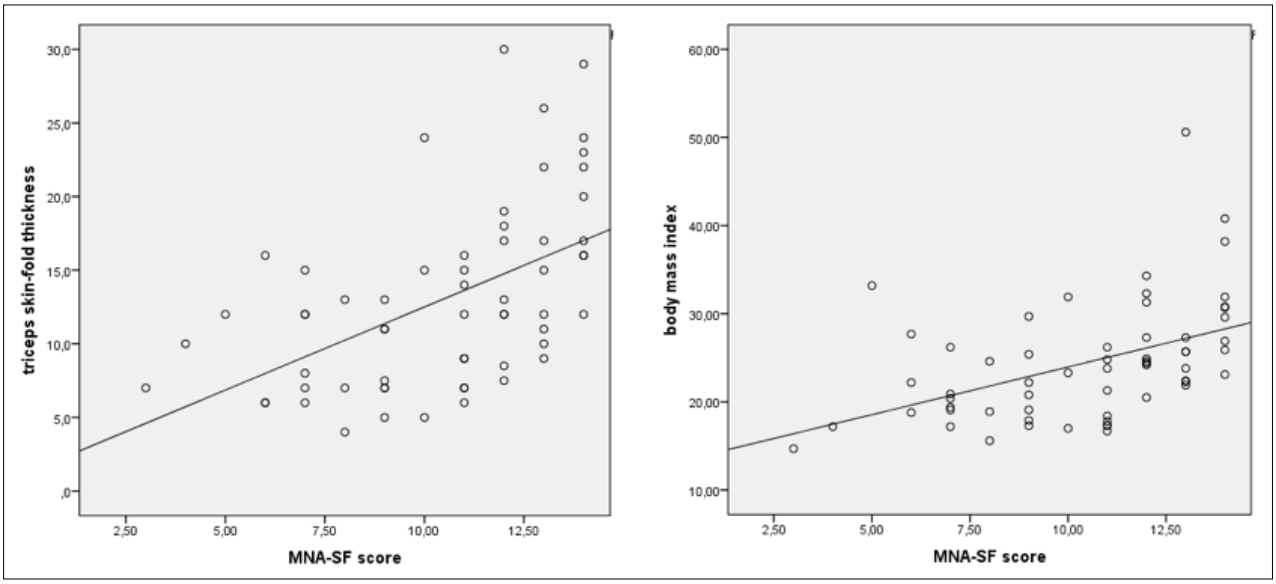

FIGURE 1: CORRELATION BETWEEN MALNUTRITION SCORE AND TSFT AND BMI.

TABLE 2: CLINICAL AND ANTHROPOMETRIC CHARACTERISTICS OF PATIENTS.

		All Groups	HD (%83, n:50)	PD (%16,7, n:10)	P
CKD Duration (months)		68.4±62	68.5±62.9	68±60.6	0.980
Dialysis Duration (months)		51±44.7	53.5±48.3	38.5±14.2	0.338
CKD Etiology (%)	Unknown Diabetes Hypertension Other	66.7 10.0 11.7 11.7	66.0 10.0 10.0 14.0	70.0 10.0 20.0 0	0.592
Presence of Comorbidity (%)	Yes Diabetes Hypertension CAD Other	73.3 23.3 66.7 28.3 8.3	68 24 60 32 6	100 20 100 10 20	0.037 0.023
Skipping Dialysis Sessions (%)	Never Once to Thrice	85.0 15.0	88 12	70 30	0.163
BMI (kg/m2)		24.4±6.6	24.2±7	25.5±4.1	0.572
Waist Circumference (cm)		93.4±16.2	92.3±16.9	98.7±10.7	0.264
TSFT (mm)		12.9±6.2	12.2±5.6	16.8±7.6	0.033
IDWG (gr)			2330±1217		N/A
Kt/V		1.6±0.5	1.4±0.3	2.5±0.6	< 0.001
URR			70.4±6.7		N/A
Systolic BP (mm/Hg)			137±30	145±23	0.471
Diastolic BP (mm/Hg)			80±18	88±17	0.346

Abbreviations: CAD, coronary artery disease; IDWG, interdialytic weight gain; URR, urea reduction ratio; BP, blood pressure;

TABLE 3: COMPARISON OF VARIOUS ASPECTS OF THE PATIENTS IN TERMS OF THE MALNUTRITION RATING.

MNA-SF status	normal nutritional status		malnutrition risk		malnutrition		P
	Mean	SD	Mean	SD	Mean	SD	
BMI (kg/m2)	27.9	6.9	21.4	4.6	21.3	5.4	0.001*
Waist Circumference (cm)	98.3	14.4	88.2	16.8	90	17.0	0.071
TSFT (mm)	16	6.5	10.2	4.8	10	3.5	0.001ϕ
CKD Duration (months)	59.9	57.1	94.4	75.2	43.7	23.7	0.039ω
Dialysis Duration (months)	45.6	40	68.9	47.1	32.6	26.2	0.063
Albumin (g/dL)	3.65	0.3	3.63	0.4	3.45	0.2	0.347
Transferrin (mg/dL)	117.4	31.4	104.1	37	121.9	16.4	0.230
Creatinine (mg/dL)	7.7	2	8.1	2	8.2	1.7	0.710
CRP (mg/L)	17.9	21.1	15.4	29.2	25.6	19.1	0.521
Low density lipoprotein (mg/dL)	105.9	31.5	102.2	36	93	32.7	0.550
Hemoglobin (gr/dL)	10.3	0.8	10.4	1.4	10.9	1.3	0.408
Calcium (mg/dL)	9	0.9	8.4	0.6	8.5	0.6	0.059
Phosphorus (mg/dL)	5.3	1.5	5.3	1.4	4.9	1.5	0.795
Potassium (mmol/L)	4.9	0.6	4.9	0.5	4.5	0.2	0.065

* between normal with malnutrition risk and malnutrition groups. ϕ between normal and malnutrition groups. ω between normal and malnutrition risk groups

common finding in individuals with CKD, malnutrition is associated with increased mortality and morbidity. Malnutrition, in itself, also has a negative impact on the quality of life. Prevention of malnutrition increases the quality and length of life in patients.

The prevalence of malnutrition in patients with CKD is between 18-75% in haemodialysis patients and 10-50% in peritoneal dialysis patients, depending on the criterion that the patient is assessed with. Malnutrition in chronic renal failure is often due to decreased energy intake associated with uremic syndrome and systemic chronic inflammation[2]. In patients who have not started renal replacement therapy, when GFR is lower than 50 mL/dL, oral intake has begun to deteriorate in patients and malnutrition has been established[28].

In our study, 34% of the patients in the HD group were under malnutrition risk and 20% was malnourished; these were 30% and 10% in the PD group, respectively. The relatively low PD patient count is limitation of our study. Studies conducted on large patient populations throughout the world have shown that the MNA test may detect nutritional deficiencies even if the patient's albumin level and body mass index (BMI) are within the normal ranges, and that hypoalbuminemia may be present in patients with normal nutritional status as well as the albumin levels of malnourished patients may be normal[29-34].

In a study by Erdoğan[35], biochemical parameters of patients in various malnutrition categories were compared and it was found that the albumin, creatinine, low density lipoprotein (LDL), haemoglobin levels were lower in the malnourished group but there was not a significant difference in calcium and phosphorus levels.

When biochemical parameters of patients in various malnutrition categories in our study were compared, it was found that the albumin, creatinine, LDL, haemoglobin, calcium, potassium, and phosphorus levels were not significantly different. The study by Girija and Radha[36] also did not find a relationship between malnutrition level and albumin level.

In a study by Rammohan and Aplasca[37], triceps skin-fold thickness (TSFT) was found to be an important anthropometric measure for detecting malnutrition. In a study conducted by Janardhan et al.[38], nutritional score and TSFT were found to negatively correlated. In our study, it was also found that is TSFT was lower in malnourished patients. In a study by Kalantar-Zadeh et al.[39], a negative correlation was found between malnutrition score and BMI; similar results were also obtained in our study.

The quality of life in dialysis patients is related to the biochemical parameters such as haemoglobin, serum albumin level, phosphorus, and calcium; the Kt/V ratio, duration of dialysis, age, and gender[14-18,40,41]. In our study, Kt/V value was found to correlate positively with the quality of life score. However, there was no significant relationship between the quality of life and duration of CKD, duration of dialysis, the levels of albumin, phosphorus, and calcium in this study.

In previous studies, a significant relationship was found between the quality of life and age[41-43]. In our study, a negative correlation was found between the EQ5D index score and age.

There are studies in literature, indicating a better quality of life with HD than with PD as well as the opposite[44,45]. In our study, although the mean EQ5D score was higher in the PD group, this was not statistically significant.

It has been found in some studies that having comorbid disease adversely affects the quality of life[46-49]. A study by Şahin[50] found lower physical component scores for patients with CAD comorbidity. Similarly, in our study, patients with comorbid CAD diagnosis were found to have more complaints related to mobility and usual activities than patients without CAD.

In a study examining the malnutrition levels of the patients were in connection with the EQ5D index score and the EQ5D VAS score, the EQ5D index score and the EQ5D VAS score decreased as the degree of malnutrition increased[51]. Similar results were obtained in our study; the EQ5D index score and the EQ5D VAS score, which are the quality of life scores, were found to decrease with increasing malnutrition. The results obtained in our study were also similar to those of Jiménez-Redondo et al.[52].

CONCLUSION

Malnutrition is common in haemodialysis and peritoneal dialysis patients, and adversely affects the patients' quality of life. It is important to prevent malnutrition and to increase patients' quality of life with early diagnosis and treatment of patients who are at risk of malnutrition. It would be useful to routinely use nutrition and quality of life scores in dialysis monthly evaluations.

RESUMO

INTRODUÇÃO: *O estado nutricional é um dos principais determinantes da qualidade de vida de pacientes com doença renal crônica (DRC) e a prevenção da desnutrição aumenta o tempo e a qualidade de vida nessa população. O objetivo do presente estudo foi determinar a prevalência de desnutrição, a qualidade de vida e a inter-relação entre esses fatores em pacientes com DRC em terapia dialítica.*

MÉTODOS: *Incluímos 60 pacientes com DRC estágio 5 sob terapia dialítica (50 pacientes em hemodiálise [HD] e 10 em diálise peritoneal [DP]). Os pacientes foram analisados com relação aos seus dados sociodemográficos, índice de massa corporal (IMC), circunferência abdominal, dobra cutânea triciptal, pressão arterial sistólica e diastólica pré-diálise, Kt/V e índice de remoção de ureia, parâmetros laboratoriais, miniavaliação nutricional (MNA) e questionário EuroQol-5 Dimensions (EQ-5D).*

RESULTADOS: *Do total de pacientes, havia 27 homens (45%) e 33 mulheres (55%), 83,3% em HD e 16,7% em DP. O MNA médio foi 10,4 ± 2,8 nos pacientes em HD e 10,5 ± 2,9 naqueles em DP, não havendo diferença significativa entre os grupos. O EQ-5D médio foi 0,60 ± 0,29 nos pacientes em HD e 0,68 ± 0,33 naqueles em DP, não havendo diferença estatisticamente significativa entre os grupos. A qualidade de vida foi pior nos pacientes desnutridos (p=0,001).*

CONCLUSÃO: *O diagnóstico e o tratamento precoce da desnutrição são necessários para melhorar a qualidade de vida dessa população.*

PALAVRAS-CHAVE: *Insuficiência renal crônica. Desnutrição. Qualidade de vida. Avaliação nutricional. Inquéritos nutricionais. Inquéritos e questionários.*

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