THE EFFECT OF NUTRITION AND DEPRESSION STATUS ON QUALITY OF LIFE IN PATIENTS REQUESTING HEMODIALYSIS

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Abstract

The research was conducted between January and March 2022 at a private dialysis center in Istanbul, involving 80 patients aged 18 to 65 who were undergoing hemodialysis treatment. The objective was to examine the interplay among nutrition, depression, and quality of life. Patient characteristics, anthropometric measurements, and 24-hour dietary records were collected via a questionnaire. The questionnaire included the Short Form-36 Quality of Life Scale (SF-36), Beck Depression Inventory (BDI), and Subjective Global Assessment (SGA). A significant correlation was observed between depression levels and quality of life scores (p < 0.05). However, no significant links emerged between nutritional status, depression, and quality of life (p > 0.05). A notable connection was found between nutritional status and daily energy/macronutrient intake. Patients with good nutritional status had significantly higher intake than those with poor nutritional status (p < 0.05). Statistical analyses revealed significant and non-significant associations among patient characteristics, quality of life, and depression status. This variability is attributed to various psychological and physiological factors influencing hemodialysis patients' quality of life. The results suggest the importance of personalized nutritional support, nutritional education, and regular monitoring of high-risk patients to mitigate malnutrition and enhance patients' quality of life.

Key words: Nutritional Status, Depression, Hemodialysis, End-Stage Renal Disease Diet, Quality of Life

HEMODİYALİZ TEDAVİSİ ALAN HASTALARDA BESLENME VE DEPRESYON DURUMUNUN YAŞAM KALİTESİ ÜZERİNDEKİ ETKİSİ

Öz

Araştırma İstanbul'da bulunan özel bir diyaliz merkezinde Ocak-Mart 2022 tarihlerinde hemodiyaliz tedavisi gören 18-65 yaş arası 80 hastanın beslenme ve depresyon durumu ile yaşam kalitesi arasındaki ilişkiyi belirlemek amacıyla yapılmıştır. Hastalara uygulanan anket formunda hastaların genel özellikleri, antropometrik ölçümleri ve 24 saatlik geriye dönük besin tüketim kayıtları alınmıştır. Hastaların yaşam kalitelerini ölçmek amacıyla Yaşam Kalitesi ÖlçeğiKısa Formu (SF-36), depresyon durumlarını belirlemek için ise Beck Depresyon Envanteri uygulanmıştır. Hastaların beslenme durumlarını belirlemek için ise Subjektif Global Değerlendirme (SGD) testi uygulanmıştır. Çalışmaya katılan hastaların %47,5'i kadın, %52,5'i erkektir ve yarısından fazlası beş yıldan az süredir hemodiyaliz tedavisi görmektedir. Hastaların depresyon düzeyleri ile yaşam kalitesi puanları arasında anlamlı ilişki bulunmuştur (p<0,05). Malnütrisyon durumu ve depresyon varlığı ile yaşam kalitesi arasında anlamlı ilişki bulunamamıştır (p>0,05). Hastaların malnütrisyon durumları ile günlük enerji ve makro besin ögesi alım miktarları arasında da anlamlı ilişki bulunmuştur. Malnütrisyonu olmayan hastaların günlük enerji ve makro besin ögesi alım miktarı malnütrisyonu olanlara göre anlamlı olarak yüksek bulunmuştur (p<0,05).Hastaların bazı özellikleri ile yaşam kaliteleri ve depresyon durumları arasında da istatistiksel açıdan anlamlı veya anlamsız sonuçlara rastlanmıştır. Bunun temel sebebi hemodiyaliz hastalarında yaşam kalitesini etkileyen birçok psikolojik ve fizyolojik faktörün olduğu düşünülmektedir.

Anahtar Kelimeler: Beslenme Durumu, Depresyon, Hemodiyaliz, Son Dönem Böbrek Yetmezliği Diyeti, Yaşam Kalitesi

1. INTRODUCTION

Chronic renal disease (CKD), irrespective of the underlying etiology of renal dysfunction, is a prolonged and progressive disorder characterized by a decline in the glomerular filtration rate (GFR) to levels below 60 ml/min/1.73 m². Consequently, it gives rise to perturbations in the renal regulation of fluid-electrolyte equilibrium and metabolic-endocrine functions, thereby constituting a state of degeneration (1). The prevalence of CKD among the general adult populace of Turkey has been reported as 15.7%, as documented by the Turkish Chronic Kidney Disease Prevalence Survey (CREDIT). In line with this revelation, renal ailment at variegated severities pervades approximately one in every 6-7 adults in our nation (2). An array of risk factors is implicated in the pathogenesis of chronic renal insufficiency. Historically, glomerulonephritis had emerged as a pivotal risk determinant for the onset of Chronic Renal Disease (CRD). However, this landscape has witnessed a transformation over the past two decades. Presently, paramount risk factors encompass chronic maladies like Diabetes Mellitus (DM) and Hypertension (HT), which represent the predominant etiological agents of CRD on a global scale (3).

Should the glomerular filtration rate fall to ≤ 15 ml/min/1.73 m², the condition is characterized as End Stage Renal Disease (ESRD), mandating the initiation of renal replacement therapy (RRT) for patients at this juncture. This therapeutic regimen encompasses modalities such as hemodialysis (HD), peritoneal dialysis (PD), and kidney transplantation. It is imperative that the most appropriate therapeutic avenue be promptly embarked upon for the patient's optimal clinical management (4). Hemodialysis emerges as one of the prominently favored and fiscally demanding methodologies for the management of ESRD both nationally and globally. Functioning on the principle of altering fluid and solute composition within the patient's bloodstream via a machine and a semi-permeable membrane, hemodialysis stands as the crux of this treatment paradigm (5).

Within the realm of hemodialysis recipients, a spectrum of conditions prevails, encompassing hyperkalemia, hyperphosphatemia, perturbation of the calcium-phosphorus equilibrium, the genesis of bone-mineral anomalies due to metabolic acidosis, atrophy of musculature, vascular calcifications, as well as disturbances of endocrine and gastrointestinal systems, all concomitant with substantial mortality rates (6). Noteworthy is the observation that individuals undergoing hemodialysis intervention endure a diminished quality of life, coupled with escalated incidence of malnutrition, inflammation, hospitalization, and mortality in comparison to the general populace. In this context, the diligent assessment and vigilance regarding the nutritional status of patients becomes pivotal, facilitating early detection of malnutrition and the consequent institution of requisite preventive measures (7).

In consequence of periodic dialysis sessions, spanning several hours a few times per week, patients may encounter attenuated daily functionality and diminished engagement in activities, culminating in compromised economic well-being, fluid retention, pruritus, and perturbed sleep patterns. The amalgamation of fluid and dietary restrictions inherent to ESRD, coupled with these multifarious factors, collectively imparts a notable influence upon the health-related quality of life for dialysis recipients, thereby contributing to the genesis of malnourishment (8).

Patients experiencing complications arising from acute or chronic dialysis, as well as those grappling with shifts in emotional states, such as anxiety and depression, manifest adverse ramifications on their quality of life (9). Within the spectrum of psychiatric disorders, depression stands as the foremost and most prevalent affliction among individuals afflicted with End Stage Renal Disease (ESRD) (10). Several investigations conducted amongst the cohort of hemodialysis recipients postulate a correlation between depression and indicators such as a diminished body mass index (BMI) and an elevated prevalence of co-existing somatic ailments (11).

Hemodialysis patients constitute a demographic vulnerable on both psychological and physiological dimensions due to the intricate complications intrinsic to dialysis therapy, constrictive fluid and dietary regimens, pharmaceutical regimen adherence, and social life constraints.

This research was meticulously planned and executed to evaluate the nutritional status and levels of depression among hemodialysis patients, concurrently seeking to establish their correlation with the quality of life experienced by these individuals. We sincerely hope that this study will contribute significantly to the current academic understanding of the factors that impact the quality of life among individuals undergoing hemodialysis treatment.

2. MATERIALS AND METHODS

2.1. Research type and aim

The purpose of this descriptive and correlational study is to delineate the relationship between the nutritional status, depression condition, and quality of life among hemodialysis patients.

2.2. Research population and sample selection

The study population consists of hemodialysis patients who underwent treatment at a private dialysis center in Istanbul between January and March 2022 (n=223). The research cohort comprises 80 individuals who volunteered, aged between 18 and 65, all undergoing hemodialysis treatment for a minimum of three years. In determining the adequate sample size for the study, the GPOWER 3.1 software package was utilized. Calculations resulted in a sample size of at least 56 individuals to achieve a test power (1-β) of 0.90. Individuals undergoing peritoneal dialysis, those outside the specified age range, those with hemodialysis treatment durations less than three years, participants facing conditions hindering their ability to provide responses, and patients using antidepressant medications were deliberately excluded from the study.

2.3. Data Collection Tools

The data collection tool utilized in this study encompassed a comprehensive questionnaire structured into six distinct sections. In the initial section of the questionnaire, a compilation of general information was gathered, encompassing participants' demographic characteristics, existing health conditions, and dietary preferences. Moving to the second section, the Short Form Health Survey (SF-36) was incorporated to meticulously assess participants' perceived quality of life. The third section focused on the administration of the Beck Depression Inventory (BDI) to discern participants' levels of depression. Anthropometric measurements were the focal point of the fourth section, offering insight into the physical dimensions of the participants. Transitioning to the fifth section, a thorough evaluation of individuals' dietary intake was facilitated through the solicitation of 24-hour dietary records. The final section, required the administration of the Subjective Global Assessment (SGA) form, thereby providing a comprehensive perspective on the participants' overall health status.

Patient Diagnosis Form

The patient diagnosis form, crafted by the researcher in accordance with the pertinent literature, is structured into three sections. The first section of the form consists of a total of 15 questions pertaining to the individual's demographic characteristics and attributes related to the disease. The second section of the questionnaire encompasses 8 questions concerning the patient's dietary habits.

Short Form 36 (SF-36) Quality of Life Scale

The Short Form 36 (SF-36) Quality of Life Scale, developed by Ware in 1987, is designed to assess health-related quality of life. Applicable to individuals aged 14 and older, the scale evaluates an individual's health-related quality of life over the past four weeks. In Turkey, Koçyiğit and

colleagues conducted a validity and reliability study for the SF-36 Quality of Life Scale. The SF-36 consists of 36 items, examining eight health concepts. Scores for each of the eight scales range from 0 to 100, and a higher total score is indicative of a better health-related quality of life. However, a high score on the pain scale denotes a decrease in pain.

Beck Depression Inventory

The Beck Depression Inventory, developed by Beck and colleagues in 1961, measures depressive symptoms. The Cronbach's alpha coefficient for the scale is reported as 0.87. Adapted to the Turkish population by Hisli in 1988 through validity and reliability studies, the Cronbach's alpha coefficient was found to be 0.90. The scale consists of 21 questions, and the highest possible score that can be obtained at the end of the scale is 63. A higher total score indicates a higher level or severity of depression.

The Anthropometric Measurements

The anthropometric measurements section of the questionnaire includes body weight (kg) and height (cm). The patients' dry weights were used as body weights and measured with an electronic scale with a sensitivity of $\pm$ 0.1 kg. Patients' body weights were measured and recorded by the researcher at the end of hemodialysis. Height measurement was conducted as follows: in the Frankfort plane and with participants barefoot, heels together, standing upright against the wall with back, shoulders, and the back of the head touching the wall, in a ready stance. The distance from the top of the head to the floor in centimeters (cm) was measured using a tape measure.

24-Hour Dietary Record

Patients were queried about the foods and portions consumed the day before when they did not undergo hemodialysis treatment, and the information was recorded by the researcher on the questionnaire form. The quantity of foods consumed by individuals was recorded using the Meal and Food Photograph Catalog. Portion sizes were determined, and daily energy, macro, and micronutrient intake amounts were calculated using the full version of the Nutrition Information Systems (BEBİS) 9 program. The percentage of meeting the requirements for calculated energy, protein, sodium, and phosphorus minerals was calculated according to NKF-KDOQI, the percentage of meeting the requirements for potassium was calculated according to ERA-EDTA, and the percentage of meeting the requirements for other macro and micronutrients was calculated according to DRI (Dietary Reference Intakes).

Subjective Global Assessment Test

The scale queries the medical history, changes in body weight and eating habits, functional capacity, and gastrointestinal system changes. There are questions in this scale related to the individual's physical examination. Examples include subcutaneous fat tissue loss, decrease in lean body mass, ankle edema, and the presence of ascites. Weight loss in the last 6 months is crucial for observing the individual's progressive condition and dietary changes.

2.4. Data Collecting Process

The data collection for the research took place between January and March of 2022. The ethical framework of this study was approved by the Ankara Medipol University Non-Interventional Clinical Research Ethics Committee with the approval number: 81477236-604.01.01-3399, officially granted on December 24, 2021. Prior to the implementation of the survey form, potential participants willing to participate in the study were carefully informed about the parameters of the research. Subsequently, the "Informed Consent Form" was presented, read, and approved by the participants. The acquisition of research data was carried out through a meticulously organized face-to-face interview technique, with the researcher using the survey form as the primary tool.

2.5. Analysis and Evaluation of the Data

In the statistical phase of the study, an array of analytical methods including frequency analysis, chi-square relationship tests, and mean comparison tests was applied. In the initial stage, frequency tables detailing demographic findings were presented. The selection of the relationship test involved careful consideration of expected cell values in cross-tabulation. Accordingly, the appropriate statistical analysis technique, either chi-square independence or Fisher test, was chosen for cross-tabulation analyses based on anticipated cell values. The frequencies (n) and percentages (%) pertaining to various groups were meticulously computed in these cross-tabulations.

Subsequently, mean comparison tests were executed in the second stage. In this phase, a thorough examination of normal distribution and homogeneity of variance assumptions was conducted for the purpose of test selection. The Shapiro-Wilk test was employed for assessing the normality assumption, while the Levene test was utilized to evaluate homogeneity of variance. Following the scrutiny of assumption tests, independent samples t-tests were applied for the comparison of two independent groups in instances where the measurement scores conformed to a normal distribution. For comparisons involving three or more independent groups, the ANOVA test was implemented. In cases where the ANOVA test revealed significant results, the Tukey test was subsequently employed for multiple comparisons. For measurement scores exhibiting non-normal distribution, Mann-Whitney U tests were employed for comparisons between two independent groups, and Kruskal-Wallis H tests were conducted for comparisons involving three or more independent groups. Post hoc analysis using Dunn's test was applied for multiple comparisons following significant findings from the Kruskal-Wallis H test.

Descriptive statistics, encompassing measures such as the arithmetic mean ($\bar{x}$), standard deviation (SD), minimum (Min), maximum (Max), median, and interquartile range (IQR), were incorporated in the hypothesis testing process. A significance threshold of 5% was rigorously maintained, and the analyses were executed utilizing the IBM SPSS 26.0 software package.

3. RESULTS

The study involves participants, with 47.5% being female and 52.5% male. When examining socio-demographic characteristics based on gender, it is observed that 63.1% of females are in the 51-65 age range, while 69.0% of males are in the same age range. Regarding the diagnosis of the first kidney disease, it is noted that 63.1% of females and 71.4% of males received their initial diagnosis 5-10 years ago. Furthermore, 68.4% of females and 47.6% of males underwent their first dialysis treatment less than 5 years ago.

The daily intake of energy and macronutrients was compared between patients with and without malnutrition based on the results of the Subjective Global Assessment. A significant difference was identified in the daily intake of energy and macronutrients when comparing patients with malnutrition to those without malnutrition ($p<0.05$). It is noteworthy that the daily intake of energy and macronutrients in patients without malnutrition is significantly higher than in those with malnutrition (Table 1).

No noteworthy variance emerged between the Beck Depression Inventory scores of patients and the outcomes of the Subjective Global Assessment ($p > 0.05$). However, a notable correlation is discerned between the results of the Subjective Global Assessment and the distinct levels of depression ($p < 0.05$). Evidently, it has been elucidated that a substantial 69.4% of patients devoid of any indicators of malnutrition concurrently exhibit minimal levels of depression (Table 2).

Table 1. Comparing the daily intake of energy and macronutrients among patients based on the Subjective Global Assessment (SGA) results.

Energy and Macro Nutrients	No Malnütrition (n=59)		Moderate/Severe Malnütrition (n=21)		p
	Median-IQR	(Min-Max)	Median-IQR	(Min-Max)	
Energy (kcal)	1668,4±305,2	1019,0-2702,0	1103,7±364,4	637,0-1990,0	<0,001*
CHO (g)	207,1±47,8	108,2-327,2	152,2±46,2	80,1-255,6	<0,001*
CHO (%)	55,0±15,9	34,0-66,0	50,7±24,4	26,7-70,2	<0,001*
Protein (g)	64,8±16,6	37,0-108,2	37,3±14,9	17,7-74,0	<0,001*
Protein (%)	15,6±3,0	10,0-25,0	13,3±1,9	11,0-17,0	<0,001*
Fat (g)	66,1±21,5	34,8-122,6	39,1±21,7	16,6-112,8	<0,001*
Fat (%)	33,9±8,1	20,0-53,0	27,3±10,9	6,0-50,0	<0,001*
Fiber (g)	21,0±6,2	8,3-36,0	17,6±5,1	9,9-28,0	<0,001*
Cholesterol (mg)	345,9±169,6	61,2-716,7	115,1±114,8	16,0-359,1	<0,001*
Saturated F.A. (g)	32,8±10,7	17,2-60,8	19,4±10,7	8,2-55,9	<0,001*
Polyunsaturated F. A. (g)	10,3±6,2	3,5-40,8	6,1±2,4	2,6-10,2	<0,001*

m=Mann Whitney U Testi, *p<0,05, F.A: Fatty Acid

Table 2. Comparison of Patients' Beck Depression Inventory Scores with Subjective Global Assessment (SGA) Results

	No malnutrition (n=59)		Moderate malnutrition (n=16)		Severe malnutrition (n=5)		p
	Median ±IQR	Min-Max	Median ±IQR	Min-Max	Median ±IQR	Min-Max	
BDI Score	11,0 ±9,0	0-62	21,0±17,0	0-56	27,0±7,0	16-36	0,160
	n	%	n	%	n	%	
Minimal	41	69,4	6	37,5	0	0	
Moderate	8	13,5	5	31,2	1	20	0,002*f
Mild	6	10,1	1	6,2	1	20	
Severe	4	6,7	4	25	3	60	

k=Kruskal Wallis H Test, f=Fisher test, BDE=Beck Depression Inventory, *p<0,05

There is a significant difference observed between the sub-dimensions of the SF-36 Quality of Life Scale, namely physical function, and the depression status (p=0.001). Individuals with minimal depression exhibit significantly higher scores in physical function compared to those with moderate depression. A significant difference is also found in the sub-dimension of energy/vitality, with individuals with minimal depression having significantly higher energy levels compared to those with moderate depression (p=0.001). Regarding mental health levels, a significant difference is identified among depression statuses (p=0.001). Individuals with minimal depression have significantly higher mental health scores compared to those with moderate depression. Social functioning levels also exhibit a significant difference among depression statuses (p=0.037). Individuals with minimal depression have significantly higher social functioning levels than those with moderate depression. A significant difference is found in pain levels among depression statuses (p=0.001). Individuals with minimal depression experience significantly higher pain levels compared to those with moderate depression. Moreover, there is a significant difference in the overall perception of health levels among depression statuses (p=0.001). Individuals with minimal depression have

significantly higher scores in the overall perception of health compared to those with moderate depression. No significant difference is observed in the levels of physical and emotional role difficulties (Table 3).

Table 3. Comparison of Patients' Depression Levels with SF-36 Quality of Life Sub-Dimensions

SF-36 Quality of Life Scale	Minimal (n=47)		Mild (n=14)		Moderate (n=8)		Severe (n=11)		p	Dunn
	Median±IQR		Median±IQR		Median±IQR		Median±IQR			
Physical functioning	65,4	27,0	44,2	24,8	31,2	19,5	20	25,3	**0,001***	(1>3)
Physical role functioning	52,1	47,7	26,7	42,1	15,6	35,2	25	40,3	0,098	-
Emotional role functioning	70,9	42,0	69,0	44,2	25	46,2	45,4	52,2	0,155	-
Energy/vitality	46,1	25,0	29,6	20,8	31,8	20,8	17,2	17,0	**0,001***	(1>3)
Mental Health	66,9	12,5	52,8	14,2	50	16,9	42,1	17,4	**0,001***	(1>3)
Social Functionin	60,9	20,4	54,4	16,7	45,3	24,0	44,3	18,8	**0,037***	(1>3)
Pain	79,7	20,0	70,8	17,6	44,3	26,4	46,1	22,3	**0,001***	(1>3)
General Health Perception	50	21,1	30,3	15,5	26,8	18,7	14,5	16,0	**0,001***	(1>3)

k=Kruskal-Wallis H Test, d=Dunn test *p<0.05, SF-36=Short Form Health Survey

4. DISCUSSION

In this study, the daily energy and macro-nutrient intake levels of patients with and without malnutrition were compared based on the results of the Subjective Global Assessment. According to the findings, a significant difference was observed in the daily energy and macro-nutrient intake levels between patients with malnutrition and those without malnutrition ($p < 0.05$). It is evident that the daily energy and macro-nutrient intake of patients without malnutrition is significantly higher compared to those with malnutrition. In the study conducted by Alataş et al. [12], it was observed that as the nutritional status of patients worsened, the malnutrition score increased. Among the reasons for decreased nutrient intake in hemodialysis patients are difficulties in preparing or purchasing meals due to economic limitations, diseases that impair the ability to chew and digest food, impaired cognitive function, and other mental or physical disabilities [13].

The study found no significant difference between patients' Beck Depression Inventory scores and Subjective Global Assessment results ($p > 0.05$). However, a significant difference was observed between the results of Subjective Global Assessment and depression levels ($p < 0.05$). It was indicated that 69.4% of patients without malnutrition had a minimal level of depression. Malnutrition and depression are important issues in hemodialysis patients, and the study has found a significant relationship between the levels of depression and the state of malnutrition. It was observed that 69.4% of patients without malnutrition had minimal depression ($p<0.05$). Among patients with severe malnutrition, 60% had severe depression. Looking at the literature, a study conducted by KOO et al.

in Korea with hemodialysis patients showed a positive correlation between the severity of depressive symptoms and the degree of malnutrition (14). In a study conducted by Heng-Jung Hsu et al. (15) with 209 HD patients, lower albumin levels were found in depressive HD patients. The results are consistent with the literature.

In this study, a significant difference was observed in terms of life quality and depression status among patients, considering the sub-dimensions of the SF-36 Quality of Life Scale, except for the levels of physical and emotional role difficulties ($p < 0.05$). When examining the quality of life scores of the patients participating in this study, it was found that patients with minimal depression had higher quality of life scores compared to those with more severe depression. There are significant differences in terms of physical function, energy/vitality, mental health, social functioning, and pain levels in relation to the severity of depression ($p<0.05$). In a study conducted by Mitema et al. (16), the presence of depression in patients with CKD was associated with negative outcomes such as increased morbidity and mortality, as well as low levels of quality of life. In a study conducted in Korea by Park et al. (17), a reverse linear relationship was shown between depression levels and quality of life in HD patients.

5. CONCLUSION and RECOMMENDATIONS

According to the results of this study conducted on hemodialysis patients, a significant relationship was found between the patients' depression status and their quality of life. The daily intake of energy, macronutrients, and micronutrients by the patients was found to be associated with the presence of malnutrition determined by the Subjective Global Assessment results. Therefore, hemodialysis patients should receive dietary education from a dietitian, and their existing and changing dietary statuses should be monitored at regular intervals. Furthermore, a significant relationship was found between the patients' depression levels and the presence of malnutrition. Therefore, to prevent malnutrition in hemodialysis patients, efforts should be made to reduce depression and its underlying causes, while also providing psychological and social support to patients. However, no significant relationship was found between the patients' quality of life and the state of malnutrition. An examination of patients' snacking and main meal habits did not reveal any significant relationship between dietary habits and depression levels and quality of life. Similarly, no significant relationship was found between patients' anthropometric measurements and depression levels and quality of life. Our study demonstrates that in hemodialysis patients, the presence of depression, along with adequate daily energy and nutrient intake, affects patients' quality of life.

According to the Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines, when comparing patients' daily intake of energy and protein, most patients cannot meet their daily requirements. This situation can potentially lead to protein-energy malnutrition in the later stages. However, in this study, malnutrition is not observed in most patients. This result suggests that malnutrition in hemodialysis patients needs to be evaluated with multiple parameters rather than a single scale. Malnutrition is a common finding in hemodialysis patients and is a significant cause of mortality and morbidity. Therefore, detecting and preventing malnutrition is crucial. In this context, dietitians play a crucial role in the nutritional treatment of dialysis patients. Nutritional education provided by dietitians to patients and the regular monitoring of nutritional status for high-risk patients increase the survival rate. Personalized dietary support enhances dialysis efficiency and consequently positively impacts the patients' quality of life.

As a result of the study, strong relationships were found with some variables, while weak relationships were found with others. The presence of numerous factors affecting the quality of life in hemodialysis patients is likely the main reason for this variability. Preventing modifiable factors such as low income, advanced age, unemployment, and social limitations can contribute to an

improvement in the patients' quality of life. The diverse range of factors influencing the quality of life in hemodialysis patients is likely responsible for the mixed findings.

Factors such as low income, advanced age, unemployment, and social limitations can have a significant impact on the quality of life of hemodialysis patients. The mixed findings in the study indicate the complexity of factors influencing the quality of life in this patient population.

The study results suggest the need for more comprehensive, individualized, and larger sample size studies to determine the relationships between nutrition, depression status, and quality of life in hemodialysis patients. These studies could provide a more in-depth understanding of the complex interactions and factors influencing the quality of life in this patient group.

Ethics Approval: The study has received ethics approval from the Non-Interventional Clinical Research Ethics Committee of Ankara Medipol University, dated December 24, 2021 (Decision No: 62).

Conflict of Interest: Among the authors of the article, there are no personal or financial conflicts of interest within the scope of the study. The authors declare that they have no conflict of interest.

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