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The relationship between quality of life and dietary fluid restriction non-adherence in hemodialysis patient

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Abstract

Hemodialysis is now the preferred method in the treatment of kidney failure. Patients who do not adhere to the diet during hemodialysis may experience negative changes in fluid-electrolyte balance. This study aimed to investigate the relationship between restricted fluid intake and the quality of life of hemodialysis patients in our country. The study was conducted with 186 hemodialysis patients, treated as outpatients in the hemodialysis unit of a university hospital in Samsun and as inpatients in the nephrology clinic. Data were collected using a questionnaire that included 23 questions on patients' sociodemographic and clinical characteristics, the SF-36 Short Quality of Life Scale, and the Dialysis Diet and Fluid Restriction Nonadherence Questionnaire. Kruskal-Wallis and Mann-Whitney U tests were used for analysis of quantitative data while Spearman correlation coefficient was used for correlation analysis. In line with the evidence obtained, it was established that there was a negative correlation between the status of non-compliance to dialysis diet and fluid restriction and the quality of life of individuals on hemodialysis treatment**.**

Keywords: Diet; hemodialysis; fluid restriction; quality of life.

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1. Introduction

Chronic Renal Failure (CRF) is characterized by chronic, progressive, and irreversible nephron loss due to different diseases. CRF is an important health problem defined as decreased glomerular filtration rate, increased urinary albumin excretion, or a combination of these two conditions [1]. Although many sociodemographic and genetic parameters play a role in the development of CRF, the main chronic diseases that cause chronic renal failure are diabetes and hypertension [2]. Complications of the disease include cardiovascular mortality, acute kidney injury, cognitive decline, anemia, bone and mineral disorders, and fractures [3]. Morbidity and mortality can be reduced with good treatment in CRF. Worldwide, CRF affects between 8% and 16% of the population and ranks 16th among global causes of death [1]. The incidence of CRF is increasing worldwide, and it is projected that by 2040, CRF will rise from 16th to 5th place among causes of death, and 2.2-4.0 million people will die [4,5]. Many people with CRF experience a disease stage called end-stage renal failure (ESRF), in which they cannot survive without either dialysis or renal transplantation [6].

Dialysis is the diffusion of molecules in solution across a semipermeable membrane and is performed in two ways: hemodialysis and peritoneal dialysis. The main function of hemodialysis is to maintain the balance between the intracellular and extracellular environment, which is the task of a healthy kidney, with the help of a device [7]. Hemodialysis is the most common renal replacement therapy globally, accounting for approximately 69% of all renal replacement therapies and 89% of dialysis treatment options [8]. In our country, when the distribution of individuals receiving renal replacement therapy as of the end of 2021 is examined, it is stated that 71.38% of patients are on hemodialysis, 4.06% on peritoneal dialysis, and 24.56% on renal transplantation [9].

Many physical and psychosocial factors negatively affect the satisfaction with life in hemodialysis patients during the treatment process [10]. Biochemistry parameters such as blood urea nitrogen (BUN), hematocrit, hemoglobin level, albumin, calcium, phosphorus, Kt/V ratio, the severity of uremia symptoms, duration of dialysis, presence of concomitant chronic diseases are among the physical factors, while treatment-related restrictions, Increased dependency, changing roles within the family, marital conflicts, fear of death, decreased social activities and economic problems lead to various psychosocial problems such as stress, guilt, anxiety, hostility, feeling worthless and depression [11,12]. Although hemodialysis treatment prolongs the life span of individuals, it may negatively affect the life order, family relations, and working life due to dependence on performing daily life activities and limitation of activities due to physical weakness. The obligation of individuals to follow a diet with dialysis treatment, experiencing symptoms such as nausea-vomiting and weakness due to treatment, being dependent on a machine to survive, and the deterioration of the body image of the dialysis catheter can also negatively affect the self-efficacy and self-care of individuals [6,13].

Although hemodialysis is a life-saving treatment method for patients with end-stage renal failure, patients need to effectively adapt to the therapeutic diet during the treatment process to restrict some nutrients in the hemodialysis regimen and to remove waste metabolites from the blood regularly [14]. Compliance is an indicator of the extent to which the patient responds behaviorally to lifestyle changes, dietary instructions, and drug therapy [15]. Compliance with diet and fluid restriction is extremely important for treatment success. Failure of patients to comply with the dietary patterns recommended for them negatively affects the disease prognosis, leading to an increase in health expenditures and increasing the incidence of disease-related mortality [7]. Adherence to special diets is very difficult for dialysis patients, and the reported compliance rate

varies within a wide range of 18-68% [16-18]. Another issue as critical as dietary compliance is the ability of hemodialysis patients to comply with fluid restriction. Fluid restriction is strongly recommended for patients with end-stage renal failure. These restrictions are applied to prevent fluid overload and pulmonary edema. Compliance with fluid restriction is difficult for individuals receiving hemodialysis, and reported compliance rates vary within a wide range of 25-79% [16,17]. The inability of the patient to prevent the desire to drink water and fluids and consequently not to comply with fluid restriction may lead to complications such as severe hypertension, left ventricular hypertrophy, cognitive dysfunction, and increased mortality [15], The strict diet and fluid restrictions required from hemodialysis patients, whose treatment process is quite difficult, may cause negative consequences such as refusal of restrictions in these patients [19,20].

1.1. Purpose of the study

This study aims to determine the relationship between quality of life and dietary fluid restriction nonadherence in hemodialysis patients in Turkey. It is thought that the findings obtained by determining the relationship between quality of life and non-compliance with dietary and fluid restrictions will help hemodialysis patients to be a part of the care, and the quality of care provided can be improved. This study was planned to investigate the relationship between quality of life and dietary fluid restriction nonadherence in hemodialysis patients. The following questions were sought to be answered in this study:

- What is the distribution of sociodemographic and clinical characteristics of hemodialysis patients?
- What is the quality of life level of hemodialysis patients?
- Is there a relationship between quality of life and dietary fluid restriction nonadherence in hemodialysis patients?

2. Materials and Methods

This descriptive and correlational study was conducted between 15/06/2017 and 15/12/2017 with outpatients in the hemodialysis unit and inpatients in the nephrology clinic of a university hospital located in the Central Black Sea Region in northern Turkey.

2.1. Participants and sample

In the study, patients were selected using the Simple Random Sampling Method, which is a probability sampling method in which individuals can be selected from the population with equal probability. The sample size was calculated using the NCSS-PASS (Number Cruncher Statistical System-Power Analysis and Sample Size) program with 90% power, 95% confidence limit, and 0.05% margin of error based on the studies conducted on patients on this subject and the minimum number of patients to be included in the study was determined as 180. The study was completed with 186 patients who were 18 years of age or older, male or female, receiving hemodialysis treatment, had no mental or organic disability that would prevent them from answering the questions, were easily communicated with, and volunteered to participate in the study.

2.2. Data collection tools

Data were collected using a 23-question Patient Information Form including socio-demographic and clinical characteristics, SF-36 Quality of Life Scale Short Form, and Dialysis Diet and Fluid Restriction Nonadherence Scale (DFRS). The study was conducted voluntarily, and verbal informed consent was obtained from the patients.

2.2.1. SF-36 Quality of Life Scale Short Form

It is in the form of a scale developed by Ware [21] consisting of a total of 36 multi-titled statements including two main dimensions: physical and mental, and eight sub-dimensions: physical function, social function, role limitations due to physical problems, role limitations due to emotional problems, mental health, energy (vitality), pain and general health perception. Scale scores of health-related life domains in the scale take values ranging from 0 to 100, from the lowest score to the highest score. The SF-36 is scored in such a way that the higher the score of each health domain, the higher the health-related quality of life (positive scoring). The Cronbach's alpha of the SF-36, the reliability and validity study of which was conducted in Turkey by Koçyiğit et al. [22], was found to be 0.75, whereas, in this study, it was found to be 0.87.

2.2.2. Dialysis Diet and Fluid Restriction Nonadherence Questionnaire (DDFQ)

Vlaminck et al. [23] developed a self-report instrument consisting of four subscales to assess nonadherence with diet and fluid restriction in hemodialysis patients. Two items in the scale address dietary nonadherence (items 1 and 2), and the other two items address fluid restriction nonadherence (items 3 and 4) in terms of frequency and degree. The degree of nonadherence with diet and fluid restriction has a Likert-type structure with a score between 0-4 (No nonadherence = 0, Mild = 1, Moderate = 2, Severe = 3, Very severe = 4). While the Cronbach's alpha coefficient of the scale, the validity and reliability study of which was conducted by Kara [24] in Turkey, was found to be 0.70, it was found to be 0.75 in this study. The higher the scores on the scale, the higher the incompatibility of the individuals.

2.3. Procedure

The data were collected through face-to-face interviews with the patients. It was explained to the patients that the decision on whether to participate in the study was entirely their own, that their names would not be written on the questionnaire form, and that the data to be collected from this study would only be used within the scope of the research. The data collection period was completed in approximately 15 minutes.

2.4. Ethics

Ethics committee approval (Number: 2017/1063, Date: 14.07.2017) and written permission (15374210-044-E-17666) were obtained from the institution. The purpose and benefits of the study were explained to the patients, and their consent was obtained by paying attention to the principle of voluntariness.

2.5. Data analysis

The research data were analyzed using the SPSS 23.0 package program in a computer environment. Mean, median, minimum-maximum, ratio, and frequency values were used in the descriptive statistics of the data. The distribution of variables was checked by the Kolmogorov-Smirnov test. Kruskal-Wallis and Mann-Whitney U tests were used in the analysis of quantitative data, and the Spearman correlation coefficient was used in correlation analysis. The significance level was taken as $p<0.05$.

3. Results

The distribution of the socio-demographic characteristics of the patients who participated in the study is presented in Table I. When the results of the study were evaluated, it was determined that 52.2% of the hemodialysis patients were in the 60-79 age group, 50.5% were male, 49.5% were female, 36.6% were primary school graduates, 90.9% had a nuclear family structure, 87.6% had children, 60.8% had income equal to expenses, 99.5% had social security, and 60.8% lived in the city center (Table I).

TABLE I
DISTRIBUTION OF SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS (N=186)

Characteristics		**n**	**%**
Age groups	20-39	17	9.1
	40-59	57	30.6
	60-79	97	52.2
	80-99	15	8.1
Gender	Female	92	49.5
	Male	94	50.5
Education status	Illiterate	37	19.9
	Literate	15	8.1
	Primary School	68	36.6
	Middle School	16	8.6
	High School	30	16.1
	University	20	10.8
Family type	Extended Family	17	9.1
	Nuclear Family	169	90.9
Has children	Yes	163	87.6
	No	23	12.4
Socio-economic status	Income less than expenses	34	18.3
	Income equal to expenses	113	60.8
	Income more than expenses	39	21.0
Has social security	Yes	185	99.5
	No	1	0.5
Residence	Province	113	60.8
	District	56	30.1
	Town	17	9.1
	Total	186	100.0

The distribution of the clinical characteristics of the patients who participated in the study is shown in Table 2. When the results of the study were evaluated, 86.6% of the hemodialysis patients had a disease other than chronic renal failure, 54.8% stated that they perceived their health as good, 81.2% stated that changes occurred in their lives due to dialysis, 24.7% had a dialysis patient in their family, 48. 4% stated that it was crucial to comply with the dialysis program, 93% had received previous training on fluid, salt restriction, and diet, 62.9% stated that they had no difficulty in complying with fluid restriction recommendations, 26.9% stated that they did not control their fluid intake, 57.5% stated that they had no difficulty in complying with dietary recommendations, 22% stated that they were not willing to control what they eat (Table II).

TABLE II
DISTRIBUTION OF CLINICAL CHARACTERISTICS OF THE PATIENTS (N=186)

Characteristics		n	%
Has a disease other than chronic renal failure	Yes	161	86.6
	No	25	13.4
Health perception status	Good	102	54.8
	Average	60	32.3
	Bad	24	12.9
Presence of dialysis-dependent change	Yes	151	81.2
	No	35	18.8
The presence of dialysis patients in family	Yes	46	24.7
	No	140	75.3
How important is adherence to the dialysis schedule	Very important	90	48.4
	Important	70	37.6
	Moderately important	20	10.8
	Somewhat important	4	2.2
	Not important at All	2	1.1
Receiving education on fluid, salt restriction, and diet	Yes	173	93.0
	No	13	7.0
Difficulties in complying with fluid restriction recommendations	No difficulty	117	62.9
	I don't understand how to follow fluid restriction	2	1.1
	No fluid intake control	50	26.9
	Not interested	17	9.1
Difficulties in adhering to dietary recommendations	No difficulty	107	57.5
	I was not willing to control what ı eat	41	22.0
	I couldn't avoid certain unrecommended meals	38	20.4
	Total	186	100.0

The findings related to the SF-36 Quality of Life Scale sub-dimension median scores of hemodialysis patients are given in Table 3. When the SF-36 Quality of Life Scale sub-dimension median scores were evaluated, the highest score of 95 (0-100) points was in the Physical Role Difficulty sub-dimension, while the lowest median score of 30 (0-100) points was in the Physical Function sub-dimension (Table III).

TABLE III
SF-36 QUALITY OF LIFE SCALE SUBSCALE SCORES OF PATIENTS

Subscales of the Scale	**Median (Min-Max.)**
1. Physical Function	30(0-100)
2. Physical Role Difficulty	95(0-100)
3. Pain	70(10-90)
4. General Health	40(0-80)
5. Energy-Vitality	45(5-95)
6. Social Function	62.5(0-100)
7. Emotional Role Difficulty	69(0-100)
8. Mental Health	64(12-96)

The comparison of the socio-demographic characteristics of the patients included in the study and the SF-36 Quality of Life Scale sub-dimension median scores are given in Table IV. The median score of the "*Physical Function*" sub-dimension of the hemodialysis patients participating in the study was compared with age group (p=0.000; χ2=45.80), gender (p=0.023; U=3493.5), educational status (p=0.000; χ2=30.72), and having children (p=0.000; U=947.0); the median score of the "*Physical Role Difficulty*" sub-dimension was compared with educational status (p=0. 000; χ2=24.81); "*Pain*" sub-dimension median score by gender (p=0.017; U=3471.5), educational status (p=0.001; χ2=21.048), residential unit (p=0.000; χ2=16. 27); the median score of the "*General Health*" sub-dimension was determined by age group (p=0.038; χ2=8.43), educational status (p=0.000; χ2=25.55), socio-economic status (p=0. 041; χ2=6.37); the median score of the "*Energy-Vitality*" sub-dimension was significantly higher in age group (p=0.034; χ2=8.656), educational status (p=0.000; χ2=23.60), socio-economic status (p=0. 043; χ2=6.271), residential unit (p=0.026; χ2=7.30); the median score of "*Social Functioning*" sub-dimension was significantly higher than socio-economic status (p=0.002; χ2=12. 42), "*Emotional Role Difficulty*" sub-dimension median score showed statistically significant differences according to age group (p=0.004; χ2=13.50), educational status (p=0.002; χ2=18.53), and "*Mental Health*" sub-dimension median score showed statistically significant differences according to educational status (p=0.005; χ2=16.55) (Table IV).

The comparison of the clinical characteristics of the patients included in the study with the SF-36 Quality of Life Scale subscale median scores is presented in Table 5. The median score of the "Physical Function" sub-dimension of the hemodialysis patients who participated in the study was compared with the status of having a disease other than CRF (p=0.002; U=1247.5), health perception status (p=0.000; χ2=29.80), presence of dialysis-related changes in life (p=0.001; U=1700.5), fluid-salt restriction and diet training status (p=0. 045; U=752.00); the median score of the "Physical Role Difficulty" subscale was determined by having a disease other than CRF (p=0.006; χ2=10.17), health perception status (p=0.001; U=1832.5), presence of changes in family and social life (p=0.028; U=2728.0), presence of hemodialysis patients in the family (p=0. 031; U=2614.5); "Pain" sub-dimension median score was determined by health perception status (p=0.000; χ2=31.65), change in diet-related life (p=0.000; U=1510.0), change in family and social life (p=0.036; U=2697.00), fluid-salt restriction and diet education status (p=0.004; U=604. 0); "General Health" sub-dimension median score was determined by health perception status (p=0.000; χ2=65.26), change in diet-related life (p=0.000; U=1531.5), change in family and social life (p=0.008; U=2500.0), presence of dialysis patients in the family (p=0.040; U=2571.50), fluid-salt restriction and diet education status (p=0.049; U=758. 0); "Energy-Vitality" sub-dimension median score was determined by having a disease other than CRF (p=0.002; U=1245.0), health perception status (p=0.000; χ2=52.73), change in diet-related life (p=0.016; U=1951.5), fluid-salt restriction and diet education status (p=0.001; U=490. 0), the importance of the diet program in his/her life (p=0.011; χ2=13.01), the median score of the "Social Function" sub-dimension perceived health status (p=0.000; χ2=42.56), change in diet-related life (p=0.000; U=1150.5), change in family and social life (p=0.000; U=1783.0), presence of dialysis patients in the family (p=0.007; U=2381. 0), status of receiving fluid-salt restriction and diet education (p=0.067; U=787.051); "Emotional Role Difficulty" subscale median score was determined by health perception status (p=0.000; χ2=23.59), change in diet-related life (p=0.032; U=2182.5), change in family and social life (p=0.002; U=2624.5), presence of dialysis patients in the family (p=0. 031; U=2708.5), fluid-salt restriction and diet education (p=0.001; U=654.5), and the "Mental Health" subscale median score showed statistically significant differences according to health perception status (p=0.000; χ2=58.13) and the importance of the diet program in life (p=0.002; U=540.0) (Table V).

TABLE IV

COMPARISON OF PATIENTS' SOCIO-DEMOGRAPHIC CHARACTERISTICS AND SF-36 QUALITY OF LIFE SCALE SUBSCALE MEDIAN SCORES

		Physical Function		Physical Role Difficulty		Pain		General Health		Energy-Vitality		Social Function		Emotional Role Difficulty		Mental Health	
Characteristics		**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**
Age groups	20-39	75(0-100) [a]	**p=0.000 X²=45.80**	25(0-100)	p=0.089 X²=6.526		p=0.242 X²=4.183	35(10-80) [ab]	**p=0.038 X²=8.43**	45(20-70) [b]	**p=0.034 X²=8.656**	75(25-100)	p=0.073 X²=6.95	66(0-100)[a]	**p=0.004 X²=13.5**	64(28-96)	p=0.216 X²=4.459
	40-59	50(0-95) [a]		100(0-100)		70(20-90)		45(0-75)[a]		50(5-95)[a]		75(0-100)		100(0-100) [ab]		64(20-84)	
	60-79	25(0-100) [b]		100(0-100)		80(20-90)		40(0-75) [ab]		45(10-95) [ab]		62(0-100)		100(0-100) [b]		64(12-96)	
	80-99	5(0-60) [b]		100(0-100)		70(10-90)		20(5-70) [b]		20(5-70) [b]		37(13-100)		100(0-100) [ab]		48(28-84)	
Gender	Female	25(0-100)	**p=0.023 U=3493.5**	100(0-100)	p=0.557 U=4133.5	50(20-90)	**p=0.017 U=3471.5**	35(5-75)	p=0.425 U=4032.5	45(5-95)	p=0.282 U=3930.5	62.50(13-100)	p=0.944 U=4298.5	100(0-100)	p=0.707 U=4221.0	62(28-96)	p=0.939 U=4296.0
	Male	40(0-100)		100(0-100)		70(10-90)		40(0-80)		50(5-95)		62.50(0-100)		100(0-100)		64(12-96)	
Education status	Illiterate	20(0-70)[a]	**p=0.000 X²=30.72**	100(0-100) [a]	**p=0.000 X²=24.813**	75(20-90)	**p=0.001 X²=21.048**	40(5-75) [a]	**p=0.000 X²=25.55**	45(5-70) [a]	**p=0.000 X²=23.6**	62.50(25-100)	p=0.05 X²=12.05	100(0-100)[ab]	**p=0.002 X²=18.53**	60(28-92) [ab]	**p=0.005 X²=16.55**
	Literate	0(0-45)[a]		0(0-100) [b]		50(10-90) [a]		20(10-45) [b]		25(10-60) [a]		50(25-100)		100(0-100)[ab]		48(36-84) [a]	
	Primary School	30(0-100)[ba]		100(0-100) [a]		60(20-90) [a]		45(10-75) [a]		45(5-95) [ab]		68.75(13-100)		100(0-100)[a]		64(28-96)[ab]	
	Middle School	42(0-65)[ac]		50(0-100)[ab]		80(20-90) [ab]		35(0-75) [ab]		40(5-70) [a]		50(0-100)		83(0-100)[ab]		48(12-80)[a]	
	High School	40(0-100)[bc]		50(0-100)[ab]		60(20-90) [a]		52(0-75) [a]		50(5-80) [ab]		62.50(0-100)		100(0-100)[b]		62(20-96)[ab]	
	University	55(0-90) [bc]		100(0-100)[a]		75(20-90)[ab]		37(5-80) [a]		60(20-95) [b]		81(38-100)		100(0-100) [ab]		76(36-88) [b]	
Family type	Extended	25(0-70)	p=0.098 U=1089.0	100(0-100)	p=0.351 U=1262.0	90(60-90) [b]	p=0.46 U=1286.0	35(10-70)	p=0.781 U=1378.0	45(5-70)	p=0.550 U=1310.5	62.50(13-100)	p=0.717 U=1361.0	100(0-100)	p=0.939 U=1424.5	60(28-92)	p=0.733 U=1364.5
	Nuclear	30(0-100)		100(0-100)		70(20-90)		40(0-80)		45(5-95)		62.50(0-100)		100(0-100)		64(12-96)	
Socio-Economic Status	Income less	25(0-100)	p=0.229 X²=2.952	50(0-100)	p=0.177 X²=3.461	60(20-90)	p=0.05 X²=5.948	35(0-75) [a]	**p=0.041 X²=6.37**	37.50(5-75) [a]	**p=0.043 X²=6.271**	50(0-100)	**p=0.002 X²=12.42**	100(0-100)	p=0.092 X²=4.766	54(12-92)	p=0.183 X²=3.394
	Income equal expense	35(0-100)		100(0-100)		80(10-90)		40(5-80) [b]		50(5-95) [b]		75(13-100)		100(0-100)		64(28-96)	
	Income higher	25(0-75)		100(0-100)		70(20-90)		40(10-75) [ab]		45(15-95) [ab]		62.50(25-100)		100(0-100)		64(28-88)	
Has children	Yes	30(0-100)	**p=0.000 U=947.0**	100(0-100)	p=0.064 U=1479.0	70(10-90)	p=0.856 U=1832.0	35(5-80)	p=0.630 U=1758.5	45(5-95)	p=0.781 U=1807.5	62.50(13-100)	p=0.717 U=1361.0	100(0-100)	p=0.061 U=1536.5	60(12-92)	p=0.707 U=1784.0
	No	60(0-100)		25(0-100)		70(30-90)		45(0-80)		50(5-95)		62.50(0-100)		100(0-100)		64(32-96)	
Residence	Province	40(0-100)	p=0.208 X²=3.141	100(0-100)	p=0.444 X²=1.62	80(20-90)[a]	**p=0.000 X²=16.27**	35(0-75)	p=0.05 X²=8.50	50(5-95) [a]	**p=0.026 X²=7.30**	62.50(0-100)	p=0.760 U=1802.0	100(0-100)	p=0.080 X²=5.040	64(20-96)	p=0.087 X²=4.881
	District	25(0-100)		100(0-100)		60(20-90)[b]		25(10-65)		40(5-75) [b]		75(13-100)		100(0-100)		56(12-96)	
	Town	30(0-95)		50(0-100)		60(10-80)[b]		35(5-80)		45(20-80) [ab]		62.50(13-100)		100(33-100)		64(36-92)	

		Physical Function		Physical Role Difficulty		Pain		General Health		Energy-Vitality		Social Function		Emotional Role Difficulty		Mental Health	
Characteristics		**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**	**Med (Min-Max)**	**p**
Diseases other than chronic renal failure	Yes	30(0-100)	**p=0.002 U=1247.5**	100(0-100)	p=0.534 U=1875.0	70(20-90)	p=0.192 U=1695.0	40(0-75)	p=0.116 U=1620.5	45(5-95)	**p=0.002 U=1245.0**	62.50(0-100)	p=0.053 U=1536.0	100(0-100)	p=0.904 U=1990.0	60(12-96)	p=0.083 U=1579.5
	No	55(0-95)		75(0-100)		80(10-90)		55(5-80)		60(5-95)		75(13-100)		100(0-100)		68(36-96)	
Health awareness status	Good	45(0-100) [a]	**p=0.000 X^2=29.80**	100(0-100)	**p=0.006 X^2=10.17**	80(20-90)[a]	**p=0.000 X^2=31.65**	55(10-80)[a]	**p=0.000 X^2=65.26**	14(7-23) [a]	**p=0.000 X^2=52.73**	75(13-100)[a]	**p=0.000 X^2=42.56**	100(0-100)[a]	**p=0.000 X^2=23.59**	70(36-96) [a]	**p=0.000 X^2=58.13**
	Average	27(0-85) [b]		100(0-100)		70(10-90)[b]		35(10-75)[b]		12(6-19) [b]		56(25-100) [b]		100(0-100) [a]		58(28-92) [b]	
	Bad	0(0-90) [c]		12(0-100)		40(20-70)[c]		15(0-35) [c]		7(5-15) [c]		37(0-75) [c]		0(0-100)[b]		36(12-60) [c]	
Dialysis-related change status	Yes	25(0-100)	**p=0.001 U=1700.5**	100(0-100)	**p=0.001 U=1832.5**	60(10-90)	**p=0.000 U=1510.0**	35(10-75)	**p=0.000 U=1531.5**	45(5-95)	**p=0.016 U=1951.5**	50(0-100)	**p=0.000 U=1150.5**	100(0-100)	**p=0.032 U=2182.5**	60(12-96)	p=0.148 U=2228.0
	No	45(5-90)		100(0-100)		90(20-90)		60(20-80)		50(25-85)		100(25-100)		100(0-100)		64(36-96)	
Change in family and social life	Yes	30(0-100)	p=0.398 U=3085.0	100(0-100)	**p=0.028 U=2728.0**	70(10-90)	**p=0.036 U=2697.00**	35(10-75)	**p=0.008 U=2500.0**	45(5-95)	p=0.126 U=2863.50	50(0-100)	**p=0.000 U=1783.0**	100(0-100)	**p=0.002 U=2624.5**	60(12-96)	p=0.187 U=2931.0
	No	35(0-100)		100(0-100)		80(20-90)		55(10-80)		50(15-95)		100(25-100)		100(0-100)		64(36-96)	
Has dialysis patient in the family	Yes	40(0-100)	p=0.403 U=2957.0	100(0-100)	**p=0.031 U=2614.5**	80(10-90)	p=0.419 U=2971.0	42.50(10-75)	**p=0.040 U=2571.50**	47(15-95)	p=0.948 U=3195.50	75(13-100)	**p=0.007 U=2381.0**	100(0-100)	**p=0.031 U=2708.5**	60(36-96)	p=0.325 U=2909.0
	No	30(0-100)		100(0-100)		70(20-90)		35(0-80)		45(5-95)		62(0-100)		100(0-100)		64(12-96)	
Fluid-salt restriction and diet training	Yes	30(0-100)	**p=0.045 U=752.0**	100(0-100)	p=0.072 U=827.0	70(10-90)	**p=0.004 U=604.0**	40(0-80)	**p=0.049 U=758.0**	50(5-95)	**p=0.001 U=490.0**	62(0-100)	**p=0.067 U=787.5**	100(0-100)	**p=0.001 U=654.5**	64(12-96)	p=0.176 X^2=6.33
	No	0(0-100)		100(0-100)		40(20-90)		25(5-75)		20(5-60)		50(25-100)		0(0-100)		40(28-72)	
Importance of diet program in life	Very important	37(0-100)	p=0.05 X^2=10.95	100(0-100)	p=0.475 X^2=3.52	70(20-90)	p=0.716 X^2=2.10	40(0-80)	p=0.05 X^2=12.14	45(5-95)[ab]	**p=0.011 X^2=13.01**	62(0-100)	p=0.183 X^2=6.22	100(0-100)	p=0.493 X^2=3.40	60(20-96)	**p=0.002 U=540.0**
	Important	30(0-100)		100(0-100)		70(10-90)		40(0-75)		50(5-75) [ab]		62(0-100)		100(0-100)		64(12-96)	
	Partially important	15(0-40)		87(0-100)		55(30-90)		35(5-75)		40(5-55)[a]		50(25-100)		100(0-100)		60(32-80)	
	Somewhat important	70(0-70)		-		65(40-90)		57(55-65)		55(40-60) [ab]		81(25-100)		-		64(60-68)	
	Not important	47(40-55)		50(0-100)		80(70-90)		-		85(75-95) [b]		-		50(0-100)		84(80-88)	

TABLE V

COMPARISON OF PATIENTS' CLINICAL CHARACTERISTICS AND SF-36 QUALITY OF LIFE SCALE SUBSCALE MEDIAN SCORES

The findings regarding the median scores of the Dialysis Diet and Fluid Restriction Non-adherence Questionnaire (DDFQ) of hemodialysis patients are presented in Table VI. It was determined that the item score of Frequency of Non-adherence with Diet in the "*Diet*" subscale of the DFRS in hemodialysis patients was 2 (0-14) and the item score of Degree of Nonadherence with Diet was 1 (0-4) at a mild level; the item score of Frequency of Non-adherence with Fluid Restriction in the "Fluid Restriction" subscale of the DDFQ in hemodialysis patients was 2 (0-14) and the item score of Degree of Nonadherence with Fluid Restriction was 1 (0-4) at a mild level (Table VI).

TABLE VI
DIALYSIS DIET AND FLUID RESTRICTION NON-ADHERENCE QUESTIONNAIRE (DDFQ) SCORES OF PATIENTS

Dimensions of the Scale	**Median (Min-Max.)**
Diet	
Frequency of Dietary Non-adherence (FDNA)	2(0-14)
Degree of Dietary Non-adherence (DDNA)	1(0-4)
Frequency of Fluid Non-adherence (FFNA)	2(0-14)
Degree of Fluid Non-adherence (DFNA)	1(0-4)

The results regarding the relationship between Dialysis Diet and Fluid Restriction Non-adherence Questionnaire (DDFQ) scores and SF-36 Quality of Life Scale subscale scores of hemodialysis patients are presented in Table VII.

TABLE VII
THE RELATIONSHIP BETWEEN DIALYSIS DIET AND FLUID RESTRICTION NON-ADHERENCE QUESTIONNAIRE (DDFQ) SCORES AND SF-36 QUALITY OF LIFE SCALE SUBSCALE SCORES

		SF-36 Quality of Life Scale							
DDFQ		Physical Function	Physical Role Difficulty	Pain	General Health	Energy-Vitality	Social Function	Emotional Role Difficulty	Mental Health
FDNA	r	0.123	0.050	-0.132	-0.053	-0.165*	-0.014	-0.014	-0.209**
	p	0.093	0.502	0.072	0.469	0.024	0.850	0.850	0.004
DDNA	r	0.093	0.035	-0.178*	0.048	-0.132	-0.074	-0.017	-0.164*
	p	0.207	0.634	0.015	0.512	0.073	0.318	0.819	0.025
FFNA	r	-0.265**	0.011	-0.272**	-0.194**	-0.283**	-0.236**	-0.039	-0.241**
	p	0.000	0.877	0.000	0.008	0.000	0.001	0.596	0.001
DFNA	r	-0.266**	-0.015	-0.280**	-0.217**	-0.287**	-0.258**	-0.073	-0.260**
	p	0.000	0.835	0.000	0.003	0.000	0.000	0.320	0.000

It was determined that there was a low and negative statistically significant relationship between the Frequency of Dietary Non-adherence (FDNA) subscale of the FDNA and the Energy-Vitality subscale score of the SF-36 Quality of Life Scale (r=-0.165; p= 0.024), and as the FDNA subscale score increased, the Energy-Vitality subscale score decreased. It was found that there was a low and negative statistically significant relationship between the FDNA subscale of the DDFQ and the Mental Health subscale of the SF-36 Quality of Life Scale (r=-0.209; p= 0.004), and as the FDNA subscale score increased, the Mental Health subscale score decreased (Table VII).

Results showed that there was a low and negative statistically significant relationship between the Degree of Dietary Non-adherence (DDNA) subscale of the DFRS and the Pain subscale score of the SF-36 Quality of Life Scale (r=-0.178; p=0.015), and as the DDN subscale score increased, the Pain subscale score decreased. It was observed that there was a low and negative statistically significant correlation (r=-0.164; p=0.025) between the FDNA sub-dimension of the DDFQ and the Mental Health sub-dimension score of the SF-36 Quality of Life Scale, and the DDNA sub-dimension score increased, the Mental Health sub-dimension score decreased (Table VII).

It was determined that there was a low and negative statistically significant relationship between the Frequency of Non-adherence with Fluid Restriction (FFNA) subscale of the DDFQ and the Physical Function subscale score of the SF-36 Quality of Life Scale (r=-0.265; p=0.000), and the Physical Function subscale score decreased as the FFNA subscale score increased. There was a low and negative statistically significant correlation between the FFNA sub-dimension of the DDFQ and the Pain sub-dimension score of the SF-36 Quality of Life Scale (r=-0.272; p=0.000), and as the FFNA sub-dimension score increased, the Pain sub-dimension score decreased. It can be seen that there was a low and negative statistically significant relationship between the FFNA sub-dimension of the DFRS and the General Health sub-dimension score of the SF-36 Quality of Life Scale (r=-0.194; 0.008), and as the FFNA sub-dimension score increased, the General Health Perception sub-dimension score decreased. Results showed that there was a low and negative statistically significant relationship between the FFNA sub-dimension of the DDFQ and the Energy-Vitality sub-dimension score of the SF-36 Quality of Life Scale (r=-0.283; p=0.000), and as the FNF sub-dimension score increased, the Energy-Vitality sub-dimension score decreased. It was determined that there was a low and negative statistically significant relationship between the FFNA sub-dimension of the DDFQ and the Social Function sub-dimension score of the SF-36 Quality of Life Scale (r=-0.236, p=0.001) and as the FFNA sub-dimension score increased, the Social Function sub-dimension score decreased. It was found that there was a low and negative statistically significant relationship between the FFNA sub-dimension of the DDFQ and the Mental Health sub-dimension score of the SF-36 Quality of Life Scale (r=-0.241, p=0.001), and as the FFNA sub-dimension score increased, the Mental Health sub-dimension score decreased (Table VII).

It was found that there was a low and negative statistically significant relationship between the Degree of Non-adherence with Fluid Restriction (DFNA) sub-dimension of the DDFQ and the Physical Function sub-dimension score of the SF-36 Quality of Life Scale (r=-0.266, p=0.000), and as the DDFQ sub-dimension score increased, the Physical Function sub-dimension score decreased. Results showed that there was a low and negatively statistically significant relationship between the Degree of Non-adherence with Fluid Restriction (DFNA) sub-dimension of the DDFQ and the Pain sub-dimension score of the SF-36 Quality of Life Scale, and as the DFNA sub-dimension score increased, the Pain sub-dimension score decreased (Table VII).

It was observed that there was a low and negative statistically significant relationship between the Degree of Non-adherence with Fluid Restriction (DUD) sub-dimension of the DDFQ and the General Health sub-dimension score of the SF-36 Quality of Life Scale (r=-0.217; p=0.003), and as the DDN sub-dimension score increased, the General Health sub-dimension score decreased. There was a low and negative statistically significant correlation between the DFNA sub-dimension of the DDFQ and the Energy-Vitality sub-dimension score of the SF-36 Quality of Life Scale (r=-0.258; p=0.000), and as the DFNA sub-dimension score increased, the Energy-Vitality sub-dimension score decreased. There was a low and negative statistically significant correlation between the DFNA sub-dimension of the DDFQ and the Social Function sub-dimension score of the SF-36 Quality of Life Scale (r=-0.258; p=0.000), and as the DFNA sub-dimension score increased, the Social Function sub-dimension score decreased. It was determined that there was a low and negative statistically significant relationship between the DFNA sub-dimension of the DDFQ and the Mental Health sub-dimension score of the

SF-36 Quality of Life Scale (r=-0.260; p=0.000), and as the DFNA sub-dimension score increased, the Mental Health sub-dimension score decreased (Table VII).

When the research findings were evaluated, no statistically significant relationship was found between all sub-dimension scores of the Dialysis Diet and Fluid Restriction Non-adherence Scale (DDFQ) and the Physical Role Difficulty and Emotional Role Difficulty sub-dimension scores of the SF-36 Quality of Life Scale (p>0.05) (Table VII).

4. Discussion

When the SF-36 Quality of Life Scale sub-dimension median scores of hemodialysis patients were evaluated; the highest score of 95 (0-100) points was in the Physical Role Difficulty sub-dimension, while the lowest median score with 30 (0-100) points was in the Physical Function sub-dimension. When all scale sub-dimension medians are considered, it is seen that the quality of life of the patients is at a partially good level. While the study findings are similar to the findings of Kurbun [25] on the quality of life and self-care power of hemodialysis patients, they differ from the findings of Hiramitsu et al. [11] with a higher mean score. Quality of life in hemodialysis patients was found to be lower than in individuals in the general population and those with chronic diseases [26-28].

When the sociodemographic characteristics of hemodialysis patients and SF-36 Quality of Life sub-dimension median scores were compared, it was determined that sociodemographic characteristics of hemodialysis patients such as being in the young age group, having a high level of education, having a high level of income and living in the city center showed a positive difference in many sub-dimensions of quality of life. While the findings are in parallel with the study of Kaya [29], in which the quality of life and educational needs of H-hemodialysis patients were examined, they differ from the finding that socio-demographic variables in the study of Akyol [28] did not provide sufficient information to explain the quality of life.

When the clinical characteristics of hemodialysis patients and SF-36 Quality of Life sub-dimension median scores were compared, it was observed that clinical characteristics such as perceiving their health as good, having no change in their life, family and social life due to dialysis, experiencing the process before due to the presence of another dialysis patient in the family, receiving training on fluid-salt restriction and nutrition level provided a positive difference in all sub-dimensions of quality of life. In parallel with the findings of the study, Akyol [28] reported that mental-cognitive health, good health perception, the presence of social support, and health education positively affected the quality of life of hemodialysis patients.

Compliance with treatment, dialysis sessions, and dietary restrictions is very important to the success of treatment in hemodialysis patients. However, when the literature is examined, non-compliance with diet and fluid restriction is common in hemodialysis patients. The reasons for this non-adherence can be listed as boredom due to the long treatment process, lack of social support, lack of information, and economic difficulties [30]. Therefore, it is important to evaluate patients and ensure their compliance with diet and fluid restriction, to prevent complications, ensure patient safety, and improve their quality of life [31]. In the Dialysis Diet and Fluid Restriction Non-adherence Questionnaire of the patients in this study, it was determined that the median score of the frequency of dietary Non-adherence was 2(0-14), the median score of the degree of dietary non-adherence was 1(0-4), the median score of fluid restriction non-adherence was 2(0-14) and the median score of the degree of fluid restriction non-adherence was 1(0-4). While the scores related to dietary and fluid restriction nonadherence were similar to the findings of the studies in the literature [17,20,32], it was observed that diet-fluid restriction non-adherence was more severe in Acar's [33] study. It was thought that the mild severity of diet and fluid non-adherence in hemodialysis patients participating in the study might be because the majority of them received education on fluid, salt restriction, and diet, had high individual control of the disease, and had family support.

When the relationship between the Dialysis Dietary and Fluid Restriction Non-adherence Questionnaire and SF-36 Quality of Life scores of hemodialysis patients was examined, it was determined that there was a negative low-grade relationship between them; as all subscale scores of dietary and fluid restriction non-adherence increased, patients' quality of life decreased in the energy and mental health subscale. In addition, as the frequency and severity of fluid restriction non-adherence increased, quality of life decreased in almost all subscales. When all sub-dimensions of the Dietary and Fluid Restriction Non-adherence Questionnaire were considered, it was determined that the fluid restriction non-adherence and severity sub-dimension negatively affected the quality of life more than the frequency and severity of dietary restriction non-adherence. Non-compliance with diet-fluid restriction is one of the most important problems in hemodialysis patients. Excessive weight gain (fluid intake) between two dialysis leads to problems such as shortness of breath, muscle cramps, anxiety, pulmonary edema, and hypertension. Patients' compliance with hemodialysis treatment is closely related to the effective management of hemodialysis treatment. Compliance with treatment is a condition that can change over time [34-37].

5. Conclusion

The nursing care goals of the patient with CRF are to evaluate the patient's compliance with the treatment regimen and the level of knowledge, to ensure the patient's participation in planning the patient's care and deciding on the treatment model, to evaluate the patient's effective coping methods, and to enable the patient to maintain daily living activities within their physical limitations.

In this study, it was determined that educational status, socio-economic status, perception of good health, dialysis-related social and family life changes, and diet-liquid restriction incompatibility affected the quality of life of hemodialysis patients. It is recommended that continuous education programs should be organized for hemodialysis patients, and teams consisting of nurses, physicians, nutritionists, social counselors, and psychologists should be formed to monitor the patient at the center and home during the disease process to achieve the goal in education and to improve quality of life.

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