Cukurova Medical Journal
ÇUKUROVA ÜNİVERSİTESİ TIP FAKÜLTESİ

Cukurova Med J 2020;45(1):79-88
DOI: 10.17826/cumj.628274

ARAŞTIRMA / RESEARCH

Quality of life and associated factors in hemodialysis and peritoneal dialysis patients

Hemodiyaliz ve periton diyalizi hastalarında yaşam kalitesi ve ilişkili olduğu faktörler

İpek Türk[1], Kenan Ateş[2], Zeynep Bıyıklı[3]

[1]Ankara University School of Medicine, Department of Internal Medicine, [2]Deparment of Nephrology, Ankara, Turkey.
[3]Ankara University, Cebeci Medical Faculty, Department of Biostatistics, Ankara, Turkey

Cukurova Medical Journal 2020;45(1):79-88

Abstract

Purpose: This study aimed to examine the quality of life (QOL) in hemodialysis (HD) and peritoneal dialysis (PD) patients. Additionally, associations between QOL and clinical and demographic factors were investigated.
Materials and Methods: Patients under dialysis treatment were included in this cross-sectional study. Demographic data, disease history, and laboratory data were collected. Charlson comorbidity index (CCl) was used to score the level of comorbidity. Health-related quality of life (HRQOL) was measured by Kidney Disease Quality of Life Short Form Version 1.3 (KDQOL-SF 1.3).
Results: One hundred and five patients, 60 of whom were under HD, and 45 were under PD (45.7% were females; mean age 54.63±13.86 years) were enrolled in the study. PD patients had better scores in five domains of the KDQOL-SF 1.3 questionnaire (emotional role, work status, cognitive function, dialysis staff encouragement, patient satisfaction). Older age, female sex, lower education level, high comorbidity score and, hospitalization in the last 12 months were found to be related to low QOL. We detected positive correlations between serum hemoglobin levels, albumin, and some subgroups of KDQOL-SF 1.3 scale; whereas negative correlations were detected between serum ferritin levels and some of the KDQOL-SF 1.3 items.
Conclusion: According to our study, HRQOL was better in PD patients compared to HD in specific domains of the KDQOL-SF 1.3. Age, gender, education level, hemoglobin level, albumin, and ferritin were associated with HRQOL.
Keywords:. Periton dialysis, hemodialysis, health-related quality of life

Öz

Amaç: Bu çalışmanın amacı hemodiyaliz (HD) ve periton diyalizi (PD) hastalarında yaşam kalitesini incelemektir. Ayrıca, yaşam kalitesi ile klinik ve demografik faktörler arasındaki ilişkiler incelenmiştir.
Gereç ve Yöntem: Diyaliz tedavisi alan hastalar bu kesitsel çalışmaya dahil edildi. Demografik veriler, hastalık öyküsü, laboratuvar verileri toplandı. Komorbidite seviyesini puanlamak için Charlson komorbidite indeksi (CCl) kullanıldı. Sağlıkla ilişkili yaşam kalitesi (SYK), Böbrek Hastalığı İlişkili Yaşam Kalitesi Kısa Form Versiyon 1.3 (KDQOL-SF 1.3) ile ölçülmüştür.
Bulgular: Çalışmaya 60'ı HD, 45'i PD tedavisi altında (% 45.7'si kadın; ort. yaş 54.63 ± 13.86) toplam 105 hasta alındı. PD hastaları beş alanda KDQOL-SF 1.3 alt ölçek puanları (duygusal rol, iş durumu, bilişsel işlev, diyaliz personelinin teşviki, hasta memnuniyeti) HD hastalarına göre daha yüksek puanlara sahipti. İleri yaş, kadın cinsiyet, düşük eğitim düzeyi, yüksek komorbidite skoru ve son 12 aydaki hastanede yatış sürelerinin yaşam kalitesi ile ilişkili olduğu bulundu. Bazı KDQOL-SF 1.3 alt ölçekleri ile hemoglobin, albümin arasında pozitif; ferritin düzeyleri arasında negatif korelasyonlar olduğu tespit edildi.
Sonuç: Çalışmamıza göre, SYK, PD hastalarında HD hastalarına göre, KDQOL-SF 1.3'ün spesifik alanlarında daha iyiydi. Yaş, cinsiyet, eğitim düzeyi, hemoglobin, albümin ve ferritin düzeyleri SYK ile ilişkiliydi.

Anahtar kelimeler: Periton diyalizi, hemodiyaliz, sağlıkla ilişkili yaşam kalitesi

Yazışma Adresi/Address for Correspondence: Dr. İpek Türk, Ankara University School of Medicine, Department of Internal Medicine, Ankara, Turkey. E-mail address: sanlisoyturk@yahoo.com
Geliş tarihi/Received: 02.10.2019 Kabul tarihi/Accepted: 02.02.2020 Published online: 02.03.3030

INTRODUCTION

There is a highly close relationship between health-related quality of life (HRQOL) and treatment outcome, mortality in patients with end-stage renal disease (ESRD)[1]. ESRD negatively impacts the quality of life (QOL) of patients by acting negatively on their physical, functional, social, financial, and psychological status[2,3]. It has been observed that several factors influence the QOL of patients under dialysis. Laboratory parameters (hemoglobin concentration, albumin level), psychological factors (depression and anxiety), socioeconomic and demographic factors (age, gender, level of education, marital status) and clinical features (the duration of the dialysis time, the number of comorbidities) are the factors that are associated with QOL[4,5]. Clearly et al. reported that patients on hemodialysis had a worse quality of life than the general population[6].

Hemodialysis (HD) and peritoneal dialysis (PD) are the two common forms of dialysis therapy for ESRD. The results of the data regarding the effect of dialysis type on the quality of life are contradictory. Thus, it is required to focus on treatment methods, which will improve the patient's quality of life. The 36-item Short Form Health Survey (SF-36) was used in most of the studies investigating the QOL of dialysis patients[7,8]. For example, Alvares et al. evaluated the QOL of patients undergoing hemodialysis, peritoneal dialysis, and patients who had renal transplantation by using SF-36[8]. Assessment of the factors that contribute to HRQOL as measured by SF-36 questionnaire is limited[9]. KDQOL- SF (Kidney Disease Quality of Life Short Form) questionnaire, is a multidimensional and validated instrument especially designed for dialysis patients and has both generic (SF-36) and disease-specific questions.[10] Additionally, previous studies used the KDQOL-SF 1.3 questionnaire, examined the relationship between QOL and specific parameters. Okpechi et al. evaluated the QOL of 56 patients on hemodialysis and 26 on peritoneal dialysis by using KDQOL-SF 1.3. They found associations between the use of the erythropoiesis-stimulating agents (ESA), serum ferritin, and level of hemoglobin concentration and QOL[11]. More attention should be paid on the predictors of QOL in dialysis patients in order to improve HRQOL in clinical practice.

This study aimed to examine the quality of life in HD and PD patients by KDQOL-SF 1.3 questionnaire. Additionally, associations between QOL and extensive clinical, laboratory, and demographic factors were investigated.

MATERIALS AND METHODS

Study design and subjects

Patients with ESRD on dialysis treatment at Ankara University Nephrology Department from June 2013-December 2013 were included in this cross-sectional study. The inclusion criteria were as follows: age ≥18 years, undergoing continuous hemodialysis or peritoneal dialysis treatment for 12 months due to ESRD. The exclusion criteria were as follows; age <18 years, patients with cognitive impairment, neurological deficit or psychiatric disorders, patients with dialysis duration less than 12 months, patients who discontinued dialysis treatment for more than two weeks, patients who hospitalized for more than one month in the last three months.

The study was conducted under the original Declaration of Helsinki and its later amendments or comparable ethical standards and was approved by the local ethics committee of the Ankara University, Faculty of Medicine, (Reference number: 10-405-13, date: 24.06.2013). Informed consent was received from all the patients.

Demographic and clinical data were extracted from the hospital database. The information included the followings: demographic data (age, gender, marital status, education level, occupational status), disease history [duration of dialysis (the time between the onset of the dialysis and the study visit), creatinine clearance, primary cause of renal disease (the disease that caused kidney failure), history of hospitalization in hospital or intensive care unit in the last year, if present causes of hospitalizations, duration of hospitalizations (total number of days that the patient stayed at hospital), hospitalization number (how many times that the patient was hospitalized)], use of ESA treatment, laboratory data (hemoglobin, albumin, parathormone, phosphorus, C-reactive protein, ferritin), Kt/V (where K is the dialyzer urea clearance, t the dialysis session time and V the volume of urea distribution in the body) for dialysis adequacy. The average of laboratory data in the last year was calculated and recorded. Patients were accepted to have inadequate dialysis quality when Kt/V < 1.2 g/kg/day for HD patients and <1.7 g/kg/day for PD patients as recommended by National Kidney Foundation Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines[12].

Measures

Charlson comorbidity index (CCI)

Charlson comorbidity index was used to score the level of comorbidity. The CCI is calculated by summing the weights for each condition[13]. An extra one point was added for each decade of age above 50 years to the orginal score in the age-adjusted CCI[14]. The patients were grouped as moderate (CCl score ≤ 5), high (CCl score 6-7), and very high (CCl score ≥8) according to their CCl scores.

Kidney Disease Quality of Life Short Form Version 1.3 (KDQOL-SF 1.3):

KDQOL-SF 1.3, a self-report measure developed for individuals who have kidney disease and are on dialysis was used to assess HRQOL[15]. Questionnaires were filled out by the patients under the supervision of the investigator. The questionnaire consists of a generic core (SF 36) and a disease-specific core. SF-36 consists of 36 questions measuring eight scales (physical functioning, physical role, pain, general health, emotional well-being, emotional role, social functioning, and energy/fatigue). The kidney disease-specific part consists of symptom/ problem list, effects of kidney disease, the burden of kidney disease, work status, cognitive function, quality of social interaction, sexual function, sleep, social support, dialysis staff encouragement and patient satisfaction. Overall health rating item was asked separately. All scale scores range between 0 and 100, where higher scores indicate a better quality of life. Yıldırım et al. conducted the validity and reliability of the Turkish language version of KDQOL-SF 1.3 questionnaire[16]. Cronbach's alpha coefficient of the Turkish KDQOL-SF questionnaire was 0.84 to 0.9[16].

Statistical analysis

All analyses were performed using the IBM SPSS Statistics Version 15.0 statistical software package. Categorical variables were expressed as numbers and percentages, whereas continuous variables were summarized as mean and standard deviation and as median and minimum-maximum where appropriate. For the comparison between two groups, the Student's t-test was used for normally distributed variables, and the Mann-Whitney U test was used for the abnormally distributed variables. For the comparison of more than two groups, one-way analysis of variance (ANOVA) or the Kruskal-Wallis test was used depending on whether the statistical statistical hypotheses were fulfilled or not. The Chi-square test or Fisher exact test was used to compare the categorical variables between the groups. Pearson test was used for normally distributed continuous variables, and the Spearman correlation test was used for the abnormally distributed continuous variables. The statistical level of significance for all tests was considered as 0.05. The data were evaluated in IBM SPSS Statistics 15.0 (IBM Corp. Armong, New York, AB) program.

RESULTS

One hundred and twenty-two patients were examined for eligibility for the study. Seventeen of the patients were excluded due to the following reasons; three of the patients had psychiatric disorders, six of the patients refused to participate, seven of the patients had a dialysis duration of fewer than 12 months, and one of the patients was hospitalized for more than one month in the last three months. One hundred and five patients, 60 of whom were under HD and 45 under PD were enrolled in the study. 45.7% of the patients were female, and the mean age was 54.63±13.86 years. Both HD and PD patients had similar sociodemographic characteristics (gender, age, marital status, and education level). The socio-demographic, clinical, and laboratory data of HD and PD patients are summarized in Table 1.

The most common causes of renal disease were diabetes mellitus (28.3% of HD and 11.1% of PD patients) and hypertension (18.3% of HD and 37.8% of PD patients). HD patients had higher CCl scores compared to PD patients (p=0.018). While 25% of HD patients were in high and 11.7% of HD patients were in very high comorbidity groups, only 11.1% of PD patients were in the high comorbidity group.

PD patients had better scores in five domains of the KDQOL-SF 1.3 questionnaire (Emotional role, work status, cognitive function, dialysis staff encouragement, patient satisfaction). After adjustment for age, gender and comorbidity score, PD patients had statistically significant higher scores in domains of cognitive function, dialysis staff encouragement, and patient satisfaction. Comparison of SF-36 scores and the ESRD-targeted areas between HD and PD patients are summarized in Table 2 and 3.

Table 1. The socio-demographic, clinical and laboratory data of HD and PD patients

	HD patients	PD patients	P value
Sex, male/female	35/25	22/23	0.099
Age (years), mean±SD	56.6±14.1	51.98±13.2	0.059
Marital status, n (%)			
Married	45(75)	36(80)	0.157
Single	15(25)	9(20)	
Education level, n (%)			
Illiterate	2(3.3)	0(0)	
Literate	1(1.7)	2(4.4)	0.057
Primary School	17(28.3)	17(37.8)	
Secondary School	6(10)	2(4.4)	
High School	18(30)	9(20)	
University	16(26.7)	15(33.3)	
Duration of dialysis, (months) median (min-max)	40 (12-246)	40 (12-146)	0.944
Primer renal disease, n (%)			
Diabetes	17(28.3)	5(11.1)	
Hypertension	11(18.3)	17(37.8)	
Chronic pyelonephritis	7(11.7)	3(6.7)	
Glomerulonephritis	2(3.3)	6(13.3)	0.035
Amyloidosis	4(6.7)	2(4.4)	
Polycystic kidney disease	3(5)	1(2.2)	
Others/Unknown	16(26.7)	11(24.4)	
CCl, mean±SD	4.8±2.1	3.8±1.3	0.018
Comorbidity group, n (%)			
Middle	38(63.3)	40(88.9)	
High	15(25)	5(11.1)	0.006
Very high	7(11.7)	0(0)	
Hospitalization number, mean±SD	1.9±1.2	1.7±0.9	0.969
Duration of hospitalizations, (day) mean±SD	24.7±37.2	20.1±13.0	0.938
ESA use, n (%)	31(51.7)	20(44.4)	0.12
Hemoglobin (gr/dl), mean±SD	11.09±1.45	11.77±1.85	0.06
Albumin (gr/dl), mean±SD	4.11±0.36	3.82±0.37	<0.001
Phosphorus (mg/dl), mean±SD	5.29±1.46	4.85±1.05	0.077
Parathormone (pg/ml), median (min-max)	423.5 (25.4-2497.4)	326 (25-2020)	0.365
CRP (mg/l), median (min-max)	9.1 (0.79-94.9)	8.94 (0.6-99.5)	0.545
Ferritin, median (min-max)	545(5-1246)	200 (8-745)	<0.001
Patients with inadequate dialysis n (%)	4(6.6)	13(28.8)	0.006

HD: Hemodialysis, PD: peritoneal dialysis, CCl: Charlson comorbidity index, ESA: Erythropoietin stimulating agent, CRP: C-reactive protein

Table 2. Comparison of SF-36 scores between HD and PD patients

SF-36 variable	All patients	HD patients	PD patients	P value
Physical functioning, median (min-max)	90 (0-100)	90 (5-100)	80 (0-100)	0.622
Physical role, median (min-max)	75 (0-100)	75 (0-100)	100 (0-100)	0.058
Pain, median (min-max)	90 (0-100)	90 (0-100)	80 (0-100)	0.666
General health, mean±SD	39.8±18.4	37.1±17.4	43.4±19.2	0.147
Emotional well-being, mean±SD	60.5±18.1	58.8±18.1	62.8±18.1	0.244
Emotional role, mean±SD	75.6±35.6	67.9±36.3	85.9±32.2	<0.001
Social functioning median (min-max)	100 (0-100)	100 (0-100)	87.5 (12.5-100)	0.141
Energy/fatigue, mean±SD	48.2±22.9	44.9±23.8	52.7±21.3	0.134
Overall health rating, mean±SD	60.4±21.92	58.5±20.23	62.9±23.9	0.259

HD: Hemodialysis, PD: peritoneal dialysis, SF-36: The Short Form 36.

Table 3. Comparison of KDQOL-SF 1.3 scores of the ESRD-targeted areas between HD and PD patients.

	All patients	HD patients	PD patients	P value
Symptoms/problems	81.2±13.6	81.3±15.3	81.1±11.1	0.454
Effects of kidney disease, median (min-max)	84.4(53.1-90)	84.4 (53.1-90)	84.3 (53.1-100)	0.699
Burden of kidney disease, mean±SD	43.4±26.3	38.8±25.6	49.4±26.3	0.052
Work status, mean±SD	47.6±34.2	41.7±34.6	55.6±32.4	0.038
Cognitive function, mean±SD	72.2±18.3	68±16.4	77.8±19.4	0.011
Quality of social interaction, median (min-max)	80 (33-100)	80 (40-100)	87 (33-100)	0.128
Sexual function, mean±SD	97.5±7.4	95.8±9.6	100±0	0.442
Sleep, mean±SD	66.3±22.7	67.6±23.2	64.6±22.2	0.434
Social support, median (min-max)	100 (0-100)	100 (0-100)	92.5 (16.6-100)	0.556
Dialysis staff encouragement, mean±SD	87.1±16.9	78.8±17.4	98.2±7.2	<0.001
Patient satisfaction, mean±SD	79.0±22.4	63.8±17.8	99.3±4.9	<0.001

HD: Hemodialysis, PD: peritoneal dialysis

Male patients had higher scores in three domains of the KDQOL-SF 1.3 questionnaire (Table 4). There were statistically significant negative correlations between the age and the domains of work status, sexual function, physical functioning, physical role and general health status (Table 5 and 6). No significant relationship was observed between marital status and KDQOL-SF 1.3 scores.

Table 4. Associations between sex and KDQOL-SF 1.3 scores

	Male	Female	P value
Symptoms/problems, mean±SD	83.9±12	78.1±14.7	0.039
Work status, mean±SD	55.3±36.2	38.5±29.6	0.014
Physical functioning, median (min-max)	95 (5-100)	80 (0-100)	0.046

Statistically significant positive correlations were found between education level and physical functioning, general health, emotional well-being energy, symptoms and work status domains (Table 5 and 6). A statistically significant negative correlation was found between the duration of dialysis and physical role domain (r=-0.195, p=0.046). Statistically significant negative correlations were found between CCl scores and physical functioning, physical role, pain, general health, emotional well-being, energy, overall health rating, the burden of kidney disease, work status, quality of social interaction, and sleep domains. Significant negative correlations were observed between hospitalization number, duration of hospitalizations and most subgroups of the KDQOL-SF 1.3 scale (Table 5 and Table 6). There was no significant difference between the groups with and without ESA use regarding KDQOL-SF 1.3 scores. There was no relationship between Kt/v and KDQOL-SF 1.3 scores in PD patients. Significiant positive correlations were found between Kt/v and sleep, patient satisfaction domains in HD patients (r= 0.32, p=0.013; r=0.27, p=0.035 respectively). Correlations between KDQOL-SF 1.3 scores and demographic, clinical, and laboratory data of HD and PD patients are summarized in Table 5 and 6.

Table 5. Correlations between KDQOL-SF 1.3 scores and demographic, clinical and laboratory data of HD and PD patients

SF-36 domain	Variable	r value	P value
Physical functioning	E	0.274	0.005
	Age	-0.369	<0.001
	CCl	-0.41	<0.001
	HN	-0.297	0.002

	HT	-0.314	0.001
	Alb	0.306	0.001
Physical role	Age	-0.209	0.032
	CCl	-0.34	<0.001
	HN	-0.349	<0.001
	HT	-0.348	<0.001
	Alb	0.250	0.01
	DD	-0.195	0.046
Pain	CCl	-0.21	0.033
	HN	-0.228	0.019
	HT	-0.235	0.016
	Alb	0.269	0.005
General health	E	0.200	0.041
	Age	-0.197	0.044
	CCl	-0.28	0.033
	HN	-0.229	0.019
	HT	-0.216	0.027
Emotional well-being	E	0.224	0.021
	CCl	-0.23	0.019
	HN	-0.300	0.002
	HT	-0.326	0.001
Emotional role	HN	-0.301	0.002
	HT	-0.288	0.003
Social functioning	HN	-0.225	0.021
	HT	-0.241	0.014
Energy/fatigue	E	0.242	0.013
	CCl	-0.27	0.005
	HN	-0.383	<0.001
	HT	-0.410	<0.001
	Ferritin	-0.247	0.011
Overall health rating	CCl	-0.20	0.040
	HN	-0.300	0.002
	HT	-0.314	0.001

SF-36: The Short Form 36, E:Education level, CCl: Charlson comorbidity index; HN: Hospitalizations number; HT: Hospitalization time, Alb:Albumin, DD: Duration of dialysis

Table 6. Correlations between KDQOL-SF 1.3 scores of the ESRD-targeted areas and demographic, clinical and laboratory data of HD and PD patients

	Variable	r value	P value
Symptoms/problems	E	0.248	0.011
	HN	-0.381	<0.001
	HT	-0.377	<0.001
	Hb	0.259	0.008
	Alb	0.271	0.005
Effects of kidney disease	HN	-0.350	<0.001
	HT	-0.323	0.001
Burden of kidney disease	CCl	-0.21	0.030
	HN	-0.261	0.007
	HT	-0.260	0.007
Work status	E	0.331	0.001
	Age	-0.306	0.002
	CCl	-0.31	0.001
	HN	-0.255	0.009
	HT	-0.229	0.019
	Hb	0.211	0.03
	ferritin	-0.277	0.004
Cognitive function	HN	-0.231	0.018

	HT	-0.219	0.025
	ferritin	-0.234	0.016
Quality of social interaction	CCl	-0.21	0.033
Sexual function	Age	-0.424	0.015
	CRP	-0.459	0.008
Sleep	CCl	-0.29	0.003
	HN	-0.369	<0.001
	HT	-0.379	<0.001
	Alb	0.304	0.002
Social support	HT	-0.193	0.049
Dialysis staff encouragement	Ferritin	-0.338	<0.001
	Hb	0.196	0.045
Patient satisfaction	P	-0.226	0.02
	Ferritin	-0.384	<0.001

E:Education level, HN: Hospitalizations number; HT: Hospitalization time, Hb: Hemoglobin, Alb:Albumin, CCl: Charlson comorbidity index, CRP: C-reactive protein, P:Phosphorus.

DISCUSSION

The studies over QOL of patients with ESRD have not led to an answer to the question of which dialysis method will provide a better quality of life. Some studies report that HD patients had better QOL [7,8], while others claim that patients on PD had better QOL[3,17]. On the other hand, some studies showed no difference between the two groups[11,18]. Alvares et al. evaluated the QOL of patients undergoing hemodialysis, peritoneal dialysis, and patients who had renal transplantation by using SF-36. In that study, HD patients showed better results in the dimensions of functional capacity, physical aspects, and social aspects, compared to PD patients[8]. Similarly, Mittal et al. reported that the average physical component summary (PCS) of SF-36 was lower in PD patients compared to HD patients, while mental component summary (MCS) was similar between the groups[7]. On the other hand, in a study by Wakeel et al., the scores of QOL were higher in almost all domains analyzed by the KDQOL-SF 1.3 in PD patients compared to HD patients[3]. According to the results of our study, PD patients had better scores in five domains of the KDQOL-SF 1.3 questionnaire. After adjustment for age, gender and comorbidity score, PD patients had statistically significant higher scores in domains of cognitive function, dialysis staff encouragement, and patient satisfaction in the statistical analysis. These different results may be due to the use of different quality of life tools in clinically different populations.

In our study, male patients had better QOL. Many studies have shown that women have lower scores on different QOL tests compared to men[8,19,20]. In a study by Wakael et al. the male gender was found as a negative predictor of QOL[3]. In the same study, PD patients had better QOL, compared to HD patients. The authors explained the result by the higher percentage of male patients in the HD patients. The reasons for reduced QOL in women are not clear and might be related to psychological and social factors, rather than the disease itself[21]. Also, Kimmel et al. reported differences in the perception of disease effects and social support between men and women[22]. Depending on these data, the lower scores of female patients might be explained.

According to our results, positive correlations were found between education level and symptoms, physical functioning, general health, emotional well-being and energy domains of the KDQOL-SF 1.3 questionnaire. The studies including predialysis patients and patients undergoing dialysis, showed that a higher level of education was associated with improved QOL scores[23,24]. In contrast to our study, Mittal et al. did not find an association between the education level and QOL scores of dialysis patients by using SF-36[7]. The study by Mielck et al., in which national representative surveys were used, low educational level was associated with a higher prevelance of moderate or severe problems in mobility, self-care, usual activities, pain/discomfort, and anxiety/depression domains of European quality of life-5 dimensions (EuroQol 5D). Furthermore, in the same study, the overall visual analog scale (VAS) value of participants with a low educational level was lower than the score of those with high educational level[25]. Based on these studies, it can be claimed that higher education level is associated with higher QOL scores.

Numerous studies have reported that comorbidity

was inversely related to QOL[8, 26]. In a study by Alvares et al., PD patients had a higher degree of comorbid diseases compared to HD patients, and high comorbidity score was associated with reduced QOL[8]. According to the results of our study, the comorbidity score of HD patients was higher than PD patients. Furthermore, high comorbidity scores affected many of the quality of life domains negatively.

According to the results of our study, the number and duration of hospitalizations in the the last 12 months were similar in patients with PD and HD. Also, it was found that the number and duration of hospitalizations degraded most of the KDQOL-SF 1.3 questionnaire scores. Zhang et al. reported that HD patients had higher hospitalization rates compared to PD patients, and hospitalized patients had worse quality of life than non-hospitalized patients[27].

In our study, while significant negative correlations were observed between hemoglobin levels and symptoms, work status, and dialysis staff encouragement domains, no significant difference was observed between the groups with and without ESA use regarding KDQOL-SF 1.3 scores. In a study by Fructuoso et al., hemoglobin value was related to the quality of life[17]. Similarly, Okpechi et al. reported that hemoglobin level was associated with the emotional role, symptom and cognitive function domains in HD patients. In the same study, ESA use was associated with emotional well-being domain in PD patients and with pain, emotional well-being, energy/fatigue domains in HD patients[11]. Moreno et al. showed that normalization of hematocrit/hemoglobin significantly improved the quality of life[28]. According to our results, the hemoglobin level as a target of ESA use was found to be associated with quality of life.

The serum albumin level was associated with symptoms/problems, sleep, physical functioning, physical role and pain domains in our study. Mittal et al. reported that serum albumin was significant predictor of physical component summary (PCS) among PD patients, and was a predictor of PCS and mental component summary among HD patients[7]. Blake et al. showed that serum albumin correlated with hospital days, fatigue index, and death in patients undergoing PD[29]. Furthermore, low serum albumin has been suggested as a marker of an increased risk of hospitalization, morbidity, and mortality in PD patients[30]. Based on these studies, albumin might be in association with five domains of KDQOL-SF 1.3 questionnaire.

According to our study, there were negative correlations between ferritin level and five domains of the KDQOL-SF 1.3 questionnaire (work status, cognitive function, dialysis staff encouragement, patient satisfaction and energy). Serum ferritin was significantly associated with the emotional role domain in PD patients in a study conducted by Okpechi et al., which involved 56 HD and 26 PD patients[11]. Negative correlations in our study might be related to the indirect effect of anemia, leading to the use of a long term or a higher dose of iron treatment or might reflect the negative effect of inflammation.

In our study, effects of Kt/v urea on quality of life measures were very minimal. Only substantial differences were observed in sleep and patient satisfaction domains in HD patients. Similar to our study, Molsted et al. reported that there was no correlation between Kt/V and KDQOL questionnaire domains in PD and HD patients[19]. Unruh et al. reported that high doses (high Kt/V was defined as 1.45) and high flux would affect QOL using SF-36. The study showed that a higher dialysis dose was associated with significiant but very small clinical effects[31]. Based on these studies, lack of associations between Kt/V and QOL might be observed.

In this paper, we explored QOL scores in HD and PD patients and the correlations between socio-demographic, clinical, and laboratory data and QOL in patients with ESRD. In the literature, the SF-36 questionnaire was chosen in most of the studies over QOL in patients with ESRD. We used KDQOL 1.3 which is a detailed questionnaire. Furthermore, the relationship between QOL and a large number of parameters was investigated. Our study has some limitations. We performed a cross-sectional study carried out in a single center. Therefore, the results cannot be generalized to the entire ESRD population. Furthermore, in this study, since there are no repeated measurements, the results of quality of life measures reflect only the period in which the study was conducted.

In conclusion, in this study, we showed that QOL might be affected by demographic factors (age, gender, education level); the QOL was deteriorated by high comorbidity score and hospitalization prominently; inadequate dialysis, hipoalbuminemia,

anemia, and inflammation might have adverse effects on QOL. HRQOL was found to be better in PD patients compared to HD patients, at least in some parameters. As a result, more extensive use of the concept of QOL and patient-reported scales will guide achieving the best medical intervention, patient satisfaction and, consequently, improving QOL.

Yazar Katkıları: Çalışma konsepti/Tasarımı: İT; Veri toplama: İT, KA; Veri analizi ve yorumlama: İT, KA, ZB; Yazı taslağı: İT, KA, ZB; İçeriğin eleştirel incelenmesi: İT, KA, ZB; Son onay ve sorumluluk: İT, KA, ZB; Teknik ve malzeme desteği: İT, KA; Süpervizyon: İT, KA; Fon sağlama (mevcut ise): yok.
Etik Onay: Bu çalışma Ankara Üniversitesi Tıp Fakültesi Etik Kurulu tarafından onaylanmıştır (Referans numarası: 10-405-13, tarih: 24.06.2013).
Hakem Değerlendirmesi: Dış bağımsız.
Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemişlerdir.
Finansal Destek: Yazarlar finansal destek beyan etmemişlerdir.
Author Contributions: Concept/Design : İT, KA; Data acquisition: İT, KA, ZB; Data analysis and interpretation: İT, KA, ZB; Drafting manuscript: İT, KA, ZB; Critical revision of manuscript: İT, KA, ZB; Final approval and accountability: İT, KA, ZB; Technical or material support: İT, KA, ZB; Supervision: İT, KA, Securing funding (if available): n/a.
Ethical Approval: This study has been approved by the ethics committee of the Ankara University, Faculty of Medicine, (Reference number: 10-405-13, date: 24.06.2013).
Peer-review: Externally peer-reviewed.
Conflict of Interest: Authors declared no conflict of interest.
Financial Disclosure: Authors declared no financial support

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