

Comparison of Health-Related Quality of Life of Patients on Hemodialysis and Continuous Ambulatory Peritoneal Dialysis

Hemodiyaliz ve Sürekli Ayakta Periton Diyalizi Tedavisi Uygulanan Hastalarda Sağlığa-İlişkin Yaşam Kalitesinin Karşılaştırılması

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Geliş Tarihi/Received: 14.04.2009
Kabul Tarihi/Accepted: 23.06.2010

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ABSTRACT Objective: The purpose of this study was to compare the Health-Related Quality of Life (HRQOL) status of patients with end stage renal disease (ESRD) on hemodialysis (HD) and continuous ambulatory peritoneal dialysis (CAPD) treatment, and to define in which way their perception of quality of life (QOL) is affected by socio-demographic characteristics, disease-related variables and laboratory findings. **Material and Methods:** In this cross-sectional study, 22 consecutive patients on CAPD treatment at a Training and Research Hospital (42%) and 30 consecutive patients on HD treatment at a private healthcare center (57%) -who met the eligibility criteria- were evaluated in a period of three months between November 2004 and January 2005. The patients answered to two questionnaires with a face to face interview method. The first questionnaire was composed of questions regarding socio-demographic and disease-related variables. The second questionnaire was the Turkish version of The Medical Outcomes Study Short- Form 36 (SF-36) Health Status Survey, which was used to assess the general HRQOL. Data regarding laboratory findings and complications of chronic renal failure were collected from the patients' medical records. **Results:** CAPD patients had better physical functioning ($p=0.003$) and physical role limitation ($p=0.001$) scores in certain SF-36 sub-domains compared to HD patients. There was a moderate positive correlation between albumin levels and physical function, while thrombocyte counts were negatively correlated with vitality and social function in HD patients. In the CAPD group, calcium and hematocrit levels were positively correlated with vitality. There was a negative correlation between phosphorus levels and mental health status and a negative correlation between potassium levels and general health status of CAPD patients. **Conclusion:** In our study we observed higher quality of life scores in the CAPD group compared to the HD group especially in the area of physical function which may be explained by portability, easy application and mobility of these patients, which are some of the advantages compared to HD patients. Since QOL scores are affected by the modality of dialysis in ESRD patients, besides clinical parameters QOL status of these patients should also be considered in choosing the treatment modality and follow-up process.

Key Words: Quality of life; renal dialysis; peritoneal dialysis, continuous ambulatory

ÖZET Amaç: Bu çalışmanın amacı, hemodiyaliz ve sürekli ayakta periton diyalizi tedavisi uygulanan son dönem böbrek yetmezliği hastalarında sağlığa-ilişkin yaşam kalitesinin karşılaştırılması ve sosyodemografik özellikler, hastalığa ilişkin değişkenler ve laboratuvar bulgularının bu hastaların yaşam kalitesini ne şekilde etkilediğini araştırmaktır. **Gereç ve Yöntemler:** Bu kesitsel çalışmada, 2004 Kasım ve 2005 Ocak ayları arasında, çalışmaya uygunluk kriterlerini karşılayan, bir eğitim ve araştırma hastanesinde sürekli ayakta periton diyalizi uygulanan 22 ardışık olgu ve özel bir sağlık merkezinde hemodiyaliz tedavisi uygulanan 30 ardışık olgu incelenmiştir. Hastalara yüz yüze görüşme tekniği ile iki farklı anket uygulanmıştır. Birinci anket formu, sosyodemografik ve hastalığa bağlı değişkenleri, ikinci anket formu ise, sağlığa ilişkin yaşam kalitesinin genel olarak değerlendirildiği Medical Outcomes Study Short- Form 36 (SF-36) Health Status Survey, Türkçe versiyonu idi. Laboratuvar bulguları ve kronik böbrek yetmezliğine bağlı komplikasyonlar ile ilgili bilgiler hasta kayıt formlarından elde edilmiştir. **Bulgular:** Sürekli ayakta periton diyalizi uygulanan hastaların fiziksel fonksiyon ($p=0.003$) ve fiziksel rol güçlüğü ($p=0.001$) alt ölçeklerinin değerleri hemodiyaliz hastalarına göre daha yüksek bulunmuştur. Hemodiyaliz tedavisi uygulanan hastalarda albümin değerleri ile fiziksel fonksiyon arasında orta derecede pozitif korelasyon, trombosit düzeyleri ile vitalite ve sosyal fonksiyon arasında negatif korelasyon saptanmıştır. Sürekli ayakta periton diyalizi uygulanan hastalarda potasyum düzeyleri ile genel sağlık durumu arasında, fosfor düzeyleri ile mental sağlık durumu arasında negatif korelasyon, aynı grupta kalsiyum ve hematokrit düzeyleri ile vitalite arasında pozitif korelasyon bulunduğu görülmüştür. **Sonuç:** Bizim çalışmamızda, sürekli ayakta periton diyalizi hastalarında, hemodiyaliz hastalarına göre özellikle fiziksel fonksiyon alanında olmak üzere genel olarak daha yüksek yaşam kalitesi değerleri gözlemledik ki, bu durum sürekli ayakta periton diyalizinin hemodiyalize göre portabilite, kolay uygulanabilirlik ve hastaların mobilitesi gibi üstünlükleri ile açıklanabilir. Son dönem böbrek yetmezliği hastalarında yaşam kalitesi skorları diyaliz yönteminden etkilendiğinden, klinik parametrelerin yanında hastaların yaşam kalitesi düzeylerinin de, hem tedavi yönteminin seçiminde hem de izlem sürecinde göz önünde bulundurulması gerekir.

Anahtar Kelimeler: Yaşam kalitesi; böbrek diyalizi; sürekli ayakta periton diyalizi

ESRD is a progressive, debilitating, chronic illness requiring nursing and medical interventions.¹ It is characterised by an irreversible and progressive loss of nephrons as a result of variable etiological factors.

In current medical practice, emerging technology, which results in new achievements in the treatment of chronic diseases, enforces the patients to live with their diseases for a much longer time. Therefore, besides biological indicators, psychological indicators of health are becoming more and more important in the evaluation of the chronically ill patient. Thus, questioning quality of life (QOL) in these patients is introduced to daily medical practice as a new approach in clinical care. The best description of quality of life is the difference between an individual's expectations from life and what he/she realizes.²

As with other chronic diseases, the goal of therapy for most ESRD patients is not to ensure "cure" but to eliminate uremic symptoms, minimize dysfunction of main organ systems and improve QOL.³ Because of hard treatment protocols and following complications, QOL, interpersonal relationships, social activities and emotional wellbeing of ESRD patients are negatively affected.

Renal dialysis still plays a major role in the treatment of ESRD patients, which is performed by hemodialysis (HD) or continuing ambulatory peritoneal dialysis (CAPD). Both methods have its own advantages and disadvantages in achieving the goal of therapy.^{4,6}

Peritoneal dialysis (PD) has several advantages which may positively affect QOL such as easy application, portability, better blood pressure control in patients with cardiac problems, easier application for patients with vascular problems like very young and elderly patients, less risk for hepatitis and less dietary and liquid intake limitations. However, there is an increased risk of infection, inadequate dialysis, hyper-triglyceridemia, potential protein loss, malnutrition and psychological problems.^{2,3}

On the other hand, compared to PD, HD is definitely superior in certain aspects including rapid and effective elimination of toxic metabolites, bet-

ter social relationship, less malnutrition risk, less need for hospitalization that may affect the sub-domains of SF-36. Unfortunately, it has also some disadvantages such as the need for minor surgery of A-V shunts, diet and liquid limitations.⁴

This study aims to compare quality of life status of HD and CAPD patients, and also to investigate how socio-demographic characteristics, disease-related variables and hematologic and biochemical parameters of patients affect QOL domains.

MATERIAL AND METHODS

PATIENTS

In this cross-sectional study, a total of 52 ESRD patients selected from two different health institutions were investigated. Twenty-two consecutive patients on CAPD treatment at Dr. Lutfu Kırdar Kartal Training and Research Hospital (%42) and 30 consecutive patients on HD treatment at a private healthcare center (%57) -who met the eligibility criteria- were evaluated in a period of three months between November 2004 and January 2005.

The eligibility criteria were to be diagnosed with ESRD, being on HD or CAPD treatment more than three months, and being over 15 years of age.

Study data were collected by using two questionnaires, one included questions regarding socio-demographic and disease-related variables, (such as age, gender, marital status, presence of fatigue, itching, nausea, vomiting, etc.) and the other consisted of SF-36 QOL scale, which was performed by face to face interviews with the same interviewer in each health facility. Each patient's laboratory findings and complications related to ESRD were collected from patient records.

This study was approved by the Yeditepe University Ethical Committee and all subjects participated voluntarily after giving a verbal informed consent.

INSTRUMENT: SF-36

The SF-36 scale (The Medical Outcomes Study 36 Item Short Form Health Survey) is a general QOL

scale developed by Ware and Sherbourne, in the USA in 1992 and is a shortened version of a battery of 149 health state questions developed and tested on a population of over 22 000 patients.⁷ The SF-36 is a QOL battery based on health and can be applied to all chronic diseases as it has multiple-item dimensions.⁸

SF-36 measures health on eight multi-item dimensions covering three aspects of health (functional status, wellbeing, and "overall evaluation of health"). SF-36 is able to evaluate both positive and negative aspects of health. Conclusively, each dimension of SF-36 health survey questionnaire is scored for its items, then summed to provide eight scores between 0 and 100 (the worst and the best functional health state).^{9,10} Since SF-36 is a general outcome measure which does not question some special aspects and dimensions of a definite illness, it is advised to use it to measure minor health problems that generally affect the health of the population.¹⁰

The reliability and the validity of the SF-36 scale for the Turkish population were performed by Kocyigit et al. in 1999.¹¹

STATISTICAL ANALYSIS

Statistical analysis was performed with the Statistical Package for Social Sciences (SPSS) version 13 for Windows (Inc., Chicago, IL, USA) statistical software. Quantitative data are expressed as mean \pm SD. Fisher's exact test or Chi-square test was performed as appropriate for the comparisons of categorical variables. For continuous data, unpaired Student's *t* test was used. A significance level of $p < 0.05$ was considered as significant.

Spearman's correlation analysis was used to determine the level of agreement between the biochemical parameters and the QOL domains.

RESULTS

PATIENT CHARACTERISTICS

The study included a total of 52 patients receiving either HD ($n = 30$) or CAPD ($n = 22$) treatment. The distribution of socio-demographical characteristics,

disease-related variables and the difference between HD and CAPD patients are demonstrated in Table 1. Groups were similar in terms of baseline characteristics.

Twelve (54.5%) CAPD patients had previously received hemodialysis treatment. Four (18.1%) patients had peritonitis during their treatment.

RESULTS OF BLOOD TESTS

Although all of the biochemical findings of both groups were in normal ranges, HD patients had higher potassium and hematocrit levels and lower thrombocyte counts compared to the CAPD group. Groups were accepted as similar in terms of other biochemical and hematological results (Table 2).

QUALITY OF LIFE RESULTS

Compared to HD patients, CAPD patients had significantly higher scores on physical function and physical role limitation domains of the SF-36 Questionnaire ($p = 0.003$, $p = 0.001$). Groups received similar scores on other domains of the questionnaire (Table 3).

The Spearman's correlation analysis revealed a moderate positive correlation between albumin level and physical function, and a negative correlation between thrombocyte level and both vitality and social function in HD patients. In the CAPD group, there was a negative correlation between potassium level and general health. A positive correlation was observed between calcium, hematocrit levels and vitality, and again a positive correlation between phosphorus levels and mental health (Table 4).

DISCUSSION

Although there are many studies evaluating the QOL of ESRD patients worldwide, relatively fewer studies have been reported which compare the quality of life of HD and CAPD patients.

Some studies reported no difference in the QOL of HD and CAPD patients.¹²⁻¹⁴ In other studies, there were differences in various aspects of QOL between both groups. In Diaz-Buxo et al.'s study in which the SF-36 scale was used, percep-

TABLE 1: Distribution of patient characteristics and socio-demographical and disease-related variables in HD and CAPD groups.

Variables	Hemodialysis group n (%)	CAPD group n (%)	Total n (%)
Age group			
15-34 years	9 (30.0)	8 (36.4)	17 (32.7)
35-54 years	10 (33.3)	11 (50.0)	21 (40.1)
>55 years	11 (36.7)	3 (13.6)	14 (27.2)
	$X^2= 3.531, p= 0.171$		
Gender			
Male	14 (46.7)	9 (40.9)	23 (44.2)
Female	16 (53.3)	13 (59.1)	29 (55.8)
	$X^2= 0.171, p= 0.781$		
Marital status			
Married	16 (53.3)	14 (63.6)	30 (57.7)
Single	14 (46.7)	8 (36.4)	22 (42.3)
	$X^2= 0.552, p= 0.458$		
Education			
Illiterate	7 (23.3)	4 (18.2)	11 (21.2)
Literate	23 (76.7)	18 (81.8)	41 (78.8)
	Fisher's exact X^2 test, $p= 0.741$		
Occupational status			
Currently working	19 (63.3)	16 (72.7)	35 (67.3)
Not working	11 (36.7)	6 (27.3)	17 (32.7)
	$X^2= 0.509, p= 0.476$		
Economic status			
Poor	6 (20.0)	6 (27.3)	12 (23.1)
Other	24 (80.0)	16 (72.7)	40 (76.9)
	$X^2= 0.378, p= 0.539$		
Household structure			
Living alone	3 (10.0)	1 (4.5)	4 (7.7)
Not alone	27 (90.0)	21 (95.5)	48 (92.3)
	Fisher's exact X^2 test, $p= 0.629$		
Presence of other renal disease patient in the same household			
Yes	3 (10.0)	3 (13.6)	6 (11.5)
No	27 (90.0)	19 (86.4)	46 (88.5)
	Fisher's exact X^2 test, $p= 0.689$		
Smoking			
Yes	3 (10.0)	2 (9.1)	5 (9.6)
No	27 (90.0)	20 (90.9)	47 (90.4)
	Fisher's exact X^2 test, $p= 1.000$		
Alcohol consumption			
Yes	3 (10.0)	0 (0)	3 (5.8)
No	27 (90.0)	22 (100.0)	49 (94.2)
	Fisher's exact X^2 test, $p= 0.253$		
Diagnosis			
Diabetic nephropathy	8 (26.7)	5 (22.7)	13 (25.0)
Polycystic kidney	2 (6.7)	1 (4.5)	3 (5.8)
Hypertension	4 (13.3)	5 (22.7)	9 (17.3)
Other	10 (33.3)	5 (22.7)	15 (28.8)
Unknown	6 (20.0)	6 (27.3)	12 (23.1)
	$X^2= 1.611, p= 0.807$		
Presence of fatigue, itching, nausea, vomiting, skin discoloration			
Yes	9 (30.0)	8 (36.4)	17 (32.7)
No	21 (70.0)	14 (63.6)	35 (67.3)
	$X^2= 0.234, p= 0.629$		
Presence of relatives with renal disease			
Yes	7 (23.3)	3 (13.6)	10 (19.2)
No	23 (76.7)	19 (86.4)	42 (80.2)
	Fisher's exact X^2 test, $p= 0.488$		

TABLE 2: Distribution of blood chemistry and hematological results of HD and CAPD groups.

Parameter	Hemodialysis	CAPD	t test	p value
	x ± SD	x ± SD		
Albumin	3.9 ± 0.3	3.8 ± 0.5	0.825	0.414
Potassium	5.1 ± 1.0	4.5 ± 0.6	2.54	0.014
Calcium	9.1 ± 0.8	9.3 ± 1.4	-0.763	0.623
Phosphorus	5.1 ± 1.6	5.4 ± 1.1	-0.831	0.411
Hematocrit	32.1 ± 4.1	28.4 ± 5.6	2.66	0.011
Leucocytes	7.0 ± 2.4	6.4 ± 2.3	0.91	0.369
Thrombocytes	204.7 ± 52.2	263.6 ± 85.4	-2.96	0.007

Data are expressed as mean ± SD.

TABLE 3: The Comparison of the HD and CAPD Groups According to Subdomains of SF-36 Questionnaire.

Subdomains	Groups		t test	p value
	Hemodialysis	CAPD		
	x ± SD median (min-max)	x ± SD median (min-max)		
Physical function	58.2 ± 35.5	83.2 ± 16.4	-3.06	0.003
	72.5 (0-100)	90.0 (40-100)		
Physical role limitation	35.8 ± 42.9	78.4 ± 35.6	-3.79	0.001
	12.5 (0-100)	100.0 (0-100)		
Pain	84.4 ± 23.7	82.14 ± 28.3	0.318	0.752
	100.0 (31-100)	100.0 (10-100)		
General health	43.5 ± 25.5	54.1 ± 24.7	-1.499	0.140
	39.5 (5-97)	57.0 (10-92)		
Vitality	58.7 ± 27.4	56.6 ± 22.5	0.290	0.773
	62.5 (15-100)	57.5 (10-100)		
Social functions	67.5 ± 34.2	73.9 ± 31.8	-0.683	0.446
	87.5 (0-100)	93.7 (12.5-100)		
Emotional role limitation	48.9 ± 44.4	66.7 ± 47.1	-1.390	0.171
	66.6 (0-100)	100.0 (0-100)		
Mental health	72.4 ± 20.9	71.6 ± 16.4	0.142	0.888
	76.0 (20-100)	72.0 (36-100)		

Data are expressed as mean ± SD, median (min-max).

tion of QOL among PD and HD patients was similar before adjustment, but PD patients' scores were higher for mental processes with adjustment.¹⁵ Rozenbaum et al. reported that the CAPD patients showed slightly better results of QOL.¹⁶ Tucker et al. reported that CAPD patients significantly more in social and recreational activity, though not in work activity, than did HD patients.¹⁷ On the other hand, Lindqvist et al. found that HD patients

had lower values on all The Swedish Health-Related Quality of Life Survey (SWED-QUAL) subscales and the women on CAPD scored lower on general health than did the women on HD.¹⁸ Another study reported that HD patients had significantly poorer QOL in the areas of physical, social, cognitive and emotional functioning in comparison to the controls, and additionally CAPD patients were not significantly different life

TABLE 4: Correlations between hematologic and biochemical parameters and subdomains of the SF-36 questionnaire for HD and CAPD patients.

	Physical function	Physical role	Pain	General health	Vitality	Social function	Emotional role	Mental health
Hemodialysis Group								
Albumin	r= 0.423*	r= 0.128	r= 0.008	r= 0.105	r= -0.030	r= -0.048	r= 0.130	r= -0.201
Potassium	r= 0.104	r= -0.341	r= 0.080	r= -0.216	r= -0.220	r= -0.369	r= -0.068	r= 0.052
Calcium	r= -0.264	r= -0.169	r= -0.050	r= -0.187	r= -0.142	r= -0.191	r= -0.141	r= -0.076
Phosphorus	r= -0.009	r= 0.046	r= -0.145	r= -0.140	r= -0.082	r= -0.053	r= -0.059	r= -0.108
Hematocrit	r= -0.121	r= -0.045	r= 0.013	r= 0.000	r= 0.043	r= -0.092	r= 0.124	r= 0.153
Leucocyte	r= -0.127	r= -0.319	r= -0.030	r= -0.218	r= -0.012	r= -0.238	r= 0.057	r= 0.371
Trombocyte	r= -0.343	r= -0.267	r= -0.052	r= -0.314	r= -0.402*	r= -0.459*	r= -0.250	r= 0.096
CAPD Group								
Albumin	r= 0.023	r= 0.047	r= 0.030	r= 0.120	r= 0.211	r= 0.032	r= 0.101	r= -0.136
Potassium	r= -0.090	r= 0.140	r= -0.026	r= -0.485*	r= -0.129	r= -0.019	r= 0.036	r= 0.077
Calcium	r= -0.009	r= -0.079	r= -0.038	r= 0.181	r= 0.503*	r= 0.385	r= 0.055	r= 0.220
Phosphorus	r= -0.222	r= 0.045	r= -0.084	r= -0.120	r= -0.217	r= -0.156	r= -0.182	r= 0.566*
Hematocrit	r= 0.440	r= 0.199	r= 0.109	r= 0.418	r= 0.465*	r= 0.150	r= 0.346	r= 0.335
Leucocyte	r= -0.213	r= 0.277	r= 0.137	r= -0.075	r= -0.109	r= -0.378	r= -0.100	r= 0.082
Trombocyte	r= 0.139	r= -0.237	r= 0.275	r= 0.196	r= 0.085	r= 0.186	r= 0.009	r= 0.230

* : Correlation coefficient found to be statistically significant.

quality-wise from controls, except for their social and professional life.¹⁹

In some other studies QOL scores were higher in the CAPD patients.²⁰⁻²⁴ The study of Kalender et al. where SF-36 was used to evaluate QOL of chronic kidney disease patients reported that the SF-36 scores were higher in the CAPD group than HD group.²⁰ Shrestha et al. stated that patients on CAPD had better quality of life than patients on HD especially in terms of mental health.²¹ Ginieri-Coccosis et al. also stated in their study that patients on HD treatment, particularly those with many years of treatment, were experiencing a more compromised QOL in comparison to CAPD/PD patients.²² Panagopoulou et al. reported that the CAPD patients were more satisfied, more compliant, better motivated, and less anxious and depressed compared to the HD patients who scored low in every aspect studied.²³ In the study of Laušević et al. where SF-36 was used, the authors stated that in an incidental group of patients, one year of peritoneal dialysis treatment was associated with a slight improvement in both physical component summary score (PCS) and mental compo-

nent summary score (MCS), but statistical significance was found in the role-physical limitation (RP), bodily pain (BP), and vitality (VT) scales only. CAPD patients had significantly higher parameters of HRQOL than HD patients.²⁴ Cinar et al. stated that PD popularity was increased in the last years because its is a simple, comfortable, and inexpensive treatment method.⁵ Similarly Ersoy et al. stated that PD was suitable for young, physically active patients who do not want to be dependent on machines.²⁵

Our study was in concordance with the studies suggesting higher physical function and physical role limitation scores in the CAPD group compared to the HD group. Although other QOL subdomain scores were similar in both of the groups, mental health and emotional role limitation scores of CAPD patients' tended to be higher and we may say that their perception regarding their functional status was better than HD patients.

There are studies that investigated the correlation between hematologic and biochemical parameters and QOL subdomains in HD and CAPD

patients. Kalender et al. reported that there was a significant positive correlation between the SF-36 physical scores and both the hematocrit value and serum albumin levels.²⁰ Shrestha et al. stated that variables like hemoglobin, hematocrit and adequacy of dialysis had a positive correlation with all the four domains of the KDQOL scale i.e. optimizing these variables improves the overall quality of life.²¹ Arogundade et al. in their study regarding assessment of QOL in HD patients reported that hemoglobin positively correlated with physical function.²⁶

The results of our study are similar for both hematocrit and vitality in CAPD patients, and albumin and physical function in HD patients.

The small numbers of study groups are the major limitation of our study. However, all of the eli-

gible patients during the study period in the research centers were used, and the aim of the study was only to compare the HD and CAPD patient groups.

CONCLUSION

In our study we observed higher quality of life scores in the CAPD group compared to the HD group especially in the area of physical function which may be explained by portability, easy application and mobility of these patients, which are some of the advantages compared to HD patients. Since QOL scores are affected by modality of dialysis in ESRD patients, besides clinical parameters, QOL status of these patients should also be considered in choosing the treatment modality and follow-up process.

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