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Original Article

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The Effect of Hemodialysis Treatment on Quality of Life and Sleep in Patients with Chronic Kidney Disease

Mustafa Demir[1], Ömer Canpolat[2], Fadime Demir[3], Sedat Çiçek[4], Ayhan Doğukan[1]

[1]Division of Nephrology, Fırat University School of Medicine, Elazığ, Turkey
[2]Department of Emergency Medicine, Elazığ Training and Research Hospital, Elazığ, Turkey
[3]Department of Nuclear Medicine, Elazığ Training and Research Hospital, Elazığ, Turkey
[4]Department of Internal Medicine, Fırat University School of Medicine, Elazığ, Turkey

Abstract

Objective: This study aimed to compare quality of life and sleep between patients with hemodialysis and patients with stage 3-4 chronic kidney disease (CKD) who did not receive hemodialysis treatment.
Material and Methods: A total of 139 patients (56 female and 83 male) diagnosed with CKD who were being followed up at our clinic were included. Of these, 101 were dialysis patients (dialysis CKD group), and 38 were non-dialysis patients (non-dialysis CKD group). Patients were asked to complete the sociodemographic questionnaire, 36-Item Short Form Health Survey, and Pittsburgh Sleep Quality Index. The chi-square test, Fisher exact test, t-test, and Mann-Whitney test were used to assess differences between the groups according to test assumptions.
Results: In terms of gender, age, height, education, exercise, and smoking, no statistically significant differences ($p>0.05$) were observed between the groups. Weight was found to be significantly higher in the nondialysis group than in the dialysis CKD group ($p=0.001$). Quality of life scores were compared; statistically significant differences were found in terms of general health ($p=0.003$), mental health ($p=0.001$), and fitness ($p=0.008$) subscales. Three parameters were higher in the dialysis patients' hemodialysis group. Sleep quality subscales were compared; sleep disturbance ($p=0.007$) and sleeping pill use ($p=0.014$) were statistically significant. Sleep disturbance and sleeping pill use they were higher in the nondialysis group.
Conclusion: Our study results suggest that impairment of quality of life and sleep is because of chronic kidney disease and not because of hemodialysis. Furthermore, hemodialysis treatment improves some subparameters of life and sleep quality.
Keywords: Chronic kidney disease, hemodialysis, quality of life, quality of sleep

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INTRODUCTION

Chronic kidney disease (CKD) is a clinical syndrome that results in progressive and irreversible loss of nephrons. The disease clinically consists of five stages. It may show a spectrum ranging from asymptomatic renal dysfunction to uremic syndrome (1). The prevalence of CKD has been increasing in the recent years. Prolongation of life expectancy as well as many comorbid factors such as hypertension and diabetes have contributed to this increase (2, 3).

CKD affects not only the physical health of the patients but also their psychosocial well-being. It causes significant emotional, psychological, and social disorders (4-6). This can lead to anger and unpredictable aggressive reactions (7). Therefore, accurate assessment of quality of life and appropriate intervention are important to improve prognosis in this patient population (8). The most important goal of health interventions is quality of life, which is measured by physical and social functioning perceived physically and mentally (9). World Health Organization defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." This multidimensional health definition envisages the determination of health-related well-being, as well as features such as

the frequency and severity of diseases in health care, in other words, the quality of life in modern sense is addressed as a new concept in the measurement of health. The aim of modern health services is to not only treat or prevent diseases but also provide a good quality life to the person (10). In patients with hemodialysis (HD), health-related quality of life is generally assessed by the 36-Item Short Form Health Survey (SF-36) (11).

Sleep disorders are common in patients with HD, and about 60% of patients have sleep problems (12). Poor sleep quality in patients with HD is associated with lower quality of life and increased morbidity and mortality rate. In addition, sleep disturbance is associated with physical, behavioral, and psychological problems. It causes problems in communication as well as mental and social performance (13). The etiology of sleep disorders in dialysis patients is not fully understood, but it is known to be multifactorial. Although it is a frequent and important problem, sleep disorders are not usually noticed since not all patients openly reveal the symptoms (14). One of the tests used to measure sleep quality with proven reliability is the Pittsburgh Sleep Quality Index (PSQI).

This study aimed to compare the quality of life and sleep in patients with HD and patients with stage 3-4 CKD without HD treatment and to investigate the possible effects of HD treatment on quality of life and sleep.

MATERIALS AND METHODS

Selection and Identification of Cases

A total of 139 patients with the diagnosis of CKD who were being followed up at our clinic were included in the study. Among them, 56 were female and 83 were male. Of these, 101 were dialysis patients and 38 were nondialysis patients.

The exclusion criteria for patients was age under 18 years, presence of any malignancy, history of HD<6 months, and unwillingness to participate in the study. Written informed consent was obtained from all patients who participated in this study.

Technical Data

Patients were asked to fill out the prepared questionnaire forms. In the first part, age, gender, marital status, income level, education, duration of CKD diagnosis, exercise, smoking status, height, and weight parameters were evaluated. Then, SF-36 was used to measure quality of life, and PSQI was used to measure sleep quality. Approval for the study was obtained from the Fırat University School of Medicine Ethics Committee (decision no.: 07; date: 05.10.2017).

The SF-36 scores were calculated for each subscale, which are as follows:

- physical function,
- physical role function,
- wellness/fatigue,
- pain,
- general health perception,
- social functioning,
- emotional role function, and
- mental health.

Then, the raw scale score was calculated. The obtained raw scale scores were converted to transformed scores, and a value between 0 and 100 was obtained. The standard assessment of SF-36 was evaluated. A high score in SF-36 shows good quality of life (15).

In PSQI, subjective sleep quality is composed of seven items. Each component is evaluated with a score of 0–3. The total

Table 1. Comparison of sociodemographic characteristics of groups

		Dialysis CRF		Non-dialysis CRF		
		n	%	n	%	p
Gender	Female	43	42.6%	13	34.2%	0.370
	Male	58	57.4%	25	65.8%	
Education	Elementary	71	70.3%	19	50%	0.179
	Secondary	7	6.9%	5	13.2%	
	High school	15	14.9%	8	21.1%	
	Higher education	8	7.9%	6	15.8%	
Smoking	Yes	5	5%	3	7.9%	0.312
	No	96	95%	35	92.1%	
Exercise	Yes	33	32.7%	17	44.7%	0.187
	No	68	67.3%	21	55.3%	

CRF: Chronic Renal Failure

score of the scale is between 0 and 21. A PSQI total score of 5 and above indicates poor sleep quality (16). In our patients, the scores of the questions of each subscale were calculated with Pittsburgh sleep quality scale scores. The components of PSQI are as follows:

- subjective sleep quality,
- sleep latency,
- sleep duration,
- usual sleep activity,
- sleep disturbance,
- use of sleep medication, and
- total PSQI.

Statistical Analysis

Data were analyzed by using the Statistical Package for the Social Sciences (SPSS) 20.0 program (IBM Corp., Armonk, NY, USA). Data were expressed as mean±standard deviation and median. The chi-square test was used to evaluate the differences in terms of sociodemographic characteristics. The Fisher exact test, which is the nonparametric alternative, was used in case of failure of the test assumptions. To evaluate the difference between the groups in terms of quality of life and sleep score scales, the t-test was used for the parameters that met the test assumptions, and the Mann–Whitney U test was used for the nonparametric alternatives. A p<0.05 was accepted as statistically significant.

Table 2. Comparison of age, height and weight of the groups

	Dialysis CRF	Non-dialysis CRF	
	Mean±SD	Mean±SD	p
Age (year)	55.19±15.1	58.31±16.3	0.320
Height (cm)	166±8.3	168.14±11	0.222
Weight (median, min-max) kg	66 (42-97)	71 (53-112)	<0.001**

**p<0.001, CRF: Chronic Renal Failure

RESULTS

The number of participants in dialysis group was 101, of which 43 (42.6%) were women and 58 (57.4%) were men. In the non-dialysis group comprising 38 patients, there were 13 (34.2%) female and 25 (65.8%) male participants. The mean age of the nondialysis CKD group was 58.31±16.3 years and that of the dialysis CKD group was 55.19±15.1 years. Between the dialysis and nondialysis CKD groups, no statistically significant difference was observed in terms of gender, age, height, education, exercise, and smoking status (p>0.05). There was a significant difference between the two groups in terms of weight (p<0.001). Sociodemographic characteristics, height, weight parameters of these two groups and the statistical relationship between these are shown in Table 1 and Table 2, respectively.

When the quality of life scores were compared between the dialysis and nondialysis groups, a statistically significant difference was found in terms of the subcomponents of general health (p=0.003), mental health (p=0.001), and wellness (p=0.008). All three parameter scores were higher in the dialysis group than in the nondialysis CKD group. In terms of other parameters, no significant difference was found between the two groups (Table 3).

When the sleep quality scale scores were compared between the dialysis and nondialysis groups, there were statistically significant differences in sleep disorders (p=0.007) and sleep medication use (p=0.014) subscales. Both parameter scores were higher in the nondialysis CKD group than in the dialysis CKD group. In terms of other parameters, no significant difference was found between the two groups (Table 4).

Table 3. Comparison of sub-components of quality of life scale of groups

	Dialysis CRF		Non-dialysis CRF		
	Mean±SD	Median (min-max)	Mean±SD	Median (min-max)	p
Physical function	38.43±25.3		37.55±28		0.86
Social function		33 (0-78)		33 (0-100)	0.564
Physical role		25 (0-100)		25 (0-100)	0.501
Emotional role		33 (0-100)		0 (0-100)	0.142
Mental health		52 (0-92)		46 (0-68)	0.001*
Wellness		50 (0-85)		40 (0-75)	0.008*
Pain	38.97±24.25		36.89±25.52		0.659
General health		45 (0-80)		22.5 (0-75)	0.003*

*p<0.05, CRF: Chronic Renal Failure

Table 4. Comparison of sub-components of sleep quality scale of the groups

	Dialysis CRF		Non-dialysis CRF		
	Mean ± SD	Median (min-max)	Mean ± SD	Median (min-max)	p
Subjective sleep quality		1 (0-3)		1 (0-3)	0.055
Sleep latency		1 (0-3)		1 (0-3)	0.68
Sleep duration		0 (0-3)		0 (0-3)	0.123
Usual sleep activity		0 (0-3)		0.5 (0-3)	0.007*
Sleep disturbance		1 (0-3)		1.5 (0-3)	0.014*
Sleep medication use		0 (0-3)		0.5 (0-3)	0.127
Total PSQI	6.10±4.16		7.29±3.85		0.161

*p<0.05, PSQI: Pittsburgh Sleep Quality Questionnaire, CRF: Chronic Renal Failure

DISCUSSION

Chronic diseases cause changes in some aspects of life, including undertaking a new role as a patient, disease-related unemployment, limited daily activity, and additional costs of treatment, and consequently resulting in stressful and complex situations. This leads to a decrease in the quality of life (3). Although HD treatment reduces life-threatening situations and thus fear of death, it can also cause psychological distress because of continuous efforts to adapt to unusual conditions, strong limitations in daily life, and difficulties in practice. The psychological well-being of this patient group depends on not only physical health but also the positive perception of psychosocial variables and especially the quality of life (7). Quality of life in patients with chronic HD has probably become important because of the increased incidence and prevalence of patients with HD and the progressive aging of the HD population (17).

Compared with the general population, quality of life is significantly impaired for patients with HD (18). However, there are conflicting data about the effect of progressive reduction in renal function on quality of life (2). Some studies report that dialysis treatment not only prolongs life expectancy but also improves quality of life (1, 8). Furthermore, a longer age of dialysis and a better quality of life have been reported (17). For example, Dwyer et al. (19) found that patients who had dialysis for a longer period had higher Mental Health Component Scale scores.

On the other hand, many studies show the negative impact of dialysis treatment on quality of life (18, 20, 21). Lønning K et al. (20) reported that dialysis treatment has an important effect on daily life, is very time-consuming, and affects the social life and physical function. They found a decrease in the scores of quality of life by prolonged time in dialysis and showed it to be a risk factor for impaired quality of life in young recipients after kidney transplantation KTx. In his review of the subject, Weisbord stated that patients with CKD who underwent chronic dialysis treatment experienced significant reductions in health-related quality of life and multiple factors, including loss of occupational capacity, probably contributing to the deterioration of quality of life in this population (21).

Senkal et al. (1) conducted a study to compare the quality of life of dialysis patients with that of predialysis patients. They found a statistically significant difference between the two groups in the subscales of pain and physical function and determined higher scores of pain and physical function in the dialysis group (1). In our study, a significant difference was found between the two groups in the mental health, wellness, and general health subscales of quality of life scale. In our study, no difference was observed in physical function, social function, physical role, emotional role, and pain subscales. This is because of the fact that in patients with CKD, decline in the quality of life and functionality is initiated in the predialysis period (1).

Sleep quality in patients with CKD is worse than that in the healthy population (22, 23). Sleep quality is also an important and determining factor to assess quality of life in patients with HD. Sleep disturbance is correlated with a decrease in both physical and cognitive performance, and it is associated with the risk of developing anxiety and depression in patients with chronic HD. Poor sleep quality can lead to poor clinical outcomes by increasing cardiovascular morbidity and mortality in patients with HD (17). Shafi et al. (23), in their study, did not find any significant difference in sleep quality between patients with HD and nondialysis patients with CKD. In our study, a significant difference was observed between the dialysis and nondialysis groups in sleep disorder and sleep drug use subscales. Both scores were significantly higher in nondialysis patients. This result suggests that dialysis treatment may have a positive effect on sleep quality in patients with CKD. However, we believe that more clear information about this subject can be obtained by conducting studies in larger groups. No significant difference was found in other subcomponents. In both groups, the total

PSQI was found to be above 5, indicating poor sleep quality in CKD compared with the healthy population.

CONCLUSION

Our study suggests that CKD causes quality of life and sleep disorders, and that HD treatment does not cause an additional deterioration. In fact, HD treatment has been shown to cause improvement in some subparameters of life and sleep quality. In conclusion, patients with CKD need to be closely monitored starting from early stages in terms of both quality of life and sleep.

Ethics Committee Approval: Ethics Committee approval was received for this study from the Ethics Committee of Fırat University School of Medicine Ethics Committee (Decision no: 07, date: 05.10.2017).

Informed Consent: Written informed consent was obtained from all patients who participated in this study.

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REFERENCES

1. Senkal Z, Sayar K, Kaptanoğulları ÖH, Yanartaş Ö, Türkcan A, Akın E, et al. Depression and quality of life in hemodialysis and predialysis patients in a sample from Turkey. Int J Acad Res 2016; 8: 36-43.
2. Manavalan M, Majumdar A, Kumar H, Priyamvada PS. Assessment of health-related quality of life and its determinants in patients with chronic kidney disease. Indian J Nephrol 2017; 27: 37-43. [CrossRef]
3. Ahmadzade A, Ahmadi SM, Sadeghi K, Sanagu A, Amiri SM, Moghadam AP, et al. Effect of narrative writing on quality of life in chronic renal failure patients underwent hemodialysis. Ann Trop Med Public Health 2017; 10: 1165-8. [CrossRef]
4. Chena KH, Yehb LC, Huanga HL, Chiangc YJ, Lind MH, Hsiehd CY et al. Factors Determining Physical and Mental Quality of Life of Living Kidney Donors in Taiwan. Transplant Proc. 2016; 48: 745-8. [CrossRef]
5. Zengin O, Yıldırım B. Perceptions of Hemodialysis Patients Related to Their Psychosocial Problems. Turk Neph Dial Transpl 2017; 26: 67-73. [CrossRef]
6. Mıstık S, Ünalan D, Tokgöz B. The effect of depression and perceived social support systems on quality of life in dialysis patients. Turk Neph Dial Transpl 2017; 26: 23-28 [CrossRef]
7. Pasquale CD, Conti D, Pistorio ML, Fatuzzo P, Veroux M, Nuovo SD. Comparison of the CBA-H and SF-36 for the screening of the psychological and behavioural variables in chronic dialysis patients. PLoS One 2017; 12: e0180077. [CrossRef]
8. Kang SH, Do JY, Lee SY, Kim JC. Effect of dialysis modality on frailty phenotype, disability, and health-related quality of life in maintenance dialysis patients. PLoS One 2017; 12: e0176814. [CrossRef]
9. Richard R, Rubin MP. Quality of life and diabetes. Diabetes Metab Res 1999; 15: 205-18. [CrossRef]
10. Fidaner H, Elbi H, Fidaner C, Eser SY, Eser E, Göker E. Yasam kalitesinin ölçülmesi, WHOQOL-100 ve WHOQOL-BREF. 3P Dergisi 1999; 7: 5-13.
11. Bossola M, Pepe G, Marzetti E. Health-related quality of life of patients on chronic dialysis: The need for a focused effort. Semin Dial 2017; 30: 413-6. [CrossRef]
12. Shıbata S, Tsutou A, Shıotanı H. Relation between sleep quality and daily physical activity hemodialysis outpatients. Kobe J Med Sci 2013; 59: 161-6.
13. Zeydi AE, Jannati Y, Khezri HD, Baradari G, Espahbodi, Lesani M, et al. Sleep quality and its correlation with serum C-reactive protein level in hemodialysis patients. Saudi J Kidney Dis Transpl 2014; 25: 750-5. [CrossRef]
14. Stanković TJ, Stojimirović B, Bukumirić Z, Hadžibulić E, Andrić B, Djordjević V, et al. Depression and quality of sleep in maintenance hemodialysis patients. Srp Arh Celok Lek 2014; 142: 437-43.[CrossRef]
15. Ataş DB, Arıkan H, Alışır S, Çiftçi EH. Comparison of Anxiety, Depression and the Quality of Life Between Hemodialysis and Renal Transplantation Patients. Turk Neph Dial Transpl 2017; 26: 171-6.
16. Ağargün MY, Kara H, Anla ÖA. The Validity and Reliability of the Pittsburgh Sleep Quality Index. Türk Psikiyatri Dergisi 1996; 7: 107-15
17. D'Onofrio G, Simeoni M, Rizza P, Caroleo M, Capria M, Mazzitello G, et al. Quality of life, clinical outcome, personality and coping in chronic hemodialysis patients. Ren Fail 2016; 39: 45-53. [CrossRef]
18. Poulsen CG, Kjaergaard KD, Peters CD, Jespersen B, Jensen JD. Quality of life development during initial hemodialysis therapy and association with loss of residual renal function. Hemodialysis International 2017; 21: 409-21. [CrossRef]
19. Dwyer JT, Larive B, Leung J, Rocco M, Burrowes JD, Chumlea C, et al. Nutritional Status Affects Quality of Life in Hemodialysis (HEMO) Study Patients at Baseline. J Ren Nutr 2002; 12: 213-23. [CrossRef]
20. Lønning K, Midtvedt K, Bernklev T, Brunborg C, Andersen MH, Lippe N, et al. Changes in health related quality of life in older candidates waiting for kidney transplantation. Nephrology (Carlton) 2018; 23: 948-56. [CrossRef]
21. Weisbord SD. Patient-Centered Dialysis Care: Depression, Pain, and Quality of Life. Semin Dial 2016; 29: 158-66.[CrossRef]
22. Sekercioglu N, Curtis B, Murphy S, Barrett B. Sleep quality and its correlates in patients with chronic kidney disease: a cross-sectional design. Renal Failure 2015; 37: 757-62. [CrossRef]
23. Shafi ST, Shafi T. A comparison of quality of sleep between patients with chronic kidney disease not on hemodialysis and end-stage renal disease on hemodialysis in a developing country. Ren Fail 2017; 39: 623-8. [CrossRef]