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Original Article *Özgün Araştırma*

EVALUATION OF DEPRESSION SYMPTOMS IN HEMODIALYSIS AND PERITONEAL DIALYSIS PATIENTS

Hemodiyaliz ve Periton Diyalizi Hastalarında Depresyon Belirtilerinin Değerlendirilmesi

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ABSTRACT

Objective: The therapies implemented in the treatment of chronic kidney failure are Hemodialysis, Peritoneal dialysis and transplantation. Depression is the most commonly observed psychological disorder in this patient group. The purpose of this study is screening depression in hemodialysis and peritoneal dialysis patients, comparing the patient groups and the evaluation of associated socio-demographic characteristics.

Material and Methods: The study population involved 63 chronic kidney failure patients 48 of whom were on hemodialysis and 15 were on peritoneal dialysis. Sociodemographic characteristics, medical history, and psychiatric history of the patients were recorded. The Beck Depression Inventory form was used to screen for depression symptoms. Student's t test, Mann-Whitney U test, chi-square test were used to analyze the data and Spearman correlation was used to evaluate the relationship between variables, and the significance level was taken as 0.05.

Results: There was no statistically significant difference between the groups (hemodialysis group and peritoneal dialysis group) in terms of age, gender, marital status, educational status, and employment status ($p>0.05$). There was not a significant difference between the groups in terms of dialysis durations. There was a statistically significant difference between the groups in terms of depression scores ($p<0.05$). The depression scores in hemodialysis group were found to be significantly higher compared to the peritoneal dialysis group.

Conclusion: In our study, the depression level was higher in the hemodialysis group than in the peritoneal dialysis group. Frequently seen psychological problems, especially depression, in dialysis patients decrease the functionality of the patients and disrupt the compliance with the treatment, which is more clear in hemodialysis patients. This study revealed that hemodialysis patients have a higher tendency to psychological problems such as depression compared to patients undergoing peritoneal dialysis.

Keywords: *End-stage renal failure, hemodialysis, peritoneal dialysis, depression*

ÖZ

Amaç: Kronik böbrek yetmezliği tedavisinde uygulanan tedaviler hemodiyaliz, periton diyalizi ve transplantasyondur. Depresyon bu hasta grubunda en sık görülen psikolojik rahatsızlıktır. Bu çalışmanın amacı hemodiyaliz ve periton diyalizi hastalarında depresyonun taranması, hasta gruplarının karşılaştırılması ve ilişkili sosyo-demografik özelliklerin değerlendirilmesidir.

Gereç ve Yöntemler: Çalışmaya 48'i hemodiyaliz, 15'i periton diyalizi olmak üzere 63 kronik böbrek yetmezliği hastası dâhil edildi. Hastaların sosyodemografik özellikleri, tıbbi öyküleri ve psikiyatrik öyküleri kaydedildi. Depresyon belirtilerini taramak amacıyla Beck Depresyon Envanteri formu kullanıldı. Verilerin analizinde student's t testi, Mann-Whitney U testi, ki-kare testi, değişkenler arasındaki ilişkinin değerlendirilmesinde Spearman korelasyonu kullanıldı ve anlamlılık düzeyi 0.05 olarak alındı.

Bulgular: Gruplar (hemodiyaliz grubu ve periton diyalizi grubu) arasında yaş, cinsiyet, medeni durum, eğitim durumu ve çalışma durumu açısından istatistiksel olarak anlamlı fark yoktu ($p>0.05$). Diyaliz süreleri açısından gruplar arasında anlamlı fark yoktu. Depresyon puanları açısından gruplar arasında istatistiksel olarak anlamlı fark saptandı ($p<0.05$). Hemodiyaliz grubunda depresyon skorlarının periton diyalizi grubuna göre anlamlı derecede yüksek olduğu görüldü.

Sonuç: Çalışmamızda hemodiyaliz grubunda depresyon düzeyi periton diyalizi grubuna göre daha yüksekti. Diyaliz hastalarında sıklıkla görülen başta depresyon olmak üzere psikolojik sorunlar hastaların işlevselliğini azaltmakta ve tedaviye uyumu bozmaktadır ki bu durum hemodiyaliz hastalarında daha belirgindir. Bu çalışma, hemodiyaliz hastalarının periton diyalizi geçiren hastalara göre depresyon gibi psikolojik sorunlara daha fazla yatkınlık gösterdiğini ortaya koydu.

Anahtar Kelimeler: *Son dönem böbrek yetmezliği, hemodiyaliz, periton diyalizi, depresyon*

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INTRODUCTION

Chronic kidney failure (CKF) is a significant public health problem with its increasing prevalence, high morbidity and mortality, and the preferred treatment options in the management of this disease are hemodialysis (HD), peritoneal dialysis (PD) and transplantation. The most frequently used method among these treatment options is hemodialysis (1). It was reported in 2018 that 60,643 patients were on HD, 3,192 patients were on PD, and 17,220 patients were transplanted in our country for the management of CKF, which is a serious health problem (2).

It is known that psychological problems are common among CKF patients (3-6). It was reported that the psychological disorders observed in patients with end-stage CKF might be caused by such facts as multiple drug use, disease-related stress and the frequency of admission and depression was reported to be the most common psychological disorder in these patients (7-10). As a clinically and economically important problem, depression is reported to be less frequently seen in PD patients than HD patients, and HD patients' life quality decreases, hospitalization and treatment costs increase as well as the risk of death in the presence of depression (11-15).

There are studies having assessed the prevalence of depression in dialysis patients in literature (16,17). Our purpose in this study is to compare the depression symptoms and associated factors in patients with end-stage kidney failure undergoing HD and PD, and discuss the possible causes in the light of literature.

MATERIALS AND METHODS

This study was carried out in patients undergoing dialysis treatment due to end-stage CKF followed-up at our hospital between the years 2019-2020. Clinical Researches Ethics Committee of the Kırıkkale University approved the current retrospective study with protocol no: 2024.01.18. The study was conducted in accordance with the declaration of Helsinki guidelines. The inclusion criteria of the study were determined as being over the age of 18 years and being on hemodialysis or peritoneal dialysis treatment due to end-stage CKF. The patients with depression history, those using antidepressant treatment and patients with mental disease were excluded from the study. Making use of the automation system of the hospital and the previous application data in the file archive, socio-demographic data of the patients (age, gender, co-morbidities, education levels, occupations, marital status, dialysis duration and dialysis frequency etc.) were recorded. Approval of the local ethics committee was obtained. The evaluation of depression symptoms was performed using Beck Depression Inventory, which included 21 questions and the answers of each question were scored between 0 and 3.

Beck Depression Inventory (BDI): This inventory was developed by Beck et al. (1961) to measure the level of depression symptoms and the severity changes in patients (18). BDI is a self-assessment scale, which is the most frequently used type in research and clinics. The inventory consists of 21 items, two of which address the emotions, eleven items address cognitions, two items address behaviors, five items address physical symptoms, and one item addresses interpersonal symptoms. The validity and reliability study of the inventory for Turkish language was performed by Hisli (1988) (19). Each item in the inventory contains a self-assessment sentence with 4 sub-items, scored between 0 and 3. The total score ranges from 0 to 63.

Statistical analysis

The statistical analysis of the data was performed with SPSS 22.0 program. Descriptive statistics of the variables was performed. The categorical variables are expressed in frequency and percentage, and the continuous variables are expressed in average mean and standard deviation. Chi-square analysis was used to determine the difference of the categorical variable ratios among the groups. The compliance of variables with normal distribution was evaluated using Kolmogorov-Smirnov test. Student-t test was used to find the significance of the differences between the average values of the two continuous variables and it was confirmed by the non-parametric Mann-Whitney U test. Spearman correlation was used to evaluate the relationship among the variables. When the sample size is small and the expected frequency in any of the cells is less than 5, Fisher's exact test was used instead of chi-square test. The results were evaluated at $p < 0.05$ significance level.

RESULTS

The average age of 63 patients (31 females, 32 males) who were undergoing dialysis treatment due to CKF was 57.25±15.53. The demographic characteristics of all dialysis patients are shown in Table 1.

There was no significant difference between HD and PD patients in terms of age, gender, marital status, education level. The average age of the patients undergoing HD and PD were 59.0±14.9years and 51.7±16.5years, respectively. 68.8% of hemodialysis patients were married, and 73.3% of peritoneal dialysis patients were married. 37.5% of HD and 60.0% of PD patients completed secondary school education and above. 29.2% of HD patients were employed compared to PD patients (26.7%). The mean±SD of the dialysis duration was 58.5±47.8 weeks for HD patients and 55.7±45.1 weeks for PD patients. The socio-demographic

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characteristics of HD and PD patients are presented in Table 2.

The Beck Depression Inventory Scores of HD and PD patients were 17.7±9.3 and 11.2±7.2, respectively. The BDI scores of HD patients were significantly greater than those of the PD patients ($p<0.05$). The Beck Depression Inventory scores by the type of dialysis are provided in Table 3.

In order to determine whether BDI score averages differ basing on the gender, marital status, educational status, employment status and location, Mann-Whitney U test was used. The results are presented in Table 4. Accordingly, it was found that BDI scores did not show a statistically significant difference in terms of gender, marital status, educational status, employment status and location ($p>0.05$).

Table 1: Demographic characteristics of dialysis patients

Variables	n=63
Age, years	57.25±15.53
Females n (%)	31 (49.2)
DM (%)	20 (31.7)
HT (%)	40 (63.5)
Smoking (%)	5 (7.9)
Duration of dialysis (weeks)	57.81±46.80
Patients with HD n (%)	48 (76.2)
Patients with PD n (%)	15 (23.8)

Notes: The data are presented as the mean±standard deviation and percentages.
DM: Diabetes mellitus, HT: Hypertension, HD: Hemodialysis, PD: Peritoneal dialysis

Table 2: Socio-demographic characteristics of hemodialysis and peritoneal dialysis patients

Variables	Hemodialysis (n=48)	Peritoneal dialysis(n=15)	p-value
Age, years	59.0±14.9	51.7±16.5	0.111
Sex			
Female	24 (50.0%)	7 (46.7%)	0.822
Marital status			
Married	33 (68.8%)	11 (73.3%)	1.000
Duration of dialysis (weeks)	58.5± 47.8	55.7±45.1	0.809
Education Level			0.109
Illiterate	13 (27.1%)	1 (6.7%)	
Primary school	17 (35.4%)	5 (33.3%)	
Secondary school	7 (14.6%)	2 (13.3%)	
High school	8 (16.7%)	4 (26.7%)	
University	3 (6.2%)	3 (20.0%)	
Occupation			0.662
Housewife/unemployed	22 (45.8%)	5 (33.3%)	
Public officer/worker	14 (29.2%)	4 (26.7%)	
Retired	12 (25.0%)	6 (40.0%)	
DM			0.528
Yes	14 (29.2%)	6 (40%)	
No	34 (70.8%)	9 (60%)	
HT			0.121
Yes	33 (68.8%)	7 (46.7%)	
No	15 (31.3%)	8 (53.3%)	
Smoking			0.083
Yes	2 (4.2%)	3 (20.0%)	
No	46 (95.8%)	12 (80%)	

Notes: The data are presented as the mean ± standard deviation and percentages.
DM: Diabetes mellitus, HT: Hypertension

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Table 3: Comparison of Beck Depression Scores of hemodialysis and peritoneal dialysis patients

	HD patients	PD patients	p-value
Beck Depression Inventory Score	17.7±9.3	11.2±7.2	0.016*

Notes: The data are expressed as the mean±standard deviation. *Student's *t*-test.

Table 4: Comparison of BDI scores of dialysis patients by gender, marital status, educational status, employment status and location

	N	Average rank	Z	p
BDI				
Women	31	35.02	-1.287	0.198
Men	32	29.08		
BDI				
Single	19	35.55	-1.012	0.311
Married	44	30.47		
BDI				
Unemployed	45	32.72	-0.495	0.621
Employed	18	30.19		
BDI				
Over sec. School	18	26.83	-1.417	0.157
Under sec. school	45	34.07		
BDI				
Village/dist.	26	37.04	-1.831	0.067
Centrum	37	28.48		

There is a statistically insignificant relationship between the BDI scores of the hemodialysis group and the dialysis durations (r=0.095, p=0.522), and a statistically insignificant relationship between the BDI scores of the peritoneal dialysis group and the dialysis times in negative direction (r=-0.110, p=0.696). In terms of dialysis duration and BDI scores of the patients, a weak positive correlation was found for HD patients and a weak relationship was found for PD patients in the negative direction.

Among the patients who underwent HD due to CKD, arteriovenous fistula was used as the HD administration route for 37 (77%) of the patients and central venous catheters were used for 11 (23%) of the patients.

DISCUSSION

It is reported that depression, which is stated to be the most frequent psychological problem in end-stage kidney failure patients for whom the self-care and treatment compliance decrease, is seen approximately in 25% of CKF patients; which is much more (about 4 times higher) compared to the normal population (20-22). In literature, it is reported that the depression prevalence was evaluated in elderly HD patients including the study conducted by Balogun et al., where the Beck Depression Inventory was used (15,23). Some measurement instruments, including the Beck Depression Inventory, have been used to screen/identify depression in patients with end-stage kidney failure, and among those tools, the most commonly used depression screening scale is stated to be the Beck Depression Inventory (9,11,24-27).

BDI, which is an inventory consisting of 21 items (scored between 0 and 3 for each question) is used for screening and determining the severity of depression, and for the normal population the cut-off value was accepted as 17 (19). When the literature is examined, it is seen that the cut-off value adopted in the studies conducted with dialysis patients and using BDI may vary per study. Wurther et al. stated that the patients on Peritoneal Dialysis with BDI scores of 11 and above should be further evaluated in terms of depression, and Kimmel PL et al. reported that ≥15 scale scores had a positive predictive value in diagnosing the major depressive disorders in HD patients (24,27). In their study, Uglešić et al. adopted the cut-off value for BDI as 16 in dialysis patients and used this value to distinguish patients with increased depression symptoms and in our study that we conducted with CKF patients undergoing hemodialysis and peritoneal dialysis, we used the Beck Depression Inventory to screen and determine the level of depression, and we identified the Beck Depression Inventory score as 17.7±9.3 for patients undergoing HD treatment and 11.2±7.2 for patients undergoing PD treatment (28). In our study, we accepted the limit value as 15 for depression symptoms and found the depression rate among our patients with CKF as (n=27, 56.3%) for HD patients and (n=15, 40.0%) for PD patients.

In hemodialysis treatment, undergoing treatment 2-3 times a week for 4-5 hours in dialysis application, diet

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and fluid restriction requirements, restrictions in daily life activities, and in peritoneal dialysis treatment, application of dialysis at home, absence of diet and fluid restriction requirements, and being physiological due to its continuity are the reasons that may explain the difference between the two patient groups in our study in terms of depression rates. This finding is consistent with other studies in the literature (29,30).

In addition to these, it was observed that the patients undergoing continuous outpatient peritoneal dialysis (COPD) were found to have a lower prevalence of depression compared to hemodialysis (HD) patients, and the patients treated with PD could have better independence, mobility and living quality than patients treated with hemodialysis (31).

It is reported in the publications in literature that there is a higher risk of developing complications in dialysis patients in the presence of depression and there is a relationship between depression and mortality in HD patients (15,32,33). In our study, BDI scores were detected to be significantly higher in HD group than PD group, but no mortality was observed in the follow-up period in both groups, and there was no statistical difference between the two groups in terms of depression-related mortality. Depression is the most commonly seen psychopathological condition in hemodialysis patients, and it has a negative clinical effect on patients with chronic diseases, including end-stage kidney failure (34). Another important issue regarding depression is its negative influence on the life quality of dialysis patients, which becomes more important when seen in a population with more than one comorbidity (35).

The underlying causes of depression are stated to be still ambiguous in dialysis patients with CKF, and there are two theories in literature that associate depression with the loss of internal control in these patients or consider depression as a direct or indirect consequence of kidney failure (34,36,37). Besides, there are many studies reported which associate depression with the inflammatory state, and in CKF, which is well known state of chronic inflammation, the cytokine-induced depression is argued to be related to the cytokine and acute-phase reactant levels, which tend to increase in uremic patients in terms of depression pathogenesis of dialysis patients (34). It has also been reported that most of the similar inflammatory biomarkers are irregular in end-stage kidney failure patients, and hence, there might be a direct biological link between increased depression levels and kidney disease (28).

There are some limitations in our study. It would be more useful if the sample size of the study was larger. Another limitation is that BDI, which is the self-assessment inventory used in the study, is a highly sensitive but moderately specific test. Further studies are required, where depression is screened with appropriate methods in patients with CKF.

As a commonly seen psychological problem in CKF patients, depression may decrease functionality of and disrupt the treatment compliance in these patients. In our study, we also found that BDI scores were significantly higher in patients undergoing HD treatment compared to PD patients as a result of the depression screening performed. This revealed that hemodialysis patients are more prone to psychological problems such as depression. In conclusion, we think that directing HD patients to psychiatric evaluation may increase patients' compliance and quality of life.

*Conflict of Interest***:** The authors have no conflicts of interest to declare.

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