ATATÜRK ÜNİVERSİTESİ YAYINLARI
ATATURK UNIVERSITY PUBLICATIONS

Research Article *Araştırma Makalesi*

DOI: 10.5152/JMHS.2022.223160

Does Tunneled Catheter Affect Depression and Anxiety in Hemodialysis Patients?

Tünelli Kateter Hemodiyaliz Hastalarında Depresyon ve Anksiyeteyi Etkiler mi?

Erdem ÇANKAYA[1]
Hasan DOĞAN[2]
Nurhan BİLEN[3]
Mahmut Başar AYKENT[4]
Halil ÖZCAN[5]

[1]Department of Nephrology, Atatürk University, Faculty of Medicine, Erzurum, Turkey
[2]Department of Medical Biology, Atatürk University, Faculty of Medicine, Erzurum, Turkey
[3]Department of Nephrology, T.C. Ministry of Health University of Health SciencesBursa Special Education and Research Hospital, Bursa, Turkey
[4]Department of Nephrology, University Health Sciences , Erzurum Regional Training and Research Hospital, Erzurum, Turkey
[5]Department of Psychiatry, Atatürk University, Faculty of Medicine, Erzurum, Turkey

ABSTRACT

Objective: Hemodialysis is the most common renal replacement therapy for end-stage renal disease. The incidence of depression and anxiety in hemodialysis patients was found to be higher than in the normal population.

Methods: One hundred sixty-six hemodialysis patients without neurological disease were included in the study. Beck Depression and Beck Anxiety Inventory questionnaires were answered by the patients. The groups who entered hemodialysis with arteriovenous fistula and those who entered with a tunneled catheter were compared. At the same time, the groups who were registered on the kidney transplant waiting list and those who were not registered were compared. In the present study, we aimed to compare depression and anxiety levels in hemodialysis patients.

Results: The patients who had applied to a transplantation program had statistically significantly lower anxiety scores compared to patients who did not (6–11, $p = .000$). The calculated anxiety score and depression score of the hemodialysis patients with fistula was statistically significantly lower than the hemodialysis patients with catheters (6–10 and 9.5–15; $p = .001$, $p = .002$, respectively).

Conclusion: According to the presented study, we speculate that the presence of tunnel catheter and lack of application to a transplantation program were significant risk factors for anxiety and depression disorder in hemodialysis patients or at least contribute to severity of the depression or anxiety disorder in hemodialysis patients.

Keywords: Anxiety, catheter, depression, hemodialysis, transplantation

ÖZ

Amaç: Hemodiyaliz, son dönem böbrek hastalığı (SDBY) için en yaygın renal replasman tedavisidir. Hemodiyaliz hastalarında depresyon ve anksiyete insidansı normal popülasyona göre daha yüksek olduğu tespit edilmiştir. Bu çalışmada hemodiyaliz hastalarında depresyon ve anksiyete düzeylerini karşılaştırmayı amaçladık.

Yöntemler: Nörolojik hastalığı olmayan 166 hemodiyaliz hastası çalışmaya dahil edildi. Beck Depresyon Envanteri ve Beck Anksiyete Envanteri anketleri hastalar tarafından yanıtlandı. Puanlama aynı envanter kullanılarak yapıldı. Hemodiyalize AV fistül ile girenler ile tünel kateter ile girenler karşılaştırıldı. Aynı zamanda böbrek nakli bekleme listesine kayıtlı olan ve olmayan gruplar da karşılaştırıldı.

Bulgular: Transplantasyon programına başvuran hastalar, başvurmayan hastalara göre istatistiksel olarak anlamlı düzeyde daha düşük anksiyete puanlarına sahipti (6–11, $p = ,000$). Fistüllü hemodiyaliz hastalarının hesaplanan anksiyete puanı ve depresyon puanı, kateterli hemodiyaliz hastalarına göre istatistiksel olarak anlamlı derecede düşüktü (sırasıyla 6 ila 10 ve 9,5 ila 15; $p = ,001$, $p = ,002$).

Sonuç: Sunulan çalışmaya göre, tünel kateter varlığının ve bir transplantasyon programına başvurulmamasının hemodiyaliz hastalarında anksiyete ve depresyon bozukluğu için önemli risk faktörleri olduğunu veya en azından hemodiyaliz hastalarında depresyon veya anksiyete bozukluğunun şiddetine katkıda bulunduğunu düşünüyoruz.

Anahtar Kelimeler: Endişe, kateter, depresyon, hemodiyaliz, transplantasyon

Geliş Tarihi/Received: 17.06.2022
Kabul Tarihi/Accepted: 02.08.2022
Yayın Tarihi/Publication Date: 22.01.2023

Sorumlu Yazar/Corresponding Author: Hasan DOĞAN
E-mail: dthdogan@gmail.com

Cite this article as: Çankaya, E., Doğan, H., Bilen, N., Başar Aykent, M., & Özcan, H. (2023). Does tunneled catheter affect depression and anxiety in hemodialysis patients? *Journal of Midwifery and Health Sciences*, 6(1), 1-6.

Introduction

End-stage renal disease (ESRD) is an irreversible loss of kidney function that is increasingly prevalent worldwide, threatening the life expectancy of patients (Hill et al., 2016). Hemodialysis (HD) is still the most common renal replacement modality used in the treatment of ESRD. Factors such as fatigue, weakness, anorexia, fluid retention, decrease in physical capacity, frequent and long-term hospitalization, multiple drug use, dietary restriction, and presence of comorbidities, which are frequently seen in ESRD patients, cause an increased incidence of anxiety and depression disorders in these patients compared to the general population (Palmer et al., 2012; Thomas et al., 2017; 2012; Cohen et al., 2016; Mosleh et al., 2020; Hou et al., 2014). Dialysis patients are exposed to intense physical and emotional stress. Besides, the preparation period of HD may be the only source of distress. Depression and anxiety are the main psychiatric disorders in HD patients. In the literature, it has been reported that the prevalence of depression in HD patients is 25–38%, and the prevalence of anxiety disorder is between 10% and 25% (Halen, 2012; Shammari et al., 2020; Ulusoy & Kal, 2020).

Depression and anxiety disorders in adult HD patients are associated with decreased quality of life. In addition, the presence of depression and anxiety causes a decrease in adherence to treatment and an increase in hospitalization and mortality (Cukor et al., 2009, 2013; Gerogianni et al., 2019; Halen, 2012; Kimmel et al., 2019; Loosman et al., 2015). It has also been shown that unhealthy living habits such as alcohol use, smoking, sedentary life, and malnutrition may contribute to mortality due to depression and anxiety in these patients (Kraus et al., 2016). In addition, it has been reported that depression and anxiety are associated with increasing age, other diseases, low income, and education (Gerogianni et al., 2018).

Methods

The study included 166 patients with HD treatment in two HD centers. Ethics committee approval was received for this study from Atatürk University Clinical Research Ethics Committee (Date: 24.06.2021, Decision No: 0.01.00/316). All participants gave informed consent, and the local institutional ethics committee approved the study methods. We obtained the informed consent of all patients. The study's exclusion criteria were those with mental retardation, those who had been undergoing HD treatment less than 1 year, those who could not complete the questionnaire, and those with degenerative diseases such as dementia. Patients with hemoglobin values above 10 g/dL and Kt/V 1.2 were included in the study. We recorded the duration of HD, type of dialysis vascular access, waiting time on the transplant waiting list, previous transplant history, and the cause of ESRD. In addition, we conducted patient interviews after the treatment on the day of the HD session.

The patients were divided into two groups according to their admission status to the waiting list. Patients in the first group were those who applied to the cadaver waiting list for transplantation. Patients in the second group were those who did not apply to the cadaveric waiting list for transplantation, although they did not have any contraindications for transplantation (eg., active malignancy, Panel Reaktive Antibody-PRA positivity). Patients were categorized as mild, moderate, and severe according to the Beck Anxiety and Depression Scoring System, and comparisons were made. In addition, comparisons were made between the groups that received HD for less than 2 years and more than 2 years.

Beck Depression Inventory

The Beck Depression Inventory (BDI) consists of 21 items and evaluates emotional, somatic, mental, and motivational symptoms of depression. Each item has a rating between 0 and 3. The total score is obtained by summing all the items. The high scores show a level of depression.

The standardized cutoff values are as follows:

Minimal depression symptoms: scores between 0 and 9

Mild depression symptoms: scores between 10 and 16

Moderate depression symptoms: scores between 17 and 29

Severe depression symptoms: scores between 30 and 63

Beck Anxiety Inventory

This questionnaire aims to evaluate anxiety symptoms rather than the diagnosis of an anxiety disorder. The subject answers the multiple-choice questions considering the last week. The answers were scored 0 to 3 accordingly to the severity of symptoms; choices include any, mild, moderate, and severe, and the total score is obtained by summing all the items. A higher total score indicates more severe anxiety symptoms.

Scoring is as follows:

Mild anxiety symptoms: scores between 8 and 15

Moderate anxiety symptoms: scores between 16 and 25

Severe anxiety symptoms: scores between 26 and 63

Patients were evaluated for symptoms of anxiety and depression via BDI and Beck Anxiety Inventory by an independent psychiatrist.

Statistical Analysis

Statistical analyses were performed using the IBM Statistical Package for Social Sciences Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA). The variables were investigated using visual (histograms and probability plots) and analytic methods (Kolmogorov–Smirnov/Shapiro–Wilk's test) to determine whether or not they are normally distributed. Data with normal distribution are given as mean ± standard deviation (SD) and the data whose distribution was not normal were given as median (interquartile range). After checking the normality distribution of scale variables, independent samples were compared with appropriate significance tests (e.g., the Mann–Whitney *U*-test, Kruskal–Wallis *H*-test). Pearson's chi square and Fisher's exact test were used for categorical variables where appropriate. The results with $p < .05$ were considered statistically significant.

Ethical Approval

Before starting the study, written permission was obtained from Atatürk University Clinical Research Ethics Committee (Date: 24.06.2021, Decision No: 0.01.00/316).

Results

The total number of HD patients in all centers included in the study was 181. Fifteen patients were excluded from the study because they did not obtain an informed consent or did not meet

Table 1.
Characteristic and Demographic Results of Hemodialysis Patients According to Sex

		Sex							
		Female				Male			
		Median	Range	*N*	%	Median	Range	*N*	%
Age		58.00	56.00			60.00	55.00		
Time (years)		6.00	20.00			6.00	21.00		
Anxiety score		10.00	37.00			7.00	33.00		
Depression score		11.00	36.00			10.00	51.00		
Access route	Fistula			45	61.6			53	57.0
	Catheter or graft			28	38.4			40	43.0
Transplant program	Has applied			59	80.8			72	77.4
	Did not apply			14	19.2			21	22.6
Primary disease	Hypertension			45	61.6			58	62.4
	Diabetes mellitus			17	23.3			15	16.1
	Glomerulonephritis			3	4.1			4	4.3
	FMF			0	0.0			2	2.2
	Other			8	11.0			14	15.1
Anxiety status	No anxiety			29	39.7			49	52.7
	Minimal anxiety			21	28.8			29	31.2
	Mild anxiety			16	21.9			6	6.5
	Severe anxiety			7	9.6			9	9.7
Depression status	Minimal depression			32	43.8			40	43.0
	Mild depression			16	21.9			30	32.3
	Moderate depression			22	30.1			14	15.1
	Severe depression			3	4.1			9	9.7

the inclusion criteria. A total of 166 adult HD patients over the age of 17 were included in the study. The demographic data of the patients are given in Table 1.

When we compared the patient groups according to gender, we find that there is no significant difference in the type of primary disease, patient age, duration of HD, history of previous transplantation, status transplant program admission, dialysis vascular access, and depression score and status of depression (6 vs. 6, respectively; $p > .05$). It was detected that the median anxiety score of the female patients was statistically significantly higher than male patients (10 vs. 7, respectively; $p = .007$). Mild and severe anxiety scores were statistically significantly commonly detected in female patients compared to male patients (21.9% vs. 9.6%, 6.5% vs. 9.7%, respectively; $p = .03$) (Table 1).

In the present study, we compared patient groups according to their admission to the transplant waiting list. We found that the patients who were on the transplant waiting list had a statistically significantly lower anxiety score than the patients who did not (6 vs. 11, respectively; $p = .000$). The calculated depression score of the patients on the waiting list was found to be significantly lower than the patients who were not (10 vs. 19.5, respectively; $p = .009$). The results are given in Table 2.

We evaluated the HD patients according to the dialysis vascular access. The calculated median age of patients with the catheter was statistically significantly higher than the patients with fistula (58 vs. 63 years, respectively; $p = .002$). We did not detect a significant difference among the duration of HD between the groups of patients according to dialysis vascular access. The calculated anxiety score and depression score of the HD patients with fistula was statistically significantly lower than the HD patients with catheters (6 vs. 10; $p = .001$ and 9.5 vs. 15; $p = .002$, respectively). The ratio of moderate-to-severe depression and anxiety status was detected to be significantly higher in the patients with catheters compared to the patients with fistula (18.4% vs. 26.4%; $p = .026$ and 7% vs. 13.2%; $p = .000$, respectively) (Table 2).

We compared the patients who had HD for up to 2 years with those who had HD for longer than 2 years. The anxiety score of the patients who had HD for up to 2 years was statistically significantly higher than those who had HD for longer than 2 years ($p = .004$) (Table 2).

Discussion

In several studies, the rate of depression was reported to be 20–40%, and rate of anxiety was reported to be 10–50% in chronic kidney disease (Collister et al., 2019; Goh & Griva, 2018). In the present study, the calculated rate of severe depression was 28.9% and mild-to-severe anxiety rate was 22.9%. According to gender, it has been reported that anxiety disorder is more common in females compared to males. Besides this, it has also been reported that female patients were more prone to depressive disorders (Gerogianni et al., 2018). It has also been reported that there is an increase in the rate of depressive and anxiety disorder previously to the beginning of renal replacement therapy which fade away after initiation of dialysis (Cicero et al., 2018). Accordingly, in our study, we detected that the depression and anxiety

Table 2.
Comparisons of Anxiety and Depression Scores of Patient Subgroups According to Dialysis Access Route and Application Status to a Transplantation Program

		Dialysis access route				
		Fistula		**Catheter or graft**		
		Median	**Range**	**Median**	**Range**	***p***
Comparison of HD patients according to dialysis access route	Age (years)	58.00	65.00	63.00	55.00	.002
	Anxiety score	6.00	33.00	10.00	37.00	.001
	Depression score	9.50	48.00	15.00	51.00	.002
Depression status of the patients according to dialysis access route		Dialysis access route				*p*
		Fistula		Catheter or graft		
		Count	%	Count	%	
	Minimal depression	49	50.0	23	33.8	.000
	Mild depression	28	28.6	18	26.4	.056
	Moderate depression	18	18.4	18	26.4	.026
	Severe depression	3	3.1	9	13.2	.000
Anxiety status of the patients according to dialysis access route	No anxiety	52	53.1	26	38.2	.000
	Minimal anxiety	28	28.6	22	32.3	.034
	Mild anxiety	11	11.2	11	16.1	.002
	Severe anxiety	7	7.1	9	13.2	.000
Patients who had HD longer than 2 years		Dialysis access route				*p*
		Fistula		Catheter or graft		
		Median	Range	Median	Range	
	Age (years)	58.00	51.00	64.00	55.00	.064
	Anxiety score	5.50	33.00	9.00	37.00	.004
	Depression score	9.50	48.00	14.50	51.00	.014
Patients who had HD up to 2 years		Dialysis access route				*p*
		Fistula		Catheter or graft		
		Median	Range	Median	Range	
	Age (years)	58.00	55.00	61.00	30.00	.043
	Anxiety score	9.00	28.00	11.50	30.00	>.05
	Depression score	9.00	24.00	15.00	30.00	>.05
Comparison of HD patients according to application to a transplantation program		Application to a transplantation program				*p*
		Had applied		Did not apply		
		Median	Range	Median	Range	
	Age (years)	60.00	54.00	68.50	4.00	.032
	Anxiety score	6.00	37.00	11.00	30.00	.000
	Depression score	10.00	51.00	19.50	42.00	.009

Note: HD = hemodialysis.

scores of HD patients who have been on dialysis for up to 2 years were significantly higher than patients who have been on dialysis for longer than 2 years. It is seen that the symptoms of anxiety and depression are more common in patients at the beginning of dialysis, and these symptoms gradually decrease after 2 years. The discomfort and ignorance of the new lifestyle that is forced at the beginning of dialysis can cause anxiety and depressive symptoms. The new lifestyle, which is becoming accustomed to, may also cause these symptoms to decrease after a certain period of time. It has been reported that depression and anxiety were significantly related with female gender, increased patient age, low education level, retirement, marital status, comorbidities, and bad financial situation (Gerogianni et al., 2018). In our study, meanwhile, we detected that the patient age is a significant independent risk factor for depression but not for anxiety.

There are several reports stating that depression and anxiety disorders in HD patients are affected by many factors such as advanced age, sociodemographic characteristics, low income, and low hemoglobin (Ozen et al., 2019; Park et al., 2010). In our study, we detected that the patients with arteriovenous fistula as dialysis vascular access had significantly lower anxiety and depression score compared to the patients with catheter after 2 years of HD therapy. This may be related to the high number

of hospitalizations due to vascular access-related problems and catheter infections. We speculated that keeping on with catheters as a dialysis vascular access can be a significant risk factor for anxiety and depression disorders in HD patients.

The presence of comorbid diseases such as diabetes, cardiac diseases, and hypertension was mentioned as risk factors for anxiety disorder in several reports. In our study, the presence of comorbid disease was not found as a risk factor for anxiety or depression.

Anxiety and depression are common psychiatric disorders in HD patients. It is known that many factors can cause these disorders or increase the severity of the existing disorder. According to the present study, we think that the presence of a catheter and not applying to the transplant waiting list in HD patients are important risk factors for anxiety and depression, or at least contribute to the severity of depression or anxiety disorder in HD patients.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Ataturk University (Date: 24.06.2021, No: 0.01.00/316).

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

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – E.Ç., H.O.; Design – E.Ç.; Supervision – H.D.; Resources – H.O, H.D.; Data Collection and/or Processing – N.B., M.B.A.; Analysis and/or Interpretation – E.Ç., M.B.A.; Literature Search – E.Ç., N.B.; Writing Manuscript – E.Ç.; Critical Review – E.Ç., H.D.

Declaration of Interests: The authors declare that they have no competing interest

Funding: The authors declare that this study had received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite onayı Atatürk Üniversitesi Etik Kurulundan (Tarih: 24.06.2021, No: 0.01.00/316) alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir – E.Ç., H.O.; Tasarım – E.Ç.; Denetleme – H.D.; Kaynaklar – H.O., H.D.; Veri Toplanması ve/veya İşlemesi – N.B., M.B.A.; Analiz ve/veya Yorum – E.Ç., M.B.A.; Literatür Taraması – E.Ç., N.B.; Yazıyı Yazan – E.Ç.; Eleştirel İnceleme – E.Ç., H.D.

Çıkar Çatışması: Yazarlar, çıkar çatışması olmadığını beyan etmişlerdir.

Finansal Destek: Yazarlar, bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

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Genişletilmiş Özet

Son dönem böbrek hastalığı (ESRD), dünya çapında giderek yaygınlaşan ve hastaların yaşam beklentisini tehdit eden geri dönüşümsüz bir böbrek fonksiyon kaybıdır. Hemodiyaliz (HD), SDBY tedavisinde halen en yaygın kullanılan renal replasman yöntemidir. SDBY hastalarında sıklıkla görülen yorgunluk, halsizlik, iştahsızlık, sıvı tutulumu, fiziksel kapasitede azalma, sık ve uzun süreli hastanede yatış, çoklu ilaç kullanımı, diyet kısıtlaması, komorbiditelerin varlığı gibi faktörler anksiyete insidansının ve genel popülasyona kıyasla bu hastalarda depresyon bozuklukları artmasına neden olur. Diyaliz hastaları yoğun fiziksel ve duygusal strese maruz kalmaktadır. Ayrıca hemodiyalize hazırlık süreci tek sıkıntı kaynağı olabilir.

Erişkin HD hastalarında depresyon ve anksiyete bozukluğu yaşam kalitesinde azalma ile ilişkilidir. Ayrıca depresyon ve anksiyete varlığı tedaviye uyumun azalmasına, hastaneye yatış ve mortalitenin artmasına neden olmaktadır. Alkol kullanımı, sigara kullanımı, hareketsiz yaşam, yetersiz beslenme gibi sağlıksız yaşam alışkanlıklarının da bu hastalarda depresyon ve anksiyeteye bağlı ölümlere katkıda bulunabileceği gösterilmiştir. Ayrıca depresyon ve anksiyetenin artan yaş, diğer hastalıklar, düşük gelir ve eğitim ile ilişkili olduğu bildirilmiştir.

Çalışmaya hemodiyaliz tedavisi gören 166 hasta dahil edildi. Zeka geriliği, bir yıldan az hemodiyaliz tedavisi görenler, anketi doldurama-yanlar ve demans gibi dejeneratif hastalığı olanlar çalışmanın dışlanma kriterleri olarak belirlendi. Hemoglobin değeri 10 g/dl ve Kt/V 1.2'nin üzerinde olan hastalar çalışmaya alındı. Hemodiyaliz süresi, diyaliz damar yolu tipi, nakil bekleme listesinde bekleme süresi, önceki nakil öyküsü ve SDBY'nin nedeni kaydedildi. Ayrıca hemodiyaliz seansının olduğu gün tedavi sonrası hasta görüşmeleri gerçekleştirdik.

Hastalar bekleme listesine alınma durumlarına göre iki gruba ayrıldı. İlk hasta grubunu nakil için kadavra bekleme listesine başvuranlar oluşturdu. İkinci grup hastalar, nakil için herhangi bir kontrendikasyonu (aktif malignite, PRA pozitifliği vb.) olmadığı halde nakil için kadavra bekleme listesine başvurmayan hastalardı. Hastalar Beck anksiyete ve depresyon skorlama sistemine göre hafif, orta ve şiddetli olarak sınıflandırıldı ve karşılaştırmalar yapıldı. Ayrıca 2 yıldan az ve 2 yıldan fazla hemodiyaliz tedavisi gören gruplar arasında karşılaştırmalar yapıldı.

İstatistiksel analizler, Windows için IBM SPSS Statistics, Sürüm 22.0 Armonk, NY: IBM Corp. kullanılarak gerçekleştirilmiştir. Normal dağılım gösteren veriler ortalama±standart sapma (SS), normal dağılım göstermeyen veriler ortanca (çeyrekler arası aralık-IQR) olarak verildi. Ölçek değişkenlerinin normallik dağılımı kontrol edildikten sonra, bağımsız örnekler uygun anlamlılık testleriyle (örn. Mann-Whitney U testi, Kruskal-Wallis H testi) karşılaştırıldı. Uygun durumlarda kategorik değişkenler için Pearson ki-kare ve Fisher'in kesin testi kullanıldı. $p<0.05$ olan sonuçlar istatistiksel olarak anlamlı kabul edildi.

Çalışmaya dahil edilen tüm merkezlerdeki toplam hemodiyaliz hasta sayısı 181'dir. On beş hasta bilgilendirilmiş onam almadıkları veya dahil edilme kriterlerini karşılamadıkları için çalışma dışı bırakıldı. Çalışmaya 17 yaş üstü toplam 166 yetişkin hemodiyaliz hastası dahil edildi.

Hasta gruplarını cinsiyete göre karşılaştırdığımızda; Primer hastalık tipi, hasta yaşı, hemodiyaliz süresi, önceki transplantasyon öyküsü, transplantasyon programına başvuru durumu, diyaliz damar yolu, depresyon skoru ve depresyon durumu açısından anlamlı fark yoktu (sırasıyla 6'ya karşı 6 p>0,05). Kadın hastaların ortalama depresyon skoru erkek hastalardan istatistiksel olarak anlamlı derecede yüksek olduğu saptandı (10'a karşı 7, p=0,007). Hafif ve şiddetli anksiyete kadın hastalarda erkeklere göre istatistiksel olarak anlamlı şekilde daha sık saptandı (%21.9'a karşı %9.6, %6.5'e karşı %9.7; sırasıyla p=0.03).

Nakil bekleme listesinde olan hastaların, olmayan hastalara göre istatistiksel olarak anlamlı derecede daha düşük depresyon skoruna sahip olduğunu bulduk (6'ya karşı 11, p=0.000). Bekleme listesindeki hastaların hesaplanan depresyon skoru, bekleme listesinde olmayan hastalara göre anlamlı olarak düşük bulundu (10'a karşı 19,5, p=0,009).

HD hastalarını diyaliz damar yoluna göre değerlendirdik. Kateterli hastaların hesaplanan medyan yaşı fistüllü hastalardan istatistiksel olarak anlamlı derecede yüksekti (58'e karşı 63 yıl, p=0,002). Diyaliz damar yoluna göre hasta grupları arasında HD süreleri arasında anlamlı bir fark saptamadık. Fistülü olan HD hastalarının hesaplanan anksiyete puanı ve depresyon skoru, kateteri olan HD hastalarına göre istatistiksel olarak anlamlı derecede düşüktü (sırasıyla 6'ya karşı 10 p=0,001, 9,5'e karşı 15 p= 0,002). Orta-ağır depresyon ve anksiyete durumunun oranı kateterli hastalarda fistüllü hastalara göre anlamlı olarak daha yüksek saptandı (sırasıyla %18,4'e karşı %26,4 p=0,026; %7'ye karşı %13,2 p=0,000)

HD hastalarında depresyon ve anksiyete bozukluklarının ileri yaş, sosyo-demografik özellikler, düşük gelir, düşük hemoglobin gibi birçok faktörden etkilendiğini bildiren çok sayıda yayın bulunmaktadır. Çalışmamızda diyaliz damar yolu olarak arteriyovenöz fistülü olan hastaların 2 yıllık HD tedavisinden sonra kateter takılan hastalara göre anksiyete ve depresyon skorlarının anlamlı olarak daha düşük olduğunu saptadık. Bu durum damar yolu ile ilgili sorunlar ve kateter enfeksiyonları nedeniyle hastaneye yatış sayısının fazla olmasına bağlı olabilir. Hemodiyaliz hastalarında diyaliz damar yolu olarak kateter takılı kalmasının anksiyete ve depresyon bozuklukları için önemli bir risk faktörü olabileceğini düşündük.

Diyabet, kalp hastalıkları ve hipertansiyon gibi hastalıkların varlığı çeşitli yayınlarda anksiyete bozukluğu için risk faktörleri olarak belirtilmiştir. Çalışmamızda ek hastalık varlığı anksiyete veya depresyon için bir risk faktörü olarak bulunmadı.

Anksiyete ve depresyon hemodiyaliz hastalarında sık görülen psikiyatrik bozukluklardır. Birçok faktörün bu rahatsızlıklara neden olabileceği veya var olan rahatsızlığın şiddetini artırabileceği bilinmektedir. Sunulan çalışmaya göre, HD hastalarında kateter bulunması ve nakil bekleme listesine başvurmamanın anksiyete ve depresyon için önemli risk faktörleri olduğunu veya en azından HD hastalarında depresyon veya anksiyete bozukluğunun şiddetine katkıda bulunduğunu düşünüyoruz.