



Depression and suicidal ideation in hemodialysis patients

Demet Yavuz^{a,*}, Omer Faruk Yurt^b, Ayse Pinar Dogru Balakbabalar^c,
Mehmet Derya Demirag^d

^aSamsun Training and Research Hospital, Division of Nephrology, Samsun, Turkey

^bSamsun Training and Research Hospital, Internal Medicine, Samsun, Turkey

^cSamsun Training and Research Hospital Clinic of Psychiatry, Samsun, Turkey

^dSamsun Training and Research Hospital, Internal Medicine, Samsun, Turkey

ARTICLE INFO

Keywords:

Depression; suicidal ideation;
hemodialysis

Received: Dec 05, 2021

Accepted: Mar 03, 2022

Available Online: Mar 18, 2022

DOI:

[10.5455/annalsmedres.2011.11.635](https://doi.org/10.5455/annalsmedres.2011.11.635)

Abstract

Aim: Depression and suicide are more common comorbidities in end-stage renal disease patients than in healthy populations, but suicide has rarely been studied. Our research aimed to evaluate the relation between depressive mood and suicidal ideation in hemodialysis cases.

Materials and Methods: 112 hemodialysis patients were included in the study. The sociodemographic characteristics of the patients and the laboratory test results were obtained from the file records. Beck Depression Inventory (BDI) and Suicidal Ideation Scale (SIS) were administered through face-to-face interviews.

Results: We enrolled 112 volunteer hemodialysis patients [female/male, 48/64; age 59.9±13.5 years; hemodialysis duration 36.5 months (6-291)]. We divided the cases into two groups based on their BDI scores as those with depressive mood (BDI score ≥ 17, n= 47) (42%) and those without (BDI score < 17, n= 65) (58%). Of the cases with depression, 38 (68.1%) were female, and 15 were male (31.9%) (p < 0.001). While age, calcium, and SIS were higher in the depressive group than in the other group, serum albumin levels were lower. A positive correlation was found between BDI and SIS (r=0.216, p < 0.05). The suicide ideation scale was positively correlated with age (r=0.254, p < 0.001), BDI (r=0.231, p < 0.05), and hemoglobin level (r=0.194, p < 0.05), while it was negatively correlated with serum albumin level (r= -0.250, p < 0.001).

In Multiple Logistic Regression analysis, gender (OR: 5.915, 95%CI [2.086-16.776], p < 0.001) and serum albumin level (OR: 0.021, 95%CI [0.003-0.149], p < 0.001) were determined as independent risk factors for depressive mood. However, in Multiple Logistic Regression analysis, there was no significant relationship between SIS score and depressive mood (OR: 1.070, 95%CI [0.937-1.221], p>0.05).

Conclusion; Depression was higher in hemodialysis patients, and depressed patients had higher suicidal ideation. Depression had no increment effect on the suicide risk. We think it would be beneficial to consider suicidal ideation along with depression.



Copyright © 2022 The author(s) - Available online at www.annalsmedres.org. This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Introduction

Depression is the most frequent psychological problem seen in cases undergoing hemodialysis treatment. Studies have revealed that chronic renal failure patients with depression under hemodialysis treatment have high mortality rates [1]. Dieting, fluid restrictions, limitations in bodily functions, time constraints, concerns about not fulfilling roles in the social environment or family, sexual dysfunctions, and death anxiety can cause depression in patients with kidney failure. It is known that 20-30% of patients with kidney failure experience depression [1, 2, 3].

'Suicide,' which is frequently used in psychiatric and medical terminology, means taking one's own life. It originates from the combination of the Latin words 'sui', meaning 'himself' and 'caedere,' to kill [4]. The most feared depression complications are losing recovery hope and refusing treatment and are considered suicidal behaviors. Patients with the end-stage renal disease face physical and psychological losses are the main stressors, leading to lack of control and suicidal ideation [5]. Suicide can be a result of depression. Although a high risk of suicide is known among hemodialysis patients, this issue has rarely been studied [6], and it is essential to determine the relationship between psychological problems and suicide risk for dialysis patients.

*Corresponding author:

Email address: demet.yavuz@saglik.gov.tr (Demet Yavuz)

Suicidal ideation and depression are fairly common end-stage renal disease (ESRD) comorbidities but rarely studied. We think that the biopsychosocial approach to patients with ESRD is fundamental. Therefore, our study aimed to evaluate the relation between depressive mood and suicidal ideation in hemodialysis cases with clinical and laboratory results.

Materials and Methods

The study included 112 patients undergoing hemodialysis for at least the last six months, were over the age of 18, had no cognitive impairment, and were followed up in our clinic. This study was approved by Samsun Training and Research Hospital's local ethics committee (GOKA/2021/16/2), and this study was conducted in accordance with the Declaration of Helsinki. The sociodemographic characteristics of the patients and the laboratory test results studied in their routine follow-up were obtained from the clinical file records. Beck Depression Inventory and Suicidal Ideation Scale were applied through face-to-face interviews.

Beck Depression Inventory (BDI): Beck developed it in 1961 as a 21-item scale. Each question is scored between 0-3, and a total score is taken between 0-63. The interpretation of total scores obtained are as follows: 0-9- no/minimal depression, 10-16- mild depression, 17-29- moderate depression, and 30-63- severe depression [7]. Crossover points were evaluated during the BDI Turkish version development, and total scores of 17 and above were identified as determining the 90% of the depression requiring treatment [8].

The suicidal Ideation Scale (SIS) was developed by Levine et al. in 1989 (9). It includes parameters increasing the risk of suicide attempts, such as uncontrollable anger, desire to harm oneself or others, hopelessness, death thoughts and desires to die, low self-esteem, feelings of guilt, slow thinking and speaking, and depression. It is a scale consisting of 17 questions; each scored between 0-1. The total score that can be obtained varies between 0-17, and a high score indicates the presence of pronounced suicidal ideation. The reliability and validity study in our country was done by Dilbaz et al. [10].

Statistical analysis

SPSS 21.0.0.1 for Windows (SPSS; IBM) software was used for the analysis. Kolmogorov-Smirnov test was used to determine data distribution. The one-way ANOVA test of homogeneity of variance was used to define the homogeneity of the variables. According to the data distribution, median and minimum-maximum or mean and standard deviation were used to report continuous variables and percentages for categorical variables. T-test or Man Whitney U test was used by data distribution when comparing laboratory parameter changes within the groups. The Fisher's Exact Test or Chi-square test was performed for categorical variable comparison between the two groups. The Logistic regression (Method: Backward: Conditional) test was performed in risk factor analysis. A p-value of < 0.05 was accepted statistically significant.

Table 1. Sociodemographic characteristics and laboratory parameters of all patients

Variable	Mean±sd (range)
Age, year	59.9 ± 13.5 (23-87)
Gender (F/M) (%)	48/64 (%42.9 / %57.1)
Dialysis duration, months (median)	36.5 (6-291)
Marital status (married/single)(%)	70 (%62.5) /42(%37.5)
Calcium±sd (mg/dL)	8.7±0.7
Phosphorus±sd (mg/dL)	5.2±1.2
Albumin±sd (g/dL)	3.6±0.4
Ferritin (median) (ng/mL)	395.9 (28-1014)
Hemoglobin±sd (g/dL)	10.7±1.2
iPTH (median) (pg/mL)	276 (10-2177)
CRP (median) (mg/L)	7.7 (0.7-348)
BDI ±sd (min/max)	14.9±4 (min 2, max 34)
SIS ±sd (min/max)	3.3±4 (min 0, max 13)

Results

The study included one hundred twelve patients (64 males, 48 females) with HD duration of 36.5 (6-291) months and age 59.9±13.5 years. Sociodemographic characteristics and laboratory parameters of the patients participating in the study are given in Table 1. According to the BDI score, [10-16] mild depression was detected in 26 (23.2%) patients, [17-29] moderate depression in 42 (37.5%) patients and severe depression [30-63] in 5 (4.5%) patients.

CRP (C-reactive protein), iPTH (intact parathyroid hormone), BDI (Beck Depression Inventory), SIS (Suicidal Ideation Scale)

CRP (C-reactive protein), iPTH (intact parathyroid hormone), BDI (Beck Depression Inventory), SIS (Suicidal Ideation Scale)

We divided cases into two groups by their BDI scores as those with depressive mood (BDI score ≥ 17, n= 47) (42%) and those without (BDI score < 17, n= 65) (58%). Of the cases with depression, 38 (68.1%) were female, and 15 were male (31.9%) (p < 0.001). There was a female predominance in the depressed patient group (Table 2). While age, calcium, and SIS were higher in the depressive group than in the other group, serum albumin levels were lower (Table 2). In Table 2, the data and comparison results of the sociodemographic, clinical, and laboratory parameters of the two groups evaluated in terms of depressive and non-depressive mood were given. There was also a positive correlation between BDI and SIS (r=0.216, p < 0.05). The suicide ideation scale was positively correlated with age (r=0.254, p < 0.001), BDI (r=0.231, p < 0.05), and hemoglobin level, while it was negatively correlated with serum albumin level (r= -0.250, p < 0.001).

In Multiple Logistic Regression analysis, gender (OR: 5.915, 95%CI [2.086-16.776], p < 0.001) and serum albumin level (OR: 0.021, 95%CI [0.003-0.149], p < 0.001) were determined as independent risk factors for depressive mood. However, in Multiple Logistic Regression analysis, there was no significant relationship between SIS score and depressive mood (OR: 1.070, 95%CI [0.937-1.221], < 0.05) (Table 3).

Table 2. Comparison of sociodemographic characteristics and laboratory parameters of depressed and non-depressed patients

	Depressive Group n= 47) (42%)	Non-Depressive Group n=65) (58%)	p
Age, year	62.9±11.2	57.8±14.6	< 0.05
Gender (F/M)	32/15	16/49	< 0.001
Dialysis duration, months (median)	42(6-291)	33 (11-220)	<0.05
Marital status (married/single)	29/18	41/24	<0.05
Calcium±sd (mg/dL)	8.5±0.6	8.8±0.7	< 0.05
Phosphorus±sd (mg/dL)	5.1±1.4	5.3±1.1	<0.05
Albumin±sd (g/dL)	3.4±0.3	3.7±0.3	< 0.001
Ferritin (median) (ng/mL)	458(28.6-1014)	385.5(1-855)	<0.05
Hemoglobin±sd (g/dL)	10.8±1.2	10.7±1.3	<0.05
iPTH median (pg/mL)	313(99-2177)	265(10-1350)	< 0.05
CRP (median) (mg/L)	7.7(0.7-348)	7.8(0.9-326)	<0.05
BDI ±sd (min/max)	22(17-34)	9(2-16)	< 0.001
SIS ±sd (min/max)	3(0-13)	1(0-13)	< 0.05

Table 3. Regression model for the independent variable BDI with age, gender, SIS, PTH, albumin, calcium

Variable	B	SE.	Wald	df	p-value	OR	95 % CI	
							Lower	Upper
Age	0.021	0.022	0.926	1	0.336	1.021	0.978	1.067
Gender	1.778	0.532	11.172	1	0.001	5.915	2.086	16.776
SIS	0.068	0.068	1.002	1	0.317	1.070	0.937	1.221
iPTH	0.001	0.001	2.892	1	0.089	1.001	1.000	1.003
Albumin	-3.872	1.003	14.895	1	0.000	0.021	0.003	0.149
Calcium	0.523	0.417	1.574	1	0.210	0.593	0.262	1.342

Discussion

Depression is common in end-stage renal disease (ESRD) cases, but suicide is rarely studied. This study shares our experiences about depression and suicidal ideation in hemodialysis patients. In our study, 42% of the patients had a depressive mood. Suicide and depression were positively related, and higher levels of depression were associated with higher levels of suicidal ideation. However, in Logistic Regression analysis, there was no significant relationship between SIS score and depressive mood.

Several studies have shown that moderate depressive symptoms are present in 25% of ESRD cases, and major depression is expected in 5-22% of ESRD cases [11]. The dialysis-induced depression etiology is multifactorial and related to biopsychosocial mechanisms [3]. Genetic predisposition, cytokine levels increment, and neurotransmitters affected by uremia are among the biological mechanism [12]. The psychosocial factors are hopelessness, loss, perception of lack of control, loss of job, and changing social and family relationships (12). Depression is an important determinant affecting survival and is strongly associated with suicide and quality of life [12]. In our study, the depressive mood was present at a rate of 42%. This study was conducted under pandemic conditions. We thought that the high rate of depressive emotion might be due to the SARS-Cov-2 pandemic.

Malnutrition is correlated with an increased hospitalization and mortality rate for hemodialysis patients [13]. This situation is explained by malnutrition and inflammation

[13]. Loss of appetite (anorexia) and weight loss are frequent symptoms of depression and may also be associated with malnutrition. In our study, depressed patients had lower serum albumin levels than non-depressed patients. Besides, while the suicide ideation scale was negatively correlated with serum albumin level, it was positively correlated with hemoglobin level.

Elderly hemodialysis patients are known to exhibit more depressive symptoms. It has been reported that discontinuation of dialysis treatment occurs more frequently in this group of patients, which can be considered suicide [11, 14]. In hemodialysis patients, the loss of physical function increases with time and age. Therefore, elderly hemodialysis patients need more emotional support regarding depression and suicidal ideation [15]. In addition, emotional support in this patient's group will help cope with depression and stress. In our study, both the depression score and the suicide scale were positively correlated with age.

'Suicide,' which is frequently used in psychiatric and medical terminology, means taking one's own life. It originates from the combination of the Latin words 'sui', meaning 'himself' and 'caedere,' to kill (4). Self-harming acts varying from self-injury to completed suicide are among the utmost feared events in ESRD patients [16], and dialysis patients are more likely to attempt suicide than the healthy population [12,17]. Eating foods high in potassium or missing only a few dialysis sessions is sufficient to attempt suicide in a dialysis patient [17]. Two studies, including a meta-analysis by Hackney and Snaders, demon-

strated that religious commitment was highly associated with appropriate psychological functioning, and participation in religious institutions protected the patient against suicide [18, 19]. We think that the patient's depression did not have an increasing effect on suicidal behavior in our study may be related to religious commitment and religious coping.

The female gender is generally accepted as a significant risk factor for depression [20]. However, considering that men undergoing hemodialysis take the responsibility of providing for the family, we think that the loss of independence due to dialysis may accelerate the depression development in this group of patients. In our study, similar to the literature, female patients had higher depression scores than males. In addition, it has been shown that female patients with renal failure have higher suicidal ideation levels than male patients due to the lower quality of life [15]. However, there was no significant difference between the two genders in suicidal ideation in our study.

Depression in dialysis patients affects mortality and is also related to an increased risk of suicide [12]. Discontinuation of dialysis is also very common in hemodialysis patients and is more common than suicide, especially before death. In addition, discontinuation of dialysis should be considered suicide [6]. As expected, there was a positive correlation between the depression score and the suicide scale in our study. Among all the patients, the number of patients who discontinued dialysis was two.

This study had certain limitations. First of all, the study was conducted with a relatively small sample. In addition, since the scales used in our study are based on the expression of one's feelings and thoughts, correct results may be prevented if the patient cannot give correct answers.

Conclusion

Depression was relatively high in hemodialysis patients, and depressed patients had higher suicidal ideation than patients without depression. In this population, depression was associated with female gender, old age, and malnutrition. However, depression did not increase the risk of suicide. We believe that a multidisciplinary approach to patients with end-stage renal disease and considering suicidal ideation along with depression for early diagnosis would be beneficial.

References

- Lopes AA, Bragg J, Young E et al. Depression as a predictor of mortality and hospitalization among hemodialysis patients in the United States and Europe. *Kidney Int.* 2002; 62: 199–207.
- Kimmel PL, Peterson RA, Weihs KL, Simmens SJ, Alleyne S, Cruz I & Veis JH (2000) Multiple measurements of depression predict mortality in a longitudinal study of chronic hemodialysis outpatients. *Kidney International* 57, 2093–2098.
- Chilcot J, Wellsted D, Da Silva-Gane M & Farrington K (2008) Depression on dialysis. *Nephron. Clinical Practice* 108, 256–264
- Staff, WSD. *Dorland's illustrated medical dictionary*. Philadelphia: WB Saunders, 1994. 999(1290): p. 1699.
- Durkheim E & Simons J (1992) Suicide and fertility: a study of moral statistics. *European Journal of Population* 83, 175–197.
- Levina M, Kimmel PL, Young BS, et al: Suicide in the United States end-stage renal disease program. *J Am Soc Nephrol* 2005; 16:774–781.
- B. Kalender, A. C. Ozdemir, E. Dervisoglu, O. Ozdemir: Quality of life in chronic kidney disease: effects of treatment modality, depression, malnutrition and inflammation. *Int J Clin Pract*, April 2007, 61, 4, 569–576
- Hisli N. Beck Depresyon Envanteri'nin geçerliliği üzerine bir çalışma. *Psikoloji Dergisi* 1998;6:118–22
- Levine, S., R.u. Ancill, and A. Roberts, Assessment of suicide risk by computer-delivered self-rating questionnaire: preliminary findings. *Acta Psychiatrica Scandinavica*, 1989. 80(3): p. 216–220.
- Dilbaz, N., et al., İntihar düşüncesi ölçeğinin geçerlilik ve güvenilirliği. 31. Ulusal Psikiyatri Bilimler Kongresi Bilimsel Çalışma Kitabı, 1995: p. 40–41.
- Cohen LM, Dobscha SK, Hails KC, et al: Depression and suicidal ideation in patients who discontinue the life-support treatment of dialysis. *Psychosom Med* 2002; 64:889–896
- Chih-Ken Chen , Yi-Chieh Tsai, Heng-Jung Hsu, et al: Depression and suicide risk in hemodialysis patients with chronic renal failure *Psychosomatics* Nov-Dec 2010;51(6):528–528.e6. DOI: 10.1176/appi.psy.51.6.528
- Kalantar-Zadeh K, Abbott KC, Salahudeen AK, et al: Survival advantages of obesity in dialysis patients. *Am J Clin Nutr* 2005; 81:543–554
- Kutner NG, Brogan D, Hall WD, Haber M & Daniels DS (2000) Functional impairment, depression and life satisfaction among older hemodialysis patients and age-matched controls: a prospective study. *Archives of Physical Medicine and Rehabilitation* 81, 453–459
- Kusek JW, Greene P, Wang SR, Beck G, West D, Jamerson K, Agodoa LY, Faulkner M & Level B (2002) Cross-sectional study of health related quality of life in African Americans with chronic renal insufficiency: the African American Study of Kidney Disease and Hypertension Trial. *American Journal of Kidney Diseases* 39, 513–524.
- Crosby, A. E., Han, B., Ortega, L. A., Parks, S. E., & Gfroerer, J. (2011). Suicidal thoughts and behaviors among adults aged 18 years–United States, 2008–2009. *MMWR Surveillance Summaries*, 60(13), 1–22
- De Sousa, A. (2008). Psychiatric issues in renal failure and dialysis. *Indian Journal of Nephrology*, 18(2), 47–50.
- Hackney, C. H., & Sanders, G. S. (2003). Religiosity and Mental Health: A Meta-Analysis of Recent Studies. *Journal for the Scientific Study of Religion*, 42(1), 43–55.
- Chaaya, M., Sibai, A. M., Fayad, R., & El-Roueiheb, Z. (2007). Religiosity and depression in older people: Evidence from underprivileged refugee and non-refugee communities in Lebanon. *Ageing Mental Health*, 11(1), 37–44
- Unal S (2000) Depression and personality. *Index of Affective Disorders* 2, 72–76