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Evaluation of psychopathological symptoms, death anxiety, coronavirus anxiety, suicide risk, and associated risk factors among hemodialysis patients in the COVID-19 pandemic

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Abstract

Background: Hemodialysis (HD) patients have significant mental health problems related to the COVID-19 pandemic. Thus, this study aimed to evaluate the psychopathological symptoms, death anxiety, coronavirus anxiety, suicide risk, and associated risk factors in HD patients during COVID-19.

Methods: This cross-sectional study was conducted from July 15 to October 15, 2021, with 114 HD patients who were undergoing treatment in two central dialysis units.

Results: It was determined that HD patients had high levels of psychopathological symptoms. Approximately, one-third of HD patients (31.6%) had high to very high-level death anxiety. Additionally, of the participants 30.7% had coronavirus anxiety, and also the rate of severe suicide risk was 10.5%.

Conclusions: HD patients have experienced various mental health problems during the COVID-19 pandemic. Psychosocial support and interventions need to be planned by the healthcare system and healthcare providers to help HD patients in managing their disease and related mental health problems.

KEYWORDS

coronavirus anxiety, COVID-19, death anxiety, hemodialysis patients, psychopathology, suicide risk

1 | INTRODUCTION

The new Coronavirus disease 2019 (COVID-19), which first emerged in China and since then spread rapidly throughout the world, was declared a pandemic by the World Health Organization (WHO) in March 2020 [1]. The virus that causes COVID-19 has been defined as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the Coronaviridae Study Group [2]. Despite the long period since the beginning of the pandemic, COVID-19 remains a threat to the physical and mental health of the public.

Chronic kidney disease (CKD) is an important public health issue affecting approximately 10% of the global population [3]. Renal replacement therapy (RRT) is applied in patients diagnosed with end-stage renal disease (ESRD). The most commonly used RRT method in our country is maintenance hemodialysis (HD) (77.3%), followed by transplantation (17.4%), and peritoneal dialysis (5.3%). The prevalence was calculated as 935 per million population and the incidence as 147 per million population [4]. HD patients have faced serious psychosocial problems arising from the chronic nature of their disease [5]. Usually, they are exposed to psychological stressors such as challenges in their social lives due to frequent visits and prolonged waiting time for therapy, feelings of uncertainty about the future, fear of death, and decreased self-confidence [6].

Consistently, it has been demonstrated that HD patients experience high prevalence of psychiatric disorders [7, 8].

In the context of COVID-19, due to the high transmissibility and high mortality of SARS-CoV-2, it threatens the lives of people, especially those with chronic diseases (diabetes mellitus, hypertension, chronic renal failure, etc.) [9, 10]. Furthermore, mortality rates in dialysis patients infected with SARS-CoV-2 were found to be higher than in the general population [11, 12]. On the other hand, longitudinal studies indicated an increase in mental health problems in general population compared to the pre-pandemic period [13, 14]. Besides having a chronic disease, high risk of being infected with SARS-CoV-2 and its related mortality, may lead to an increase in psychopathological conditions (e.g., somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoia, psychoticism) in HD patients. Accordingly, in limited studies, it was found that anxiety and depression levels increased in HD patients during this pandemic [15, 16]. However, to date, no detailed study has been found in the literature on the psychopathological conditions of HD patients.

Death anxiety can be defined as the feeling of worry, irritability, or fear that arises due to increased awareness of a real or imagined threat to one's existence [17]. HD patients, who are dependent on a machine for survival, have decreased quality of life, have reduced life expectancy, and this may lead to death anxiety [18]. Although survival times have increased due to hemodialysis treatment, living with a life-threatening disease increases death anxiety [19]. Additionally, the accessibility of death-related thoughts increases during virus pandemics [20]. Considering that death anxiety is associated with many psychological disorders, it is an important psychological symptom that should not be neglected.

Coronavirus anxiety describes the possible dysfunctional anxiety cases related to the COVID-19 pandemic [21]. A study conducted on the general population during the pandemic indicated that high levels of coronavirus anxiety can cause serious psychological problems [22]. Remarkably, this is the first study to investigate coronavirus anxiety in HD patients, which may be associated with a significant loss in psychological functioning.

Previous studies have indicated that suicide may be the most serious consequence of mental disorders among HD patients [23, 24], and they have a higher risk of suicide than the general population [25]. Consistently, a high incidence of suicide threats and attempts has been demonstrated among HD patients [26]. To date, there has been no study investigating the risk of suicide in HD patients during COVID-19. Therefore, it is crucial to evaluate the risk of suicide in order to intervene in a timely precaution and prevent a serious suicide attempt.

There have been limited studies investigating mental health status in HD patients during the COVID-19 pandemic. Since this patient group is already vulnerable to mental disorders, it has been evaluated that comprehensive studies are needed to plan the required therapeutic interventions. To the best of the author's knowledge, this is the first study to evaluate the psychopathological symptoms, coronavirus anxiety, death anxiety, and suicide risk simultaneously in HD patients.

In summary, it was aimed in this study to evaluate the psychopathological symptoms, death anxiety, coronavirus anxiety, and suicide risk in HD patients during COVID-19, and determine the relationship between these factors. This study also investigated the demographic and clinical risk factors associated with mental health status and the psychological effects of the current pandemic on HD patients.

2 | METHODS

This multicenter and cross-sectional study was conducted at the Dialysis Centers in two state hospitals in a metropolitan city, from July to October 2021. When selecting these centers, several criteria were considered; central location, easy transport to the center, patient capacity, number of patients undergoing HD treatment, HD machines and equipments used in the center have the most modern technical features, and sufficient number of healthcare professionals (doctor, nurse, technician, etc.) working in the center. Based on these criteria, these two centers were selected and the patients undergoing treatment constituted the universe of the study. The patients were contacted by the researchers face to face during HD sessions. They were undergoing three sessions of hemodialysis lasting 4 h per week. A total of 114 patients who agreed to participate and met the participation criteria were included in the study. Besides sociodemographic and clinical data, the Brief Symptom Inventory (BSI), Turkish Death Anxiety Scale (TDAS), Suicide Probability Scale (SPS), and Coronavirus Anxiety Scale (CAS) were used for assessment.

Criteria for inclusion were as follows; agree to participate in the study, above 18 years old, undergoing HD treatment for at least 1 year, being able to read or understand the contents of the scales, and able to communicate. Criteria for exclusion were as follows: having psychiatric treatment in the last 3 months, having serious psychiatric and neurological disorders that will impair cognition (e.g., dementia, mental retardation, epilepsy, alcohol/substance abuse or addiction, psychosis). An informed consent form was obtained from all participants for the study. This study was conducted according to the

Declaration of Helsinki and Republic of Turkey Ministry of Health Scientific Research Platform (file no: 2021-03-17T14_49_35). Study approval was obtained from the local Ethics Committee for the study (approval number: 2021-167).

2.1 | Assessment tools

2.1.1 | Brief Symptom Inventory

The BSI was performed to evaluate psychopathological and psychological symptoms [27]. The BSI is a 53-item self-report, five-point Likert-type scale, ranging from 0 (not at all) to 4 (extremely). The BSI contains nine symptom subscales, namely somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Subscales are determined by dividing the total score of the items by the number of items. The global severity index (GSI) is a summary index of "psychological distress," was used as the primary BSI outcome measure. GSI is determined by the total score of all items divided by the total item number. High scores are characteristic of participants with greater psychological distress [28]. The validity and reliability study of the Turkish version was performed [29]. The alpha coefficients of the factor subscale ranged between 0.73 (for depression) and 0.92 (for somatization). Cronbach's α for GSI was 0.91 in this study.

2.1.2 | Turkish Death Anxiety Scale

This scale was developed by Sarıkaya and Baloğlu [30]. The concurrent validity of the TDAS was evaluated in relation to the Revised-Death Anxiety Scale (R-DAS), which was developed by Thorson and Powell [31], and found to be significantly correlated with the R-DAS. The scale includes 20 items scored on a five-point Likert-type ranging from 0 (never) to 4 (always). The total scale scores may range from 0 to 80 and the higher scores indicate higher levels of death anxiety. According to the total score range, death anxiety levels are evaluated as very low (0–7), low (8–25), medium (26–44), high (45–63), and very high (64–80). The Cronbach's α value of the TDAS was 0.83 in this study.

2.1.3 | Suicide Probability Scale

The scale was developed to evaluate the suicide risk [32]. It is a self-report scale with 36 items on a four-point Likert-type ranging from 1 (never) to 4 (always).

The higher scores indicate a higher risk of suicide. Validity and reliability of the Turkish version of the scale were performed and the optimized cut-off score was found as point 110 [33]. The Cronbach's α value of the SPS was 0.88 in this study.

2.1.4 | Coronavirus Anxiety Scale

CAS was developed to identify possible cases of dysfunctional anxiety related to the COVID-19 pandemic [21]. The scale is a five-point Likert-type scale ranging from 0 (not at all) to 4 (nearly every day) and includes five items. The optimized cut-off score of CAS was found as point of ≥5 [34]. Scores higher than the cut-off score indicate clinically significant coronavirus anxiety. The Turkish validity and reliability study of the scale was performed [35]. The Cronbach's α value of the CAS was 0.85 in this study.

2.2 | Statistical analysis

Statistical data were obtained using number and percentage distribution, mean values, and standard deviations. In statistical analysis, independent t test was used for data with normal distribution to determine the differences between groups in independent samples. Chi-square (χ^2) test was used to detect group differences of categorical variables. ANOVA test was used to compare continuous and normally distributed variables between groups. Tukey HSD test was used to determine the source of differentiation. Pearson's correlation analysis was used to evaluate the relationship between variables with normal distribution. All tests were two-tailed, and the level of significance was $p < 0.05$. Statistical analyzes were performed using SPSS Windows version 21.0.

3 | RESULTS

The study sample consisted of 114 patients who were undergoing HD treatment. The mean age of the participants was 60.61 ± 15.10 (min: 22, max: 90). Of them, 14% were below 50 years old, 66.7% were between the age of 50–75, and 72.3% were above 75 years old. Of the participants 52.6% were men, 47.4% were women, 71.9% were married, 35.1% graduated from a university, 81.5% were living with their family, 28.9% had a history of a psychiatric disease, 28.1% needing self-care and social support. Additionally, 2.6% ($n = 3$) of the participants reported that they were diagnosed with COVID-19, and 17.6% ($n = 20$) had history of suicidal ideation (Table 1). Also, there was no one with a history of suicide attempt.

TABLE 1 Sociodemographic characteristics of participants ($n = 114$)

	n	**Percentage**
Age		
>50	16	14
50–75	76	66.7
<75	22	19.3
Gender		
Male	60	52.6
Female	54	47.4
Marital status		
Married	82	71.9
Single	32	28.1
Graduated from a university		
Yes	40	35.1
No	74	64.9
Living with family		
Yes	93	81.5
No	21	18.5
History of psychiatric disease		
Yes	33	28.9
No	81	71.1
Needing self-care and social support		
Yes	32	28.1
No	82	71.9
History of suicidal ideation		
Yes	20	17.6
No	94	82.4
Diagnosed with COVID-19		
Yes	3	2.6
No	111	97.4

The mean HD therapy period of the patients was found to be 13.6 years (min: 1.3, max: 28). The primary causes of ESRD were nephrosclerosis (39.5%), diabetic nephropathy (31.6%), chronic glomerulonephritis (9.6%), and others (19.3%). The clinical course, complications, hemodialysis time and efficiency, and laboratory data in HD patients are summarized in Table 2.

The mean scores of the BSI subscales were as following: somatization 0.96 ± 0.94, depression 0.91 ± 0.89, obsession–compulsion 0.97 ± 0.64, interpersonal sensitivity 0.83 ± 0.56, anxiety 0.89 ± 0.79, hostility 0.61 ± 0.62, phobic anxiety 0.70 ± 0.51, paranoid ideation 0.71 ± 0.57, and psychoticism 0.62 ± 0.42, and also, the mean score of the GSI was found to be 0.71 ± 0.51 (min: 0.13; max: 2.43) in this study. Additionally, in adult non-patients, norm of

TABLE 2 Clinical course, complications, and laboratory data in hemodialysis patients ($n = 114$)

	n (%)
Primary disease	
Nephrosclerosis	45 (39.5%)
Diabetic nephropathy	36 (31.6%)
Chronic glomerulonephritis	11 (9.6%)
Others	22 (19.3%)
Complications	
Hypertension (yes/no)	42/72, 36.8%/63.2%
Diabetes mellitus (yes/no)	38/76, 33.3%/66.7%
Cardiovascular disease (yes/no)	11/103, 9.7%/90.3%
Chronic respiratory disease (yes/no)	8/106, 7%/93%
Peripheral arterial disease (yes/no)	6/108, 5.3%/94.7%
Malignancy (yes/no)	3/111, 2.6%/97.4%
Laboratory test data	
Alb (g/dL)	3.3 ± 0.8
UN (mg/dL)	53.7 ± 20.3
Cr (mg/dL)	11.2 ± 7.6
CRP (mg/dL)	5.32 ± 6.45
WBC (/μL)	6548 ± 3532
Hb (g/dL)	11.5 ± 2.1
GFR (mL/min/1.73 m^2)	33
Sodium (mmol/L)	138.5 ± 4.6
Potassium (mmol/L)	4.6 ± 0.7
Dialysis method	
Hemodialysis	
Hemodialysis time	
Three sessions per week	
4 h per session	
Hemodialysis efficiency	
Kt/V: 1.42 ± 0.23	
URR: $71.64\% \pm 6.34\%$	
Dialysis fluid flow rate (mL/min)	
500	
Blood flow rate (mL/min)	
320 ± 18	
Ultrafiltration volume (L)	
2.5 ± 1.1	

Abbreviations: Alb, albumin; Cr, creatinine; CRP, C-reactive protein; GFR, glomerular filtration rate; Hb, hemoglobin; Kt/V, urea clearance × dialysis time/urea distribution volume; UN, urea nitrogen; URR, urea reduction ratio; WBC, white blood cell count.

the mean scores of somatization, depression, obsession–compulsion, interpersonal sensitivity, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and GSI

TABLE 3 Comparisons of the mean scores of the TDAS, SPS, CAS, and GSI between sociodemographic data

	TDAS		SPS		CAS		GSI	
	M ± SD	p	M ± SD	p	M ± SD	p	M ± SD	p
Age								
>50	34.37 ± 20.32	F = 9.34	59.5 ± 9.67	F = 7.576	7.4 ± 1.2		0.33 ± 0.39	F = 12.48
50–75	31.21 ± 22.91	**0.001**	65.65 ± 9.66	**0.001**	6.5 ± 1.67	**0.409**	0.65 ± 0.47	**0.001**
<75	39.02 ± 20.27		71.22 ± 9.8		7.14 ± 2.16		1.08 ± 0.52	
Gender								
Female	39.75 ± 22.5	**0.001**	64.9 ± 11.29	**0.319**	7.65 ± 1.69	**0.011**	0.79 ± 0.59	**0.039**
Male	31.81 ± 16.27		66.73 ± 8.05		6.06 ± 1.75		0.59 ± 0.42	
Marital status								
Single	27.78 ± 18.86	**0.011**	63.03 ± 7.01	**0.051**	8.03 ± 2.18	**0.105**	0.42 ± 0.4	**0.001**
Married	38.47 ± 20.14		66.97 ± 10.42		6.71 ± 1.78		0.79 ± 0.52	
Graduated from a University								
Yes	32.31 ± 20.24	**0.215**	64.6 ± 8.74	**0.303**	7.55 ± 1.23	**0.183**	0.57 ± 0.32	**0.032**
No	37.24 ± 20.21		66.57 ± 10.22		6.76 ± 2.02		0.76 ± 0.59	
Live with someone								
Alone	26.8 ± 18.84	**0.003**	64.14 ± 8.45	**0.370**	7.33 ± 1.15	**0.632**	0.39 ± 0.29	**0.001**
With family	37.88 ± 20.47		66.25 ± 9.98		6.93 ± 1.93		0.76 ± 0.53	
Needing self-care and social support								
Yes	43.21 ± 21.23	**0.001**	70.15 ± 10.31	**0.003**	7.02 ± 2.19	**0.932**	1.08 ± 0.71	**0.001**
No	31.67 ± 18.69		64.19 ± 9.01		6.94 ± 1.79		0.54 ± 0.31	
History of psychiatric disease								
Yes	38.23 ± 21.5	**0.107**	61.6 ± 8.22	**0.002**	6.66 ± 1.32	**0.498**	0.49 ± 0.3	**0.001**
No	32.15 ± 16.43		67.6 ± 9.79		7.07 ± 2.03		0.77 ± 0.56	
History of suicidal ideation								
Yes			70.57 ± 12.60	**0.02**				
No			64.92 ± 0.91					

Note: Bold values indicate significant p values (p < 0.05).

Abbreviations: BSI, Brief Symptom Inventory; CAS, Coronavirus Anxiety Scale; F, ANOVA test; GSI, Global Severity Index; SPS, Suicide Probability Scale; TDAS, Turkish Death Anxiety Scale.

were found to be 0.34 ± 0.42, 0.31 ± 0.53, 0.48 ± 0.63, 0.35 ± 0.56, 0.33 ± 0.51, 0.34 ± 0.48, 0.18 ± 0.39, 0.50 ± 0.66, 0.22 ± 0.42, and 0.34 ± 0.42, respectively [27]. Accordingly, all psychopathological symptom levels were found to be higher in this study. Moreover, GSI was significantly higher in HD patients who were female, were above 75 years old, were married, had not graduated from university, were needing self-care and social support, and had a history of psychiatric disease (p < 0.05) (Table 3).

The mean score of the TDAS was found to be 36.47 ± 20.28 (min: 1; max: 71) in this study. Additionally, in adult non-patients, norm of the mean TDAS score was found to be 28.33 ± 19.17 [30]. Hence, the mean score was found to be higher in this study. Furthermore, death anxiety was significantly higher in HD patients who were

female, were above 75 years old, were married, were living with their family, and were in need of self-care and social support (p < 0.05) (Table 3). According to the total score of TDAS, the rate of death anxiety levels were found to be as 10.5% (n = 12) very low, 24.6% (n = 28) low, 33.3% (n = 38) medium, 20.2% (n = 23) high, and 11.4% (n = 13) very high.

The mean score of the SPS was found to be 65.86 ± 9.72 (min: 43; max: 124) in this study. In adult non-patients, norm of the mean SPS score was found to be 60.86 ± 11.13 [33]. Hence, the mean score was higher in this study. Moreover, the rate of suicide risk was 10.5% (n = 12, SPS score ≥ 110). Furthermore, suicide risk was significantly higher in HD patients who were above 75 years old, needing self-care and social support, had a

	GSI	SPS	CAS	TDAS
GSI				
SPS	$r = 0.442; p = 0.005$			
CAS	$r = 0.414; p = 0.006$	$r = 0.042; p = 0.662$		
TDAS	$r = 0.667; p = 0.001$	$r = 0.113; p = 0.231$	$r = 0.651; p = 0.001$	

TABLE 4 Correlation between the scores of GSI, SPS, TDAS, and CAS

Abbreviations: CAS, Coronavirus Anxiety Scale; GSI, Global Severity Index; r, Pearson correlation analysis; SPS, Suicide Probability Scale; TDAS, Turkish Death Anxiety Scale.

history of psychiatric disease, and had history of suicidal ideation ($p < 0.05$) (Table 3).

The mean score of CAS was found to be 3.31 ± 2.86 (min: 0; max: 12) and the rate of coronavirus anxiety was 30.7% in this study. In adult non-patients, norm of the coronavirus anxiety rate was found to be 25.4% [34]. Hence, the rate of coronavirus anxiety was higher in this study. Moreover, coronavirus anxiety was statistically higher among the participants who were female ($p < 0.05$) (Table 3).

The relationship between scores of the CAS, GSI, SPS, and TDAS was analyzed using Pearson correlation analysis. There was a significant positive correlation between GSI and SPS ($r = 0.442$; $p < 0.05$), and CAS ($r = 0.414$; $p < 0.05$), and TDAS ($r = 0.667$; $p < 0.05$). There was also significant positive correlation between TDAS and CAS ($r = 0.651$; $p < 0.05$). In addition, there was a positive correlation between SPS and CAS ($r = 0.042$; $p = 0.662$), and TDAS ($r = 0.113$; $p = 0.231$), that was not statistically significant ($p > 0.05$) (Table 4).

4 | DISCUSSION

In this study, it was found to be that HD patients had high levels of psychopathological symptoms such as somatization, obsession–compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, and also psychological distress. Although there are studies evaluating anxiety and depression in HD patients during the current pandemic [15, 36], to date no study has been found that evaluated other psychopathological symptoms together. According to the results of these studies, it was found that the prevalence of anxiety and depression increased in HD patients. Due to the lack of studies with similar methods and using similar assessment tools in this study in which HD patients were the participants, comparison cannot be possible. Therefore, in terms of assessing psychopathological symptoms, the findings of this study were compared with norms of adult non-patients [28, 37] and with the findings of a study including HD patients which was conducted before COVID-19 [38]. It is worth

noting that psychopathological symptom levels in this study were found to be higher than in these studies. Furthermore, in this study, demographic and clinical risk factors causing higher psychopathological symptoms were evaluated as female gender, advanced age (>75), being married, lower educational status, need for self-care and social support, and history of psychiatric disease. Factors such as psychosocial and economic problems due to the pandemic, increased physical activity limitation due to social isolation, lack of curative treatment or vaccine against the infection, continuing to increase the number of cases and deaths related to the disease, uncertainty about the pandemic and hopelessness, exposure to negative news about the pandemic in the mass media, increased perceived danger and stress, fear of contacting and contaminating with the virus, inadequate coping skills and stress management strategies, and decreased in social support may cause an increase in psychopathological symptoms in HD patients.

Death anxiety causes severe distress to patients suffering from life-threatening diseases. The findings in this study obtained that HD patients have medium-level death anxiety in general. It is worth noting that approximately one-third (31.6%) of HD patients have experienced high to very high levels of death anxiety. Due to the lack of studies using TDAS in which HD patients were the participants, the comparison could not be possible. Consistently in a study conducted with HD patients in current pandemic using Templer's Death Anxiety Scale [39], it was demonstrated that death anxiety levels were increased compared to the pre-pandemic period among the patients of HD [40]. In this study, higher levels of death anxiety were associated with female gender, advanced age (>75), being married, living with family, and needing self-care and social support. Factors such as having a chronic illness, a high risk of getting infected with the virus and also being vulnerable to COVID-19 [41], challenges in accessing healthcare facilities for routine check-ups and HD sessions due to mobility restrictions during the pandemic, might be the reasons for high levels of death anxiety.

Previous studies have indicated that the suicide rates among HD patients are higher than the general population [26, 42]. In a study conducted on the general

population during COVID-19, it was found that suicide rates increased [43]. Notably, this is the first study focusing on suicide risk in patients undergoing HD therapy during COVID-19. In this study, it was found that the rate of suicide risk was 10.5% in HD patients. Due to the lack of study evaluating suicide risk in HD patients during this pandemic, comparison was not possible. Notably, in this study, it was determined that the suicide risk was associated with advanced age (>75), need for self-care and social support, history of psychiatric disease, and history of suicidal ideation. Factors such as having serious mental health problems due to the negative emotional impact of the pandemic, increasing psychological distress and hopelessness, fear of death due to COVID-19, decreased life quality and life expectancy, and feeling helpless, may increase the risk of suicide.

Coronavirus anxiety is a specific type of anxiety that describes the anxiety associated with COVID-19 [21]. In this study, it was found that the rate of coronavirus anxiety was found to be 30.7%. Additionally, coronavirus anxiety was higher in females. However, no significant difference was found in terms of other demographic and clinical data. Although studies have been conducted on coronavirus anxiety in the general population [44] and healthcare professionals [45], no studies have been found in patients with HD.

The study findings confirmed that psychopathological symptoms positively correlated with suicide risk, coronavirus anxiety, and death anxiety. Considering that synergistic interactions between psychological factors are common, this result is not surprising. Furthermore, there was a positive correlation between coronavirus anxiety and death anxiety. This result can be evaluated as the increased general anxiety levels in HD patients have a triggering role on specific anxiety types.

In the study, it was considered remarkable that the psychological distress, death anxiety, and suicide risk were higher in patients above 75 years old and in need of self-care and social support. Accordingly, previous studies have also evaluated that elderly patients experience severe death anxiety during COVID-19 [46, 47]. Moreover, it has been declared by the WHO [48] that the suicide rate is highest above the age of 75. In another study, it was found that a functional family and social support reduced the risk of suicide [49]. So, it was evaluated that these patients were more susceptible to mental health problems. Therefore, these patients should have priority in psychosocial support. Additionally, suicide risk and death anxiety are more important issues to be evaluated in HD patients, which may negatively affect the course of treatment and even cause them to stop treatment [50].

This study has several limitations. First, because of the cross-sectional design, the findings provide only a snapshot of psychological effects at a particular point in time, and a longitudinal study is required to provide information on whether the observed impact will last for longer periods. Second, the study sample was comparatively low can be considered a limitation in terms of generalizability of the findings. Therefore, studies with larger samples are needed. Third, due to the limited studies focusing on the mental health status of HD patients during COVID-19, the findings could not be adequately compared. Hence, further studies are needed.

However, despite these limitations, the findings of this study provide a considerable contribution to the literature regarding the effects of the COVID-19 pandemic on mental health in HD patients.

In conclusion, data from the results of this study indicate that psychopathological symptoms, coronavirus anxiety, death anxiety, and suicide risk are considerable mental health problems among hemodialysis patients, which require timely diagnosis and adequate intervention to improve prognosis. To date, no study has been found that examines the aforementioned mental health problems and associated risk factors simultaneously in hemodialysis patients during the current pandemic. Furthermore, this study, in which these psychological problems and related demographic and clinical risk factors are evaluated separately, can be a guide to psychological intervention and psychological counseling. Hemodialysis patients should be provided with psychosocial support to manage their illness and related mental health conditions. Psychoeducation should be given to patients and caregivers by mental health providers (e.g., psychologists, psychiatrists) on issues such as coping with negative psychological consequences, gaining problem-solving skills, and gaining mental health-promoting behaviors. Notably, the risk of suicide and death anxiety is more important psychological issues to be considered in hemodialysis patients, which may negatively affect the course of treatment. Consistently, the findings of this study indicated that death anxiety and suicide risk should be carefully evaluated in these patients. Lastly, studies are needed to confirm the findings of this study and to investigate the temporal variation of the psychopathological impact of the pandemic on hemodialysis patients.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The data presented in this study are available on request from the corresponding author.

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