

ORIGINAL ARTICLE

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Psychological effects of the COVID-19 pandemic on hemodialysis patients**Funda Datli Yakaryilmaz¹, Irem Pembegül²**

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**Abstract**

During the unprecedented COVID-19 pandemic, there is insufficient information about the psychological effects and factors that will affect the mental health status of hemodialysis (HD) patients. We aimed to evaluate the psychological effects of the COVID-19 pandemic on HD patients. There is an observational study in secondary-level healthcare services in eastern Turkey. There were a total of 176 respondents. Sociodemographic data of the participants were obtained from the files. All participants were measured with the Fear of COVID-19 Scale (FVC-19S) the depression anxiety and stress scale (DASS-21). There were significant differences between FVC-19S, depression, and anxiety in the age groups ($p<0.001$, $p<0.001$, $p<0.001$, respectively). While there was no difference in stress levels between age groups, stress levels were found to be significantly higher in males. ($p<0.001$). When important public health events such as pandemics break out, especially HD patients with advanced age and multiple comorbid diseases should be evaluated carefully and psychologically, and early intervention should be provided.

Keywords: COVID-19, Hemodialysis, Psychological distress, FVC-19S

Introduction

The coronavirus disease pandemic, which is still showing its effect all over the world, is a public health problem of international importance. The epidemic and the restrictions will inevitably cause psychological problems in society. The first cases of a COVID-19 pandemic, which affected the whole world, appeared in Wuhan, China at the end of December. The World Health Organization (WHO) declared the COVID-19 pandemic in March 2020. [1].

The delay in travel plans and social isolation came out with the media overload and piling up food caused a global environment of anxiety and depression [2]. The ongoing

COVID-19 pandemic is triggering fear in societies, so it is very crucial to have guidance and procedures for effective interventions that can protect mental health status in society.

Those with end-stage renal disease (ESRD) are dependent on a machine to survive. In addition; a certain diet, fluid restriction, regular drug use, prolonged treatment during the day, changes in physical appearance, and sexual problems occur due to treatment [3]. It has been shown in studies conducted with individuals that this situation causes psychosocial problems arising from loss of job, health, income, body image, and self-confidence, and the incidence of mental disorders increases in dialysis patients [4,5]. In addition to all these, the fact that patients undergoing hemodialysis (HD) due to ESRD during the pandemic process enter healthcare units more frequently than those with other chronic diseases may cause fear and anxiety.

Treatment models for COVID-19 mainly focus on control of the spread, rapid vaccination, and supportive care. The psychosocial dimension has not yet been fully taken into account. Existing guidance and procedures have been designed for healthcare providers to identify the fear of COVID-19

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based upon the information on individuals' fear of COVID-19.

During the COVID-19 pandemic, when unprecedented large-scale public health measures were implemented, we still do not have enough information about the psychological impact of the epidemic and the factors that will affect the associated mental health status in HD patients. In this study, we aimed to evaluate the psychological effects of the COVID-19 pandemic on HD patients.

Materials and Methods

We designed a cross-sectional study to evaluate the psychological changes that occur during the pandemic in HD patients. A written individual informed consent form was obtained from participants. The study protocol was approved by the Local Research Ethics Committee of Malatya Turgut Özal University Faculty of Medicine (IRB number: 23536505-604.02-E.13460; Date: August 12, 2020).

Setting

This study was conducted at the Department of Nephrology at Malatya Education and Research Hospital from August 2020 to December 2020. Established in 1939, the study hospital currently provides secondary-level healthcare services in eastern Turkey with 1040 inpatient beds, 240 outpatient clinics, 23 surgical intervention rooms, a 90-bed capacity intensive care unit, and a hemodialysis unit able to serve 29 simultaneous patients.

Participants

Patients >18 years of age with ESRD, who were receiving hemodialysis for at least 3 months were included in the study. The exclusion criteria of the study were patients that were not able to complete the study questionnaire due to cognitive impairment (n=3), active psychosis (n=2), a history of recent hospitalization (n=7), history of malignancy (n=1). Data could be collected from 149 patients out of the 176 patients under treatment (Figure 1). All patients under follow-up were invited to join the study without sampling.

Variables

Demographic information and laboratory test results of the patients were obtained from their files. Before the dialysis session, both a questionnaire was applied to the patients and blood samples were taken for laboratory tests.

Fear of COVID-19 Scale (FVC-19S)

The Turkish validity and reliability study of the FVC-19S developed by Ahorsu et al. was performed by Seller et al. [6,7]. A validated Turkish form was administered to all participants. The answers given by the participants for each question were scored between 1 and 5. The higher the sum of the end-of-question scores (between 7 and 35), the higher the patient's fear of COVID-19.

DASS-21 Scale

The depression anxiety and stress scale (DASS-21) is a scale designed to measure the severity of depression, anxiety, and stress [8]. It is a scale consisting of 21 items and measuring in three areas. Questions under the headings of depression, anxiety, and stress are asked to the patients one by one, and scoring is done. High scores

in each area indicate that emotional distress in that area is more serious. The Turkish version of DASS-21 was used in the study [9]. If the individual scores 5 points or more from the depression sub-dimension, 4 points or more from the anxiety sub-dimension, and 8 points or more from the stress sub-dimension, it indicates the presence of a related problem.

Data were analyzed by using the SPSS 22 program. Descriptive data for all sociodemographic characteristics, laboratory results, and test outputs were calculated. Shapiro-Wilk tests were used for the conformity of continuous data to normal distribution. All four psychopathologies were evaluated by correlation analysis.

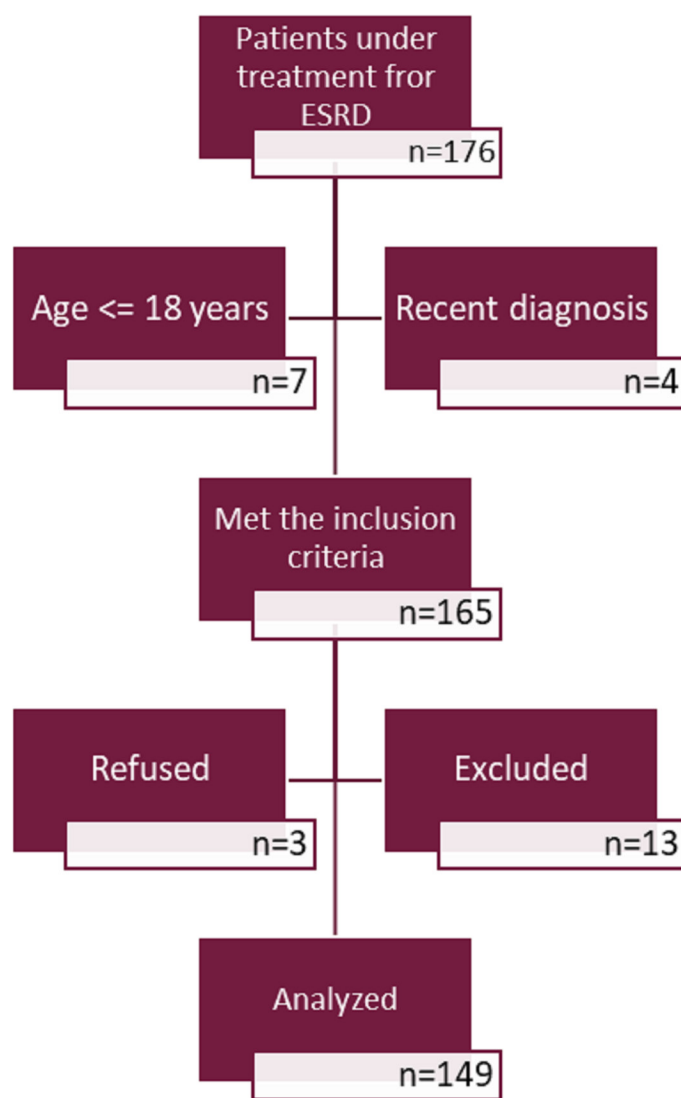


Figure 1. Study flow diagram

Results

Data of 149 participants were analyzed. Sociodemographic information of the participants was shown in Table 1. While 54% (n=81) of patients were female, 46% (n=68) were male. The mean age was 60.81±15.24 years. Patients were divided into two groups based on age: ≥65 and <65 years. While there was no significant difference between the two groups in terms of HD duration and BMI, a significant difference was observed in terms of PTH and vitamin D levels (Table 2).

Table 1. Background information of the respondents (n=149)

		Total n=149	%
Age category	18-64 years old	80	55
	65 and more than 65 years old	69	45
Gender	Female	68	45.6
	Male	81	54.4
Marital status	Married	130	87.4
	Single	11	7.3
	Widowed	8	5.3
Education level	Primary	64	42.9
	Junior	52	34.8
	Senior	31	20.8
	University degree or above	2	1.5
Occupation	Worker/farmer	58	38.9
	Government	22	14.7
	Company employee	15	10
	Retired	38	25.5
	Unemployment or others	16	10.9

Table 2. Comparison of sex, dialysis duration, BMI, and laboratory variables between the age groups

	Young (n=80)	Older (n=69)	p
Sex			
Women	49 (32.9%)	32 (21.5%)	0.690
Men	31 (20.8%)	37 (24.8%)	
Under dialysis since (months)	59.71±50.74	57.41±44.98	0.786
BMI (kg/m²)	24.64±4.39	24.65±4.08	0.983
Laboratory Values			
Urea (mg/dL)	136.27±31.86	135.20±31.14	0.848
Creatinine (mg/dL)	8.47±3.07	7.45±2.84	0.055
Uric acid (mg/dL)	6.51±1.12	6.3133±0.90	0.252
Total protein (g/dL)	6.97±0.55	7.04±0.56	0.443
Albumin (g/dL)	3.54±0.37	3.53±0.38	0.858
Calcium (mg/dL)	8.78±0.60	8.99±0.75	0.091
Phosphorus (mg/dL)	5.13±1.27	4.86±1.11	0.205
Parathormone (PTH) (pg/mL)	495.8±557.91	376.51±269.42	0.005
Vitamin D (ng/mL)	10.43±7.47	9.57±4.46	0.042
C-reactive protein (mg/L)	0.91±0.87	1.35±2.02	0.130
Ferritin (ml/ng)	600.87±425.62	570.12±350.58	0.653
Hemoglobin (g/dL)	10.92±1.42	11.11±1.43	0.449

Data are presented as n (%) or mean±standard deviations

The total FVC-19S score in the whole group ranges from 3 to 35, with a median of 21 points. FVC-19S levels were significantly higher in the elderly group ($p<0.005$) (Table 3).

The depression score ranged from 4 to 25, with a median score of 18. According to the depression assessment on the DASS-21 scale, 26 (17.4%) patients had normal, 15 (10.3%) mild, 86 (57.7%) moderate, and 22 (14.6%) patients had severe depression symptoms, respectively. When young and old hemodialysis patients were compared, there was a significant difference between

the scores ($p<0.005$) (Table 3).

The anxiety score ranged from 0 to 21, with a median score of 11. According to the cut-off scores, the proportion of normal, mild, and moderate anxiety was 32.9 (n=49), 8.7% (n=13), and 20.8% (n=31), respectively. Of the patients, 36.9% (n=55) had severe anxiety. The anxiety levels were significantly higher in the elderly group ($p<0.005$) (Table 3).

The stress score ranged from 3 to 21, with a median score of

11. According to the cut-off scores, the proportions of normal, mild, and moderate stress was 72.5% (n=108), 24.8% (n=37), and 2.7% (n=4), respectively. None of the patients had severe stress. The stress level in the young group was relatively higher than in the elderly group (p=0.310) (Table 3).

The results showed that FVC-19S, depression, and anxiety differed significantly between age categories. FVC-19S, depression, and anxiety levels were found to be significantly higher in the elderly

group (Table 3).

As shown in Table 4, there was no significant difference between men and women in FVC-19S, depression, and anxiety while there was a significant difference in stress.

FVC-19S showed a positive correlation with depression and anxiety levels ($r = 0.46$, $p < 0.001$; $r = 0.694$, $p < 0.001$; respectively) and a negative correlation with stress level ($r = -0.467$, $p < 0.001$).

Table 3. Comparison of fear of COVID-19, depression, anxiety, and stress between age groups

	Young (n=80)	Older (n=69)	p
Fear of COVID-19	13.80±8.34	16.46±5.30	0.000
Depression	13.88±5.42	18.44±2.61	0.000
Anxiety	6.15±5.31	15.53±3.22	0.000
Stress	12.58±3.81	9.28±4.54	0.310

Data are presented as mean±standard deviations

Table 4. Comparison of fear of COVID-19, depression, anxiety, and stress between male and female

	Female (n=68)	Male (n=81)	p
Fear of COVID-19	19.42±9.17	19.87±9.81	0.777
Depression	16.41±4.56	15.65±5.17	0.349
Anxiety	11.51±6.19	9.64±6.61	0.078
Stress	8.95±4.04	12.82±4.04	0.000

Data are presented as mean±standard deviations

Discussion

In this study, ESRD HD patients aged 65 and over had higher levels of FVC-19S, depression, and anxiety than similar patients under 65 years of age. However, there was no significant difference in stress levels between the two age groups. In addition, there was no significant difference in FVC-19S, depression, and anxiety scores by gender groups. Age has shown positive correlations, such as both FVC-19S, depression, and anxiety.

The results of this study are in good agreement with the previous studies relevant to the FVC-19S associated with anxiety, depression, and stress levels [10,11]. In this study, elderly individuals had higher levels of FVC-19S, depression, anxiety, and stress. This situation may be due to multiple factors. COVID-19 certainly has psychological knock-on effects on older people. There may be many reasons why HD patients have high COVID-19 fear, depression, anxiety, and stress scores. First, the high frequency of dialysis treatment and the necessity for many patients to use public transportation during the pandemic cause great psychological pressures on HD patients [12]. The test values may be higher, especially because of the older HD patients' dependence on other individuals for transportation. However, it can be assumed that the level of transport-related addiction is lower in the younger group. In addition, the managers, to prevent the spread of partially suspending public transport in the country has increased the pressure on patients. Second, patients who were admitted to a hospital for at least two or three hemodialysis sessions each

week were more concerned about infection and lack of protective equipment. Especially at the beginning of the pandemic, in February and March, there was a shortage of masks and protective equipment in the whole world [13]. During the pandemic, hospitals have become centers for testing and treatment of patients infected with COVID-19. Therefore, hospitals became areas with a high risk of infection, and many elective treatments and surgeries were postponed during this period. However, HD patients had to go to the hospital 2 or 3 times a week due to the nature of their treatment [14]. In addition to all these studies, it is known that patients who have received hemodialysis treatment for a long time have higher mortality rates [15,16]. Furthermore, studies have shown that both the incidence and mortality of COVID-19 infection are higher in HD patients [17].

We found a significantly higher level of stress in elderly and male HD patients. The study, which aimed to examine the early psychological effects associated with the COVID-19 pandemic in older adults, included 2,194 elderly people. It was found that 25.6% of the participants in the study had symptoms of depression, 3.6% of anxiety, and 11% of them stressed. The stress level was found to be associated with retirement, age, and addiction level, but not among gender-related factors [18]. In the study of Çakmak et al., in which they examined the stress and anxiety status of health professionals during the pandemic period, the stress level of men was found to be higher than that of women [19]. In our study, stress levels were significantly higher, especially in elderly male patients. We think that the increase in the time spent at home with

the closure period, similar to the retirement period, especially in male patients who spent most of the day outside the home before the closure, can be the reason for this.

Despite the efforts to implement new normals all over the world and Turkey, the fear of pandemics, which is further reinforced by the uncertainty arising from the second wave, is common in our society. HD patients are more susceptible to COVID-19 infection due to advanced age, additional comorbidities, and suppressed immune status [20,21]. These patients are more concerned about more serious health consequences, as studies generally show that the elderly and those receiving HD treatment are more susceptible to the morbidity and mortality of COVID-19 [22].

During and after the pandemic, stress and psychological distress in humans can cause a secondary disaster. Therefore, the long-term psychological consequences of restrictions and barriers applied in the era of infectious diseases should not be ignored [23]. These psychological stressors, which are sometimes difficult to control, may facilitate the emergence of the underlying mental illness or make it difficult to control the existing disorders. We should take appropriate measures early to support the mental health of the population to alleviate the current acute stress reactions of patients and to reduce the incidence of post-pandemic post-traumatic stress disorder [24].

Data showing the psychological disturbance caused by the fear of COVID-19 in HD patients is limited. In the study by Xia et al., In which HD and peritoneal dialysis patients evaluated the relationship between COVID-19 and stress, they reported that they encountered more trauma-related stress symptoms in HD patients than in patients with peritoneal dialysis [12]. Consistent with our study, an increase in the levels of stress and anxiety were found in the study conducted with healthcare workers who had a high risk of psychological exposure during the pandemic period [19]. Therefore, we think it is important to identify high-risk HD patients and to provide psychological support first to all healthcare personnel, including dialysis center physicians, nurses, and professional psychologists, to reduce their stress.

Our study should be interpreted in light of some limitations. First of all, the study was cross-sectional, with all assessments made at a single time point. We need longitudinal studies to investigate the variation of these parameters over time. Second, it is a descriptive study in a local sample with limited generalizability of the findings. Multicenter studies with control groups are needed to confirm the results. A total of 176 HD patients participated. PD patients who did not need to come to the hospital during the pandemic were not included in the study group. In addition, it was determined that the questionnaires were administered before the face-to-face hemodialysis session and the protective equipment mask used in elderly HD patients made communication difficult. Perhaps in a future study, it may be better to conduct out-of-hospital telephone inquiries for elderly patients. Third; the absence of a control group of age- and sex-matched healthy controls.

Our study is the first study evaluating the level of fear of COVID-19 and the relationship between fear of COVID-19 and depression, anxiety, and stress in HD patients. The COVID-19 pandemic continues unabated around the world and will likely continue for even longer. This study investigated the psychological status of

HD patients in this critical period, emphasizing the importance of evaluating with a few practice tests.

Conclusion

The psychological distress of HD patients during the constraints period of the COVID-19 pandemic was investigated in the scope of this study. It showed that fear of COVID-19 increased levels of depression and anxiety in HD patients, and those levels of COVID-19 fear, depression, and anxiety were higher in the older age group. When important public health events such as pandemics break out, especially HD patients with advanced age and multiple comorbid diseases should be evaluated carefully and psychologically, and early intervention should be provided.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

The study protocol was approved by the Local Ethics Committee at Malatya Turgut Ozal University Medical Faculty (IRB number: 23536505-604.02-E.13460; Date: Aug 12, 2020).

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