



The perspectives of dialysis patients about the Covid-19 pandemic and differences between the modalities

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Abstract

The novel coronavirus disease was declared as a pandemic and CKD is an important risk factor for morbidity and mortality. Dialysis has additional contributions on transmission risk so prompt preventive strategies were implemented for dialysis patients. We aimed to evaluate pandemic-related perceptions and concerns of dialysis patients and differences between dialysis modalities. An anonymous survey for assessing concerns, knowledge, and attitudes about the pandemic was sent online to a total of 339 patients on maintenance dialysis at four tertiary dialysis centers in Turkey. A total of 309 patients (54.9 ± 15.1 years, 51.6% females, 55.7% in-center HD, 44.3% peritoneal dialysis) enrolled. The anonymous online survey was conducted at the end of April 2020. HD patients were more concerned about transmission risk ($p = 0.002$) and risks associated with the dialysis treatment environment and the transport methods ($p < 0.001$). The total concern score was significantly higher in the HD group (2.60 ± 0.93 vs. 1.65 ± 0.54 , $p < 0.001$). The knowledge about the pandemic and prevention methods and the attitudes of prevention were similar between the groups ($p = 0.161$ and 0.418 , respectively). The compliance rate of personal preventive strategies was 98.1%. Considering changing the current dialysis modality due to the pandemic was higher in the HD group ($p < 0.001$). Although the preventive strategies were performed properly in the HD centers, HD patients were more concerned about the Covid-19 outbreak compared with PD. Our results support home dialysis treatments for modality decisions with patients' positive perspective of PD over HD during the pandemic.

KEYWORDS

CKD, Covid-19, dialysis, HD, pandemic, peritoneal dialysis

1 | INTRODUCTION

The World Health Organization declared the Novel coronavirus disease (Covid-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) a global pandemic on March 11, 2020 [1]. The pandemic caused devastating

results of over 110 000 000 confirmed cases and 2 400 000 deaths all over the world in February 2021 [2].

Patients with CKD are vulnerable to Covid-19 infection because of accompanying comorbidities, insufficient immune system, and fragility [3]. The intensive care unit admission and in-hospital mortality rates were significantly

higher in the CKD patients compared with the normal population [4]. With this regard, international and local authorities recommended specific implementations as dialysis facility arrangements, evaluation of the patients and the staff at the beginning and during the dialysis sessions, isolation of Covid-19 patients for preventing transmission, and virtual visits if possible [5–8]. However, there are several diversities in approach and condition between in-center HD and PD patients. Covid-19 affected HD patients with a higher rate compared with PD patients [9,10]. Moreover, a significant portion of Covid-19 positive HD patients could be asymptomatic [11–13]. Asymptomatic and pre-symptomatic cases could potentiate Covid-19 transmission risk among HD patients. Additionally, HD patients have a significantly higher mortality rate of 30% compared with the general population [4,9,11,14,15]. Furthermore, there are additional risk factors associated with dialysis facilities such as traveling to dialysis units, close contact with dialysis staff and with other patients. The transmission risk can be multiple-sided as patient to patient, patient to staff, or staff to patient in HD centers.

There are limited data about the prognosis of Covid-19 in PD patients. The range of mortality is extremely wide, from one report (45.6%) to another (8.5%), and the details are not yet clarified [9,10]. PD patients have advantages of home-based therapy. PD modality provided self-isolation, avoided the requirement of traveling to dialysis facility, and transmission risk from other patients. During the pandemic, PD patients could be screened by virtual PD visits which were held by phone or remote screening items if possible. Additionally, online follow-up systems contribute to recognize and solve PD treatment-associated problems. It is also recommended to postpone the scheduled visits of PD patients unless an unsolved medical problem has occurred and conduct prescriptions by phone [6].

With these aforementioned points, the nephrology community has addressed several implementations aiming to reduce the transmission risk regarding dialysis treatment from the beginning of the pandemic [5,6,16]. Results of these strategies were evaluated by several studies [9,11–14]. However, there is limited knowledge of the perspective of the dialysis patients about the pandemic. With this regard, we aimed to evaluate the Covid-19 related perceptions and concerns during the outbreak in Turkey among dialysis patients and the differences between dialysis modalities.

2 | MATERIAL AND METHODS

An anonymous survey for assessing concerns, knowledge, and attitudes about the Covid-19 outbreak among

the dialysis population was designed by the expert committee composed of two nephrologists and one dialysis nurse who had both HD and PD certificates and experience. The survey was conducted in Turkish. In the survey, demographic data, dialysis modality, dialysis duration, education level, working status, living place, marital status, primary kidney disease, having problems associated with the dialysis treatment (transport changings, modality changings, supply shortage), compliance with social isolation and personal hygiene rules were asked. Additionally, the survey included a patient-reported 12 questions (Qs) for assessing concerns (Q 1–5), knowledge (Q 6–8), and attitudes (Q 9–12) about the Covid-19 pandemic (Table 1). The Qs of 1–11 were 5-point Likert scale questions and the 12th Q was answered as YES/NO. Answers of 5-point Likert scale questions were scored separately and a total concern score was calculated by summing the scores of Q 1–5 which evaluated Covid-19 concerns.

TABLE 1 The patient-reported 5-point Likert scale questions

Questions

1. Are you concerned about the COVID-19 outbreak in the world and in our country?
2. Are you concerned that the COVID-19 disease can be transmitted to you?
3. Does your environment concern you while you are on your dialysis treatment? (Dialysis center or home)
4. Are you concerned that COVID-19 may transmit to you, your family members due to the dialysis treatment environment? (Dialysis center or home)
5. Are you concerned that the method of reaching your dialysis treatment (transportation to the dialysis center / transportation of solutions to the house) increases the risk of COVID-19 transmission?
6. Have you been informed regarding the COVID-19 outbreak by the team responsible for your treatment?
7. Do you think you have enough information about the COVID-19 outbreak and prevention methods?
8. Do you have knowledge about home dialysis treatment options?
9. Do you think that have taken / you have taken adequate prevention for COVID-19 transmission risk during your dialysis treatment?
10. Would you like your dialysis to be carried out by the medical staff at the hospital during the outbreak?
11. Can/Does home dialysis treatment decrease your concerns during the outbreak?
12. Would you consider changing your current dialysis treatment modality due to the outbreak? (YES/NO)

never (1), little (2), sometimes (3), almost (4), always (5)

We applied the survey online because of transmission risk during the Covid-19 outbreak. A link to the online survey was sent to the participants who were on dialysis treatment in four tertiary centers during the outbreak. The first case in the general population was reported in Turkey on March 11th and the survey was sent on April 28, 2020 and completed in 15 days. The anonymous online survey was conducted at the end of April 2020.

The survey was sent online to a total of 339 patients in whom 11 did not reply. The response rate was 96.8%. Three hundred and twenty eight patients (53% male)

completed the survey. Nineteen patients whose dialysis duration was shorter than 6 months were excluded. Finally, 309 patients, 172 HD, and 137 PD patients were enrolled in the present study.

Ethical approval (IRB approval number 2020-284) was obtained from the local institutional review board and all participants provided online approval through the survey. All procedures were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

TABLE 2 Demographic characteristics of the participants

	HD (n = 172)	PD (n = 137)	p value
Age (years)	55.8 ± 15.6	54.4 ± 14.8	0.251 ^a
Gender(M/F)	84/88	66/71	0.924 ^a
Education level (n, %)			
Illiterate	26 (15.1)	18 (13.2)	0.500 ^b
Primary school	83 (48.30)	69 (50.4)	
Secondary school	16 (9.3)	20 (14.6)	
High school	28 (16.2)	14 (10.2)	
University	19 (11.1)	16 (11.6)	
Working status (n, %)			
Not working	110 (61.80)	77 (51.30)	0.162 ^b
Working	16 (9)	17 (11.30)	
Retired	52 (29.20)	56 (37.30)	
Living place (n, %)			
Countryside	18 (10.5)	33 (24.1)	<0.001 ^b
County	15 (8.7)	28 (20.4)	
City	139 (80.8)	76 (55.5)	
Marital status (n, %)			
Single	29 (16.8)	11 (8.0)	0.013 ^b
Divorced	26 (15.1)	12 (8.8)	
Married	117 (68.10)	114 (83.20)	
Kidney disease etiology (n, %)			
Hypertension	39 (22.7)	44 (32.1)	0.362
DM	41 (23.8)	32 (23.4)	
Glomerulonephritis	8 (4.7)	7 (5.1)	
Polycystic kidney disease	7 (4.1)	8 (5.8)	
Others	35 (20.3)	21 (15.3)	
Unknown	42 (24.4)	25 (18.2)	
Compliance with social Isolation and personal hygiene rules (n, %)	169 (98.2)	134 (97.8)	>0.99 [*]

Notes: Data presented as median (minimum: maximum), mean ± SD and n%.

^aMann Whitney U test;

^bChi-square test;

^{*}Fisher-Freeman-Halton test.

2.1 | Statistical analysis

Statistical analyses were performed with SPSS software (SPSS: An IBM Company, version 23.0, IBM Corporation, Armonk, NY). Shapiro Wilk test was used to evaluate the suitability of variables for normal distribution. The numerical and categorical variables were expressed as the mean \pm SD and ratios, respectively. Comparison of groups was carried out by using Mann–Whitney *U*, Pearson chi-square, Fisher–Freeman–Halton, and Fisher's exact tests. A *p* value <0.05 was considered statistically significant.

3 | RESULTS

A total of 309 dialysis patients (54.9 ± 15.1 years, 51.6% females, 55.7% HD) were enrolled in the present study. The participants were divided into 2 groups according to dialysis modalities as HD ($n = 172$) and PD groups ($n = 137$). There was no significant difference in terms of age, gender, kidney disease etiology, working status, and education levels between the groups. Demographic findings were summarized in Table 2. Only 11 (6.4%) patients stated a positive real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) test in the HD group.

Regarding the PD type, 55 of 137 (40.1%) PD patients were on automated PD (APD) and 82 (59.9%) were on continuous ambulatory PD (CAPD). Only one PD patient on CAPD had to change the treatment schedule by decreasing the exchange number, and 99.3% of PD patients continued their treatment programs without any changes. Four of 137 had trouble with solution procurement and transports, 8 of 137 missed their routine controls.

In the HD group, 150 of 172 (87.2%) patients were on a thrice-weekly HD program. None of the HD patients had trouble with HD treatment schedules. Only 16 of 172 (9.3%) had to change their transport vehicle to private vehicle from center transport service.

A total 303 of 309 (98.1%) participants stated that they complied with the preventive strategies of social isolation and personal protective attitudes as hand washing, using masks, and disinfection solutions.

3.1 | Concerns (Qs 1–5)

The score of the Q1 which was regarding concern about the Covid-19 pandemic in the world and our country was similar among dialysis groups ($p = 0.457$). The scores of the Qs 2 to 5 were significantly higher in HD patients ($p < 0.05$). However, HD patients were more concerned about Covid-19 infection transmission risk ($p = 0.002$) and risks associated with the dialysis treatment environment and the transport methods ($p < 0.001$ and 0.001 , respectively). Also, patients in the HD group were more concerned about the transmission risk to themselves and the family members associated with the dialysis environment ($p < 0.001$). In addition, the total concern score was significantly higher in the HD group (2.60 ± 0.93 vs. 1.65 ± 0.54 , $p < 0.001$).

3.2 | Knowledge (Qs 6–8)

Being informed regarding the Covid-19 outbreak by the healthcare team was significantly higher in the HD group ($p < 0.001$). The knowledge about the Covid-19 outbreak

TABLE 3 The patient-reported 12, 5-point Likert scale scores

Questions	All participants ($n = 309$)	HD patients ($n = 172$)	Peritoneal dialysis patients ($n = 137$)	<i>p</i> value
Q1	3.07 ± 1.28	3.12 ± 1.28	3.01 ± 1.27	0.457
Q2	2.93 ± 1.27	3.13 ± 1.31	2.69 ± 1.19	0.002 ^a
Q3	1.70 ± 1.08	2.21 ± 1.19	1.06 ± 0.29	$<0.001^a$
Q4	2.13 ± 1.31	2.69 ± 1.31	1.43 ± 0.92	$<0.001^a$
Q5	2.00 ± 1.14	2.19 ± 1.18	1.76 ± 1.03	0.001 ^a
Q6	3.77 ± 1.94	4.12 ± 1.21	3.33 ± 1.69	$<0.001^a$
Q7	3.97 ± 0.78	4.02 ± 0.77	3.90 ± 0.79	0.161
Q8	3.31 ± 1.55	2.81 ± 1.46	3.94 ± 1.43	$<0.001^a$
Q9	4.29 ± 0.86	4.26 ± 0.83	4.34 ± 0.89	0.418
Q10	2.84 ± 1.78	4.23 ± 1.06	1.10 ± 0.52	$<0.001^a$
Q11	3.36 ± 1.59	2.48 ± 1.34	4.47 ± 1.13	$<0.001^a$
Q12 (yes/no) ($n, \%$)	30/279 (9.7/90.3)	25/147 (14.5/85.5)	5/132 (3.6/96.4)	$<0.001^b$

^aMann Whitney *U* test;

^bChi-square test.

and prevention methods were similar between the groups ($p = 0.161$). Knowledge about home dialysis treatment options was significantly lower in the HD group ($p < 0.001$).

3.3 | Attitude (Qs 9–12)

The attitudes of adequate prevention for Covid-19 transmission risk during dialysis treatment were similar between the groups ($p = 0.418$). Although HD patients were more concerned about their modality, the preference for dialysis assisted by the medical staff at the hospital during the outbreak was higher in the HD group ($p < 0.001$). Belief in decreasing concerns about outbreak with home dialysis was significantly higher in the PD group ($p < 0.001$). However, considering changing the current dialysis treatment modality due to the outbreak was higher in the HD group ($p < 0.001$) (Table 3).

4 | DISCUSSION

The Covid-19 pandemic globally has affected our practical approaches and devastating consequences provoked anxiety among people. Although preventive strategies have been implemented, the difficulty in controlling the spread of the disease may cause concern. We documented that dialysis patients were concerned about the pandemic and the dialysis modality is an important determinant of these concerns. HD patients were more concerned about the Covid-19 outbreak and transmission risk associated with the HD center environment compared with PD patients. PD patients were more satisfied with their modality regarding Covid-19 transmission risk.

Covid-19 has detrimental consequences among elder patients and patients with comorbidities. CKD and dialysis patients are vulnerable to a significantly high risk of morbidity and mortality. HD patients have a significantly higher mortality rate of 30% compared with the general population [4,14,15]. Additionally, HD facilities could potentiate the transmission risk. The main transmission route of SARS-CoV-2 is through air droplets and contact [16]. In the dialysis centers, patients closely contact the medical staff during HD sessions several times. Besides, traveling to the unit either by public transport or unit's vehicles, contacting other patients and their caregivers in the waiting areas before and after their sessions contributes to exposure risk. Rincon et al. evaluated the risk factors that could be associated with Covid-19 transmission in a dialysis facility. Sharing facility transport vehicles, living in a nurse house, and admitted to a reference hospital within the previous 2 weeks were major risk factors

for infection. They also stated that asymptomatic positive cases were important sources for transmission. There was no increased infection risk associated with receiving dialysis in the same room, sharing the same nurse [13]. Education of patients and HCWs, screening and early recognition of symptoms, using an individual vehicle for transporting to and from dialysis facilities, using personal protective equipment, arrangement of waiting areas and dialysis stations by at least 2-m distance, early recognition and isolation of individuals with a respiratory infection, and management of infected patients are the main recommended preventive strategies [5,7]. The strategies of shortening the HD session time to 3 h, decreasing the dialysate flow rate, decreasing the weekly HD schedule to twice-weekly were suggested to use the dialysis sources and staff efficiently during the pandemic among the HD patients [7]. In Turkey, dialysis facilities arranged their working systems according to the instructions of the Ministry of Health guidance. The guidance aimed to minimize the transmission risk, educate patients and the staff, diagnose the cases early and run out the dialysis service without disturbance. And the Turkish Society of Nephrology organized and supported for the same purpose [17].

In our study, the participants stated that HD schedules of the patients unchanged during the study period in the attendant centers. We did not have any trouble with equipment shortage, dialysis staff and we succeeded to continue our HD practice without any changes regarding schedules throughout the outbreak. According to recommendations [17], 16 (9.3%) HD individuals had to change their transport vehicle to private vehicle from center transport service. Only 4 of 137 (2.9%) PD patients had trouble with solution procurement and transports. The government legislation of limitation period due to pandemic could be the reason for PD solution procurement problem.

Education about Covid-19 is essential for dialysis workers and patients during the pandemic. The education program has to comprise information about social distancing, hand hygiene, use of personal protective equipment. We informed and educated our staff by online and small group in-center education programs which were updated and repeated within time. The HD patients were informed about the preventive strategies and Covid-19 infection by doctors, nurses one on one during their sessions and with written information brochures. As distinct from HD patients, PD patients had to be informed by phone during the outbreak and we advised them to follow the MH and Turkish Nephrology of Society websites [17]. This course of action could explain the result of high scores of HD patients about the Q6. However, both groups stated that they have enough information about the Covid-19 outbreak and prevention

methods and have taken adequate prevention for Covid-19 transmission risk during dialysis treatment.

The rate of Covid-19 among HD patients is about 15% in the screening studies [14]. We did not screen dialysis patients for Covid-19. Symptomatic patients or patients who contacted a positive case were tested. According to patients' declaration, in our cohort, 6.4% of HD patients were infected by SARS-CoV-2 and none of the PD patients were positive during the study period. In the attendant centers within the first year of the outbreak 21% ($n = 75/357$) HD and 12.3% ($n = 26/211$) PD patients were infected and mortality rate was 38.7% ($n = 29$) and 19.2% ($n = 5$) in HD and PD patients, respectively. With a low prevalence and mortality rate, PD could be considered a preferable dialysis modality during the pandemic.

The scores to each of the Qs that queried the concerns and the total concern scores were higher among the HD group. This outcome was predictable and compatible with the obligatory three weekly attendance of the HD patients to the HD center. We thought that besides adequate information of the HD patients and taking precautions in the centers, unavoidable contact with the HCWs during the sessions, with other patients and their family members at the waiting areas, and through the transport could be the main reasons for the concerns. Oppositely, the PD group was less concerned which could be explained that the PD is a home-based dialysis option accomplishing all the preventive strategies. To our knowledge, there are no previous studies evaluating and comparing concerns or anxiety among dialysis patients. However, in an observational study from Turkey, PD patients did not have any concerning-level anxiety, which is concordant with our results of less concerned PD patients [18]. Although preventive strategies were applied properly in the dialysis facilities, more concerned HD patients considered changing the current dialysis modality due to the outbreak in our study. Compatible with our results Ascioglu et al. stated that the pandemic could be a determinative effect on the selection of dialysis modality of CKD patients. They analyzed PD catheter implementation in the last 7 years and at the 3-month pandemic period. PD initiation, excluding acute start, increased during the days of the pandemic [19].

There are several limitations of our study. We used an anonymous survey to avoid transmission risk so we could not reach the laboratory data of the participants. Secondly, we did not use validated scales to evaluate anxiety and concerns. There are several validated scales to evaluate anxiety but we thought that they could be impractical to complete online. So we evaluated anxiety and concerns about the pandemic by a questionnaire that we formed.

The Covid-19 pandemic provoked several unpredictable, devastating, and troublesome consequences that led to some alterations, like restrictions in daily life. These consequences

of restrictions could be more prominent among specific populations such as dialysis patients. Social distancing and personal hygiene are the most effective preventive strategies among all. With this fact, throughout the Covid-19 pandemic, the reputation of home-based dialysis modalities has grown [7]. Besides the programmed beginnings for patients with CKD, it is recommended to consider PD for emergent conditions in CKD patients and even for acute kidney injury [8]. Polanco et al. developed a successful virtual program for PD treatment initiation, education, and follow-ups. They initiated PD in 64 patients and succeeded to monitor 946 PD patients during the pandemic by telemedicine utilization [20]. While success and reliability of PD was reported during the pandemic [18,20], by published and unpublished experiences dialysis initiation approaches seem to be changing [8]. In clinical practice with advantages and positive perspectives, we could guide patients for PD preference during the pandemic. The pandemic modified our pre-dialysis education content. We inform the patients about the advantages of home-dialysis modalities in the days of the pandemic, before decision making of dialysis modality. We plan to assess whether there is any impact of this approach on modality choices like other facilities in Turkey [19].

In conclusion, although the preventive strategies were performed properly in the HD centers, HD patients were more concerned about the Covid-19 outbreak associated with their dialysis modality compared with PD patients. These initial findings throughout the literature strengthen the importance of home-based dialysis therapies during the pandemic.

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CONFLICT OF INTEREST

The authors have declared that no conflict of interest exists.

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