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## **Psychological Distress of Patients with End-Stage Kidney Disease Undergoing Dialysis during the 2019 Coronavirus Disease Pandemic**

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**Objectives:** Previous studies have revealed that the COVID-19 pandemic has produced psychological distress such as depression and anxiety. Patients with chronic kidney disease (CKD) might be more vulnerable to psychological distress due to the COVID-19 pandemic and the impact could be different according to the dialysis modality. We aimed to investigate COVID-19-related psychological stress experienced by end-stage kidney disease (ESKD) patients, and the difference in concerns between hemodialysis (HD) and peritoneal dialysis (PD) patients.

**Methods:** This cross-sectional study included 148 dialysis patients at Soonchunhyang University Cheonan Hospital from August to September 2020. The patients responded to a questionnaire covering mental health status and COVID-19 related concerns. The symptoms of depression, anxiety, stress, and insomnia were measured using the 9-item Patient Health Questionnaire (PHQ-9), the 7-item Generalized Anxiety Disorder (GAD-7) scale, the 22-item Impact of Event Scale-Revised (IES-R), and the 7-item Insomnia severity Index (ISI), respectively. We compared the outcomes between HD and PD patients by propensity score matching analysis

**Results:** Dialysis patients reported psychological distress including symptoms of depression, anxiety, stress, and insomnia. HD patients showed higher scores for depression ( $p = 0.018$ ), anxiety ( $p = 0.005$ ), stress ( $p < 0.001$ ), and insomnia ( $p = 0.006$ ) than the PD patients. After propensity score matching, HD was associated to the depression ( $p = 0.0131$ ), anxiety ( $p = 0.0143$ ), and stress ( $p = 0.000415$ ).

**Conclusions:** Dialysis patients showed psychological distress during the COVID-19 pandemic period, and the HD patients had more severe symptoms than the PD patients.

Comparison of psychological characteristics in dialysis patients

Table 2. Comparison of psychological characteristics in dialysis patients

	HD patients (N = 78)	PD patients (N = 70)	<i>P</i>
PHQ-9	6.76 ± 6.45	4.29 ± 6.06	0.018
Severity			0.001
normal	35 (44.9)	51 (72.9)	
mild	19 (24.4)	8 (11.4)	
moderate	14 (17.9)	2 (2.9)	
severe	10 (12.8)	9 (12.9)	
GAD-7	11.59 ± 5.91	9.31 ± 3.95	0.005
Severity			0.081
normal	0 (0)	1 (1.4)	
mild	41 (52.6)	49 (70.0)	
moderate	19 (24.4)	12 (17.1)	
severe	18 (23.1)	8 (11.4)	
IES-R	19.10 ± 14.84	10.57 ± 11.55	< 0.001
Severity			< 0.001
normal	20 (25.6)	42 (60.0)	
mild	33 (42.3)	17 (24.3)	
moderate	19 (24.4)	9 (12.9)	
severe	6 (7.7)	2 (2.9)	
ISI	8.88 ± 5.50	6.76 ± 5.83	0.006
Severity			0.002
normal	30 (38.5)	46 (65.7)	
mild	36 (46.2)	16 (22.9)	
moderate	12 (15.4)	6 (8.6)	
severe	0 (0)	2 (2.9)	

HD: hemodialysis; PD: peritoneal dialysis; PHQ-9: the 9-item Patient Health Questionnaire; GAD-7: the 7-item Generalized Anxiety Disorder scale; IES-R: the 22-item impact of Event Scale-Revised; ISI: insomnia severity index

Psychological characteristics after PSM analysis

Table 3. Psychological characteristics after PSM analysis

3-1. Depression (PHQ-9)

	Estimated	Standard error	T value	Pr (>  t )
Intercept	3.11730	6.85937	0.454	0.6505
Group (HD)	3.36699	1.33283	2.526	0.0131*
Age	0.03731	0.05596	0.667	0.5066
Sex (female)	1.19719	1.35198	0.886	0.3781
Hb	-0.3631	0.47516	-0.764	0.4465
Dialysis vintage	-0.08975	0.13629	-0.658	0.5118
Sqrt_ferritin	0.1482	0.10117	1.465	0.1461

3-2. Anxiety (GAD7)

	Estimated	Standard error	T value	Pr (>  t )
Intercept	12.29244	5.61950	2.187	0.0311*
Group (HD)	2.72374	1.09191	2.494	0.0143*
Age	0.04469	0.04585	0.975	0.3321
Sex (female)	1.89810	1.10761	1.714	0.0898
Hb	-0.50174	0.38928	-1.289	0.2005
Dialysis vintage	-0.23408	0.11166	-2.096	0.0386*
Sqrt_ferritin	0.01621	0.08288	0.196	0.8454

3-3. Stress (IES-R)

	Estimated	Standard error	T value	Pr (>  t )
Intercept	5.3586	14.9860	0.358	0.721439
Group (HD)	10.6478	2.9119	3.657	0.000415***
Age	0.1221	0.1223	0.999	0.320356
Sex (female)	1.0765	2.9538	0.364	0.716311
Hb	-0.4678	1.0381	-0.451	0.653232
Dialysis vintage	-0.3557	0.2978	-1.194	0.235195
Sqrt_ferritin	0.2319	0.2210	1.049	0.296709

3-4. Insomnia (ISI)

	Estimated	Standard error	T value	Pr (>  t )
Intercept	6.13766	6.67457	0.920	0.3601



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