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Mental Health Outcomes during COVID-19 in Chronic Illness: Differences between Hemodialysis and Diabetic Patients

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Abstract

This study evaluated how the COVID-19 pandemic affected daily functioning and mental well-being among patients with chronic conditions, focusing on those receiving hemodialysis (HD) and those with diabetes (DM). Medical information was gathered through a structured questionnaire, while anxiety levels were evaluated using the Generalized Anxiety Disorder-7 (GAD-7) instrument.

Both groups showed comparable rates of prior COVID-19 infection and shared similar perspectives on the pandemic's disruptions. The primary constraints highlighted by participants were the obligation to wear masks and the reduction in social interactions. Mental health issues were reported significantly more often by patients in the DM group. Around 30% of all participants experienced sleep disturbances. About 20% of individuals in each group reported that the pandemic had worsened their sleep quality. In the HD group, average GAD-7 scores remained stable across genders. By contrast, a notable gender difference emerged in the DM group, where women recorded markedly higher scores than men. However, the proportions of patients with GAD-7 scores exceeding 5, 10, and 15 were statistically similar between the two groups. Anxiety disorders occurred at comparable rates across both groups of chronically ill patients. Within the DM group, women exhibited more intense anxiety symptoms. Overall, mental health problems were substantially more common among DM patients. HD patients appeared to handle the psychological burden of pandemic-related stress and restrictions more successfully.

Keywords: Anxiety, COVID-19, Hemodialysis, Diabetes, Lockdown

Introduction

The worldwide COVID-19 pandemic dramatically transformed social interactions worldwide. Measures such as restrictions, lockdowns, states of emergency, and enforced isolation likely contributed to psychological shifts and the development of anxiety and depressive symptoms. These pandemic-related limitations also heavily disrupted healthcare delivery and accessibility. A sharp decline in outpatient consultations, the repurposing of numerous hospitals to manage COVID-19 cases, and the postponement or cancellation of diagnostic procedures and elective surgeries—including cancer operations—led to reduced standards of medical care and ultimately higher overall death rates. The harmful consequences were especially clear among individuals suffering from longstanding illnesses like obesity, diabetes, chronic kidney disease, cardiovascular disease (CVD), and cancer, as their survival and long-term outlook depended heavily on uninterrupted treatment, often involving hospital stays or surgical intervention.

Doubts about receiving ongoing care, combined with a heightened chance of infection or serious complications from COVID-19, acted as key elements that undermined the psychological state of many patients with chronic illnesses, thereby intensifying feelings of anxiety and diminishing their overall quality of life.

Investigations into the pandemic's influence on psychological health have documented serious negative

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mental effects stemming from the SARS-CoV-2 outbreak in multiple patient categories [1, 2]. Still, relatively few studies have specifically explored how the pandemic affected the daily lives and mental condition of people living with chronic diseases.

Within this population, individuals with end-stage kidney disease (ESKD) who rely on regular hemodialysis (HD) represent a unique subgroup. On one side, chronic kidney disease (CKD) greatly raises the likelihood of cardiovascular complications and death, a danger that becomes even greater with COVID-19 infection [3]. On the other side, dialysis patients were largely unable to comply with isolation guidelines or social distancing rules—particularly in medical environments—because they required consistent hemodialysis sessions and other essential treatments related to their condition [4].

Another important chronic disease category includes patients with type 2 diabetes mellitus (DM). In this group, the rate of cardiovascular mortality, especially when accompanied by atherosclerotic cardiovascular disease (ASCVD), heart failure, or CKD, is many times higher than in people without diabetes. Inadequately managed type 2 DM frequently results in long-term complications, such as the progression of CKD and the eventual requirement for renal replacement therapy.

The COVID-19 outbreak and the resulting barriers to outpatient services, including specialized diabetes care, caused a drop in new diabetes diagnoses and a decline in the standard of ongoing diabetes management. Telemedicine appointments, which often lacked sufficient data on current blood sugar levels and were frequently limited to issuing prescriptions, played a role in the deterioration of glycemic control among type 2 DM patients. Furthermore, early pandemic research consistently demonstrated that poorly controlled, long-standing type 2 DM substantially elevated the mortality risk associated with SARS-CoV-2 infection [5], adding yet another layer of vulnerability for these individuals.

The objective of the present study was to explore and contrast the effects of the COVID-19 pandemic on functioning and mental health in two distinct chronic disease populations: patients on chronic dialysis and those with type 2 DM. These groups were chosen because they differ from other chronically ill patients in their specific treatment requirements and extremely elevated cardiovascular risk, which directly influences survival prospects. The study aimed to determine whether these unique features would lead to differences in the development of anxiety disorders and other elements of daily functioning during the pandemic period.

Materials and Methods

This multicenter investigation enrolled 244 hemodialysis (HD) patients from the Silesian region of Poland, with recruitment conducted during the first 3 months of 2022. Information was successfully collected from all 244 participants. The comparison group included individuals with type 2 DM who were admitted to Clinical Hospital No. 1 in Zabrze, Poland, during the same period due to insufficient glycemic control. Data were acquired from 175 patients in this group. The research relied entirely on self-reported questionnaires, and the Bioethics Committee of the Medical University of Silesia was formally notified of the project.

For the DM cohort, we omitted anyone with a recent diabetes diagnosis. Analysis was restricted to those whose therapy required escalation (the direct cause of their stay in the Diabetes Department), with most receiving insulin alone or in combination with oral antidiabetic agents.

All participants were invited to fill out a custom-designed questionnaire. Written informed consent was secured from every individual before participation. Inclusion criteria included: age > 18 years, voluntary agreement to join the study, confirmed DM for a minimum of one year (in the DM group), or ongoing hemodialysis for at least 6 months (in the HD group). Exclusion criteria included: absence of consent or inability to independently complete the questionnaire because of cognitive impairment or active malignancy.

The HD patient questionnaire was organized into four distinct sections. The opening section gathered basic sociodemographic details. The second section explored dialysis vintage, accompanying health conditions, hospital stays within the last two years, availability of medical specialists beyond nephrologists, obstacles in renewing prescriptions for long-term drugs, current body weight, and body weight recorded before the COVID-19 outbreak. The proportion of patients considered suitable candidates for kidney transplantation was also determined. The third section focused on COVID-19-related matters, covering the onset and progression of SARS-CoV-2 infection, COVID-19 vaccination status, and challenges arising from pandemic-imposed restrictions. The concluding section addressed psychological status, with special attention to anxiety

symptoms and sleep difficulties. Participants completed the Generalized Anxiety Disorder-7 (GAD-7) scale.

The questionnaire administered to DM patients followed a parallel format. The initial section collected sociodemographic information. The subsequent section inquired about the length of diabetes, its current management, diabetes-related long-term complications, other coexisting diseases, access to diabetes specialists and additional healthcare providers, and issues with obtaining prescriptions for maintenance medications. Questions also covered current body weight and HbA1c values before and after the COVID-19 period (latest values measured during the current hospitalization). Patients compared in-person clinic visits with phone-based consultations and stated their preferred consultation format. The third section examined COVID-19 topics, including SARS-CoV-2 infection history, COVID-19 vaccination, and difficulties linked to pandemic restrictions. The final section evaluated mental well-being, focusing on anxiety and sleep-related concerns, and used the GAD-7 instrument. Both groups received one supplementary question about anxiety specifically connected to possible COVID-19 infection.

The two questionnaires differed solely in the disease-specific treatment items—those related to hemodialysis procedures or logistical issues involved in traveling to dialysis sessions for the HD group.

Generalized anxiety questionnaire (GAD-7)

The tool applied in this research served as a brief screening instrument created to gauge anxiety severity and estimate the likelihood of generalized anxiety disorder (GAD). It contains 7 questions answered on a four-point Likert-type scale. Scores for each item range from 0 to 3, reflecting symptom frequency over the previous 14 days (0—not at all, 1—several days, 2—more than half the days, 3—nearly every day). The items evaluated anxiety, tension, nervousness, perceived ability to manage these emotions, how quickly such feelings arose, and difficulties unwinding. Cut-off scores of 5, 10, and 15 indicated mild, moderate, and severe anxiety levels, respectively. A total of 10 points or more indicated a substantial probability of GAD [6]. One additional question was scored on the same 0–3 scale.

Statistical analysis

Qualitative data were summarized as frequencies and percentages. Continuous variables were reported as medians with first and third quartiles. Normality of the distribution was examined using histograms and quantile–quantile (QQ) plots. Given the departure from normality observed in most variables, nonparametric statistical methods were selected: the Mann–Whitney U test for independent-group comparisons, the Wilcoxon signed-rank test for paired observations, and the Kruskal–Wallis test for multiple-group analyses. Relationships between variables were explored via Spearman's rank correlation. Differences in categorical variables were tested using Pearson's chi-squared test. All computations were executed in the R statistical programming language using the RStudio platform [7], with support from the tidyverse and janitor packages [8].

Results and Discussion

Study population

A total of 399 patients met the inclusion criteria for the analysis. Participant sociodemographic characteristics appear in **Table 1**. Ages were broadly comparable between the groups (HD group: mean 63.7 ± 15.4 years; DM group: mean 65.4 ± 10.3 years). The HD cohort had a higher proportion of men (55.8%) than the DM cohort (40%). Marriage rates were markedly higher among DM patients (69% versus 57.1%). Close to 80% of individuals across both groups lived together with family. DM patients were considerably more likely to be employed or professionally engaged (27% versus 12.5%). Financial hardship worsened for 81% of HD patients during the pandemic, compared with 85% of those with DM (P = 0.034). A nearly identical share of respondents in each group believed the pandemic had substantially altered their daily lives (68.3% versus 67%).

Table 1. Sociodemographic data of the study participants.

Sociodemographic and pandemic-related variables	Hemodialysis patients (HD) (n = 244)	Diabetes patients (DM) (n = 175)	P-value/chi-square test
Age (years, mean ± SD)	63.7 ± 15.4	65.4 ± 10.3	P = 0.600
Male sex (n (%))	125 (55.8%)	70 (40%)	P = 0.004
Married status (n (%))	128 (57.1%)	121 (69%)	P = 0.001 * [proportion test]

Living with family (n (%))	175 (78%)	139 (79%)	P = 0.826
Currently professionally active (n (%))	28 (12.5%)	48 (27%)	P = 0.005
Reported financial deterioration during pandemic (n (%))	182 (81%)	150 (85%)	P = 0.034
Reported life changes due to pandemic (n (%))	153 (68.3%)	118 (67%)	P = 0.686

Clinical data

The average time spent on dialysis was 45 months (interquartile range 19.2–84). Seventy percent of HD patients had already been receiving dialysis treatment before the pandemic's onset. The length of kidney disease before starting dialysis was not factored into the analysis for the HD group. Only 12% of HD patients qualified as candidates for kidney transplantation. Problems linked to dialysis attendance, including missed sessions or delayed arrivals caused by transport issues, remained infrequent (6.6% and 11.6%, respectively).

Diabetes had lasted an average of 12.9 ± 8.31 years. Treatment breakdown showed that 47.4% of DM patients used a combination of insulin and oral glucose-lowering agents, 38.3% relied solely on oral agents (with at least 2 agents, indicating the need for intensified management), and 14.3% received insulin alone.

Coexisting health issues were common in both cohorts. Hypertension prevalence stood at 85.6% in HD patients and 82% in DM patients. DM patients more frequently had hypercholesterolemia, whereas ischemic heart disease was more common in the HD group **(Table 2)**. In general, the HD cohort had a higher overall comorbidity burden than the DM cohort.

Table 2. Clinical data of the study participants.

Variable	Hemodialysis patients (HD) (n = 244)	Diabetes patients (DM) (n = 175)	P-value
Duration of dialysis (months, median [IQR])	45 (19.2–84)	—	—
Dialysis initiated before pandemic (yes, %)	158 (70%)	—	—
Eligible for transplant (yes, %)	27 (12%)	—	—
Missed dialysis sessions during pandemic (yes, %)	15 (6.6%)	—	—
Transport delays/surgery postponement (yes, %)	26 (11.6%)	—	—
Duration of diabetes (years ± SD)	—	12.9 ± 8.31	—
Oral antidiabetic treatment (%)	—	67 (38.3%)	—
Insulin therapy (%)	—	25 (14.3%)	—
Combined oral + insulin therapy (%)	—	83 (47.4%)	—
Hypertension (%)	—	142 (82%)	—
Hypercholesterolemia (%)	192 (85.6%)	105 (60%)	P = 0.343
Ischemic artery disease (%)	81 (36.2%)	53 (29%)	P < 0.0001
Chronic renal disease (%)	156 (69.6%)	22 (13%)	P = 0.037
Number of comorbidities (0) (%)	29 (12.9%)	15 (9%)	rowspan comparison
Number of comorbidities (1) (%)	77 (34.3%)	41 (27%)	P = 0.038
Number of comorbidities (2) (%)	74 (33%)	72 (41%)	
Number of comorbidities (3) (%)	38 (16.9%)	33 (19%)	
Number of comorbidities (≥ 4) (%)	6 (2.7%)	7 (4%)	
BMI before pandemic (kg/m², median [IQR])	27.7 (24.2–31.2)	31.2 (27.7–36.1)	P < 0.0001
BMI after two years (kg/m², median [IQR])	26.8 (23.5–30.7)	31.1 (27.7–36.2)	P = 0.691
HbA1c during pandemic (median [IQR])	—	7.5 (6.4–9.2)	P < 0.0001
HbA1c at time of study (median [IQR])	—	8.05 (6.6–10.1)	
Self-reported poorer glycemic control during pandemic (yes, %)	—	105 (63.6%)	

Preferred outpatient visits (%)	139 (62%)	113 (65%)	P = 0.986
Difficulty obtaining prescriptions during pandemic (yes, %)	23 (10.2%)	6 (3.0%)	P = 0.001 (OR 3.138; 95% CI 1.21–9.65)
Difficulty contacting specialists during pandemic (yes, %)	104 (46.4%)	60 (34.2%)	P = 0.014

140 HD patients (65.63%) had required hospital admission for various reasons in the previous 2 years. Unfortunately, hospitalization records for the DM group could not be obtained due to technical constraints.

The mean BMI among HD patients at the time of the study was 26.8 kg/m², a statistically significant drop from the pre-pandemic figure of 27.7 kg/m². DM patients, on the other hand, met criteria for obesity (BMI > 30 kg/m²) and showed no meaningful change in BMI compared with the period before COVID-19. Over the two pandemic years, HbA1c levels rose noticeably (from 7.5% to 8.05%), which aligned with participants' subjective reports of worsening blood sugar management.

Preference for face-to-face outpatient appointments was similar across groups (HD—62% versus DM—65%). Challenges in securing medication prescriptions during the pandemic affected 10.2% of HD patients but only 3% of DM patients. DM patients encountered substantially fewer obstacles when seeking other medical specialists than HD patients did (34.2% versus 46.6%).

COVID-19 status

Prior SARS-CoV-2 infection rates were closely aligned between the groups (HD—75.4% versus DM—71.4%) **(Table 3)**. A severe disease trajectory, defined by the requirement for oxygen supplementation, antibiotic treatment, and systemic steroids, occurred in 24.5% of HD patients and 18% of DM patients (P = 0.5436). Oxygen support was needed significantly more often by DM patients, while antibiotic use was significantly higher in the HD group. Vaccination against SARS-CoV-2 was completed by 85.7% of HD patients compared with 77% of DM patients (P = 0.01286). The proportion of patients who experienced the loss of a family member to COVID-19 was virtually the same in both groups.

Table 3. COVID-19 status.

Variable	Hemodialysis patients (HD) (n = 244)	Diabetes patients (DM) (n = 175)	P-value (chi-square test)
Previous COVID-19 infection (yes, %)	160 (75.4%)	125 (71.4%)	P = 0.990
Severe COVID-19 course (yes, %)	55 (24.5%)	31 (18%)	P = 0.544
Oxygen therapy during COVID-19 infection (yes, %)	28 (12.5%)	44 (25.1%)	P < 0.0001
Antibiotic use during COVID-19 infection (yes, %)	19 (8.4%)	29 (12.5%)	P = 0.013
Steroid treatment during COVID-19 infection (yes, %)	40 (17.8%)	42 (24%)	P = 0.407
Vaccination against COVID-19 (yes, %)	197 (87.9%)	133 (77%)	P = 0.013
Death of a relative due to COVID-19 (yes, %)	26 (11.6%)	21 (12%)	P = 0.990
Restricted social contact during pandemic (%)	114 (47.16%)	82 (47.6%)	P = 0.990
Mask-wearing as a limitation (%)	122 (50.9%)	94 (54.5%)	P = 0.990
Closure of shops and restaurants (%)	45 (18.8%)	26 (15.2%)	P = 0.721
No traveling during pandemic (%)	82 (33.9%)	49 (28.6%)	P = 0.571
No participation in celebrations (%)	73 (30.1%)	42 (24.5%)	P = 0.523
Limited access to primary care physician (%)	105 (43.3%)	80 (46.5%)	P = 0.810
Limited access to medical specialists (%)	114 (47.16%)	64 (37.6%)	P = 0.282

Views on the main burdens imposed by the pandemic were largely consistent across both cohorts. The two most commonly mentioned restrictions were the compulsory use of face masks (50.9% in the HD group and 54.5% in the DM group). They reduced opportunities for social interaction (47.16% in the HD group and 47.6% in the DM group). Other notable issues included restricted access to primary care doctors and specialists (47.16% in the HD group and 37.6% in the DM group), as well as the inability to hold family events or take trips.

Mental disorders and the GAD-7 scale

Key outcomes are presented in **Table 4**, which shows information on psychiatric conditions, standard GAD-7 results, and GAD-7 findings after adding an extra item focused on COVID-19-related anxiety.

Table 4. Mental disorders and the GAD-7 scale.

Variable	Hemodialysis patients (HD) (n = 244)	Diabetes patients (DM) (n = 175)	P-value (chi-square test)
Previous depressive disorders (n, %)	1 (0.4%)	17 (10%)	P ≤ 0.0001
Other diagnosed mental disorders (n, %)	1 (0.4%)	11 (6%)	P ≤ 0.0001
Sleep disorders (%)	78 (34.8%)	56 (32%)	P = 0.990
Use of hypnotic medications (%)	45 (20%)	38 (21.7%)	P = 0.407
Self-reported sleep quality worsened during the pandemic (%)	38 (17%)	35 (20%)	P = 0.238
GAD-7 score (median [IQR])	4 (1–7)	5 (1–8)	—
GAD-7 score–women (median [IQR])	3 (1–10)	1 (0–6)	P = 0.90/P = 0.001
GAD-7 score–men	—	—	—
GAD-7 with additional question (median [IQR])	5 (1–10)	6 (1–10)	—
GAD-7 + additional question – women (median [IQR])	4 (1–12)	2 (1–7)	P = 0.638/P = 0.004
GAD-7 + additional question – men	—	—	—

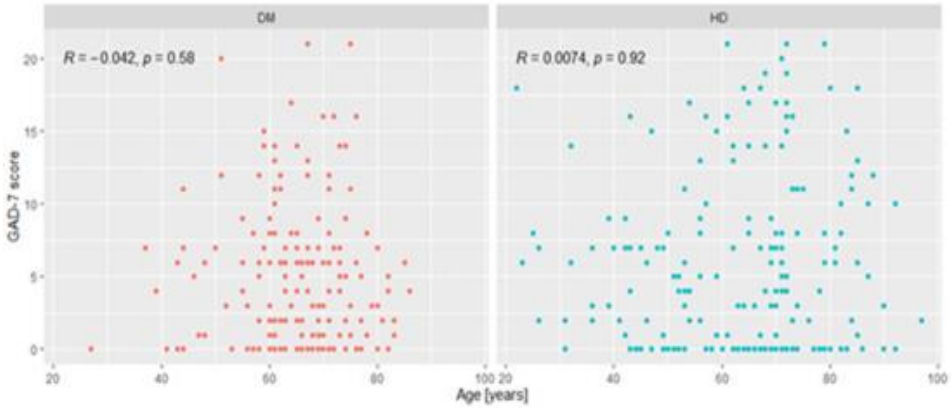
Depressive disorders were noted by just one person in the HD group, whereas 17 patients in the DM group reported them. Other types of mental health issues were also disclosed far more often by the DM participants. Around 30% of patients experienced sleep difficulties, and this rate did not differ meaningfully between groups. Use of sleep-inducing medications remained similar, affecting approximately 20% of individuals in each cohort. In addition, roughly 20% of patients from both groups stated that the pandemic had impaired the quality of their sleep.

In the HD group, average GAD-7 scores showed no variation by gender [5 (2;10) among women versus 4 (1;12) among men]. The DM group, however, revealed a pronounced gender difference, with women achieving markedly higher scores than men [6 (2;10) compared with 2 (1;7)]. This gender disparity persisted when the extended GAD-7 (including the additional anxiety question) was examined: DM women scored significantly higher, while HD patients displayed no such male-female difference. In the DM group, 39.43% of patients recorded a GAD-7 score greater than 5, 16.57% exceeded 10, and 4.57% surpassed 15. Corresponding proportions in the HD group were 41.52%, 20.09%, and 9.38%. None of these thresholds showed statistically meaningful differences between the two groups **(Table 5)**.

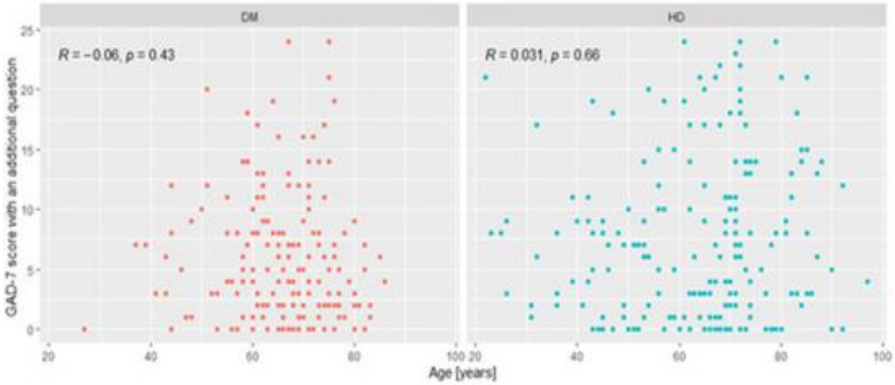
Table 5. The results of GAD-7.

	DM	HD	p
GAD-7 > 5 (n (%))	69 (39.43%)	93 (41.52%)	0.749
GAD-7 > 10 (n (%))	29 (16.57%)	45 (20.09%)	0.443
GAD-7 > 15 (n (%))	8 (4.57%)	21 (9.38%)	0.101

Relationships linking GAD-7 scores — both the original and the version with the added question — to multiple variables are outlined in **Table 6** and illustrated in **Figure 1**.



a)



b)

Figure 1. The P-values for Spearman's rank correlation between the GAD-7 score, the GAD-7 score with an additional question, and age.

Table 6. The correlation between the GAD-7 score and the GAD-7 score with an additional question, and the different sociodemographic data.

Predictor variables	GAD-7 Score (HD)	GAD-7 Score (DM)	GAD-7 + COVID-19 Anxiety Item (HD)	GAD-7 + COVID-19 Anxiety Item (DM)
Sex	P = 0.972	P = 0.001	P = 0.638	P = 0.004
Housing status (living independently)	P = 0.344	P = 0.973	P = 0.308	P = 0.774
Marital status	P = 0.8	P = 0.521	P = 0.585	P = 0.240
History of COVID-19 infection	Median: 3 (0–8)	Median: 4.5 (0–12.2)	Median: 4 (1–10)	Median: 7 (1.75–14.2)
P	P = 0.153 **	P = 0.399 **	P = 0.199 **	P = 0.176 **
Use of hypnotic medications	Median: 2 (0–7)	Median: 4 (0–9)	Median: 8 (3–8)	Median: 9 (6–18)
	P < 0.001 **	—	P < 0.001 **	—
Sleep disorders vs. anxiety level	Median: 2 (0–7)	Median: 3 (0–8)	Median: 7 (2–14)	Median: 9 (3–17)
	P < 0.001 **	—	P < 0.001 **	—
Missed dialysis sessions	P = 0.001 **	3 (0–8)	P = 0.002 **	4 (1–10)
	10 (7–15.5)	—	12 (8.5–16.50)	—
Duration of diabetes	P = 0.115 *	r = 0.119	P = 0.101 *	r = 0.124
Number of comorbidities	P < 0.001 *	r = 0.035	P < 0.001 *	r = 0.021
	r = 0.068	P = 0.369 *	P = 0.560 *	r = 0.056

Abbreviations: HD = hemodialysis; DM = diabetes. *: Spearman's correlation, **: Mann–Whitney test

Any restriction or social isolation exerts a harmful influence on people's everyday functioning. Such isolation brings about major changes, cuts individuals off from family members, and disrupts established daily habits. These elements tend to heighten feelings of fear and worry and may trigger various mental health problems. The altered daily life imposed by the pandemic also led to substantial shifts in how healthcare services were delivered. Individuals living with long-term illnesses were particularly vulnerable to the consequences of these disruptions.

The present research examined how two distinct categories of chronically ill patients were managed during the pandemic. The first category consisted of HD patients, who continued to attend regular dialysis sessions at specialized centers, shared transportation with others, and spent time in the company of fellow patients despite the ongoing health crisis. Because of multiple coexisting conditions and weakened immune function linked to CKD, this population faced an elevated chance of contracting SARS-CoV-2.

The second category comprised DM patients with long-standing disease who typically had minimal direct interaction with healthcare facilities and depended largely on remote telephone consultations throughout the pandemic. Blood glucose regulation worsened in the majority of these individuals, and periods of lockdown encouraged increased body weight. Numerous prior investigations have identified poor glycemic control and obesity associated with type 2 DM as the strongest predictors of serious COVID-19 outcomes [9-12].

A major advantage of this study lies in the substantial number of participants and the simultaneous distribution of questionnaires, which enabled data collection during a period when both groups were experiencing comparable levels of pandemic-related stress and quarantine measures.

In the DM group, a larger share of patients remained employed, and financial difficulties during the pandemic were more commonly reported. The relatively stable financial situation among HD patients is likely because most do not work or receive disability benefits.

The small proportion of patients suitable for kidney transplantation (12%) might stem from reduced availability of diagnostic procedures and consultations with non-nephrology specialists during this time, a finding also supported by our data (nearly 50% of HD patients noted restricted access to other specialists). According to national reports on dialysis care in Poland, the drop in transplantation candidates was linked to the pandemic itself, the advancing age of dialysis recipients, and the presence of multiple comorbidities, all of which hindered the referral process for new transplant candidates [13].

Among DM patients, average BMI remained essentially unchanged before and after two years of the pandemic (approximately 31 kg/m²). More than 60% of these patients recognized that their blood sugar management had clearly deteriorated (HbA1c rising from 7.5% to 8.05%). These observations align closely with findings from other recent publications [14].

Even though infection rates were similar across both groups, DM patients more frequently needed antibiotics and supplemental oxygen, indicating a more serious clinical picture. This difference may be related to the notably lower vaccination uptake observed in the DM group in our sample.

The most prominent challenges reported by participants in both groups involved the obligation to wear masks and the sharp reduction in social interactions; these factors appeared to contribute directly to mental health strain. Remarkably, no HD patients reported depressive disorders or other psychiatric conditions. Sleep disturbances affected over 30% of HD patients, similar to the DM group, and a comparable percentage relied on sleep medications. Moreover, many indicated that the pandemic had further degraded the quality of their sleep. Since 2006, the GAD-7 has served as a popular screening instrument for identifying generalized anxiety disorder in routine medical practice, with its reliability, sensitivity, and specificity frequently highlighted in the literature. Importantly, it yields consistent outcomes whether completed independently by the patient or with interviewer support. Despite this, the HD group showed unusually low rates of depressive and other mental disorders. One possible explanation is that these patients regularly interacted with dialysis staff and fellow patients several times per week, which may have led them to underreport symptoms out of concern for stigma or judgment. The differing environments in which the questionnaires were completed represent a key limitation of the study. In future research, more private and comfortable settings should be arranged, avoiding data collection during active dialysis sessions.

The GAD-7 tool has inherent constraints because it focuses exclusively on one form of anxiety and does not

capture other conditions, such as social anxiety disorder or post-traumatic stress disorder. Its developers stress that the scale indicates only a possible diagnosis and requires additional clinical evaluation. Another drawback is that the interpretation of scores can vary across different cultural or ethnic populations.

Conversely, a notable strength of our work is the direct comparison of two sizable groups of patients with distinct chronic conditions, while deliberately excluding those with cancer. Until now, limited information has been available regarding mental health and anxiety coping strategies in precisely these two populations during the pandemic.

We selected these patient groups because both suffer from persistent, incurable diseases with a high likelihood of serious complications, thereby requiring ongoing engagement with healthcare providers.

Additionally, the patient populations chosen for this research faced the poorest outlook during the pandemic. They showed elevated death rates driven primarily by cardiovascular issues rather than the direct effects of COVID-19 infection. In such high-risk groups, anxiety levels were anticipated to rank among the highest.

Analysis of the GAD-7 results revealed that HD patients had average scores that remained consistent across genders and did not even reach the threshold for mild anxiety. The share of patients scoring above 10 points stood at 20%, while 9% scored above 15 points.

Regular, face-to-face interactions with medical staff and the ongoing support provided during these encounters likely helped lower fear and worry among HD patients. In the DM group, however, a clear gender gap emerged. On average, women's scores were 5 points higher than men's, crossing into the range indicating mild anxiety.

Several previous investigations have highlighted greater psychological susceptibility among women, suggesting that the negative consequences of the pandemic and associated lockdowns were especially pronounced in the female population [15, 16]. In the DM group, 16.57% of patients achieved a GAD-7 score greater than 10, pointing toward possible generalized anxiety. A score exceeding 15 points, which signals severe anxiety, was recorded by 4.57% of DM patients.

Beyond female gender in the DM cohort, sleep disturbances and the regular use of sleep medications emerged as the strongest contributors to elevated anxiety levels in both groups. For HD patients, challenges involving transportation to dialysis sessions, missed treatments, or delayed procedures were strongly linked to increased anxiety. A greater burden of coexisting illnesses in the HD group was also tied to significantly higher anxiety scores. Global estimates place the overall rate of anxiety disorders at 7.3%. Remarkably, our findings showed that HD patients exhibited lower anxiety scores than the general population, even amid the pandemic and its many restrictions. DM patients, by comparison, displayed signs of mild anxiety, with this pattern being especially evident among women.

One practical implication of our work is the recommendation to incorporate routine screening for anxiety disorders among chronically ill individuals, with particular emphasis on women, who appear more vulnerable to developing such conditions.

Conclusion

The present study underscores the importance of addressing the psychological dimension when managing physical chronic illnesses. Anxiety disorders occurred at comparable rates across both groups of chronically ill patients. Within the DM group, women experienced more intense anxiety symptoms. Overall, mental health problems were substantially more common among DM patients. HD patients appeared to manage the emotional burden of pandemic-related stress and restrictions more effectively.

Additional research is needed to examine the long-term effects of the COVID-19 pandemic on mental well-being among patients with chronic conditions, and how these effects evolve in the post-pandemic era.

Take home message

Evaluating mental health should be a core component of care for patients with physical illnesses. Disruptions to routine medical services during the COVID-19 pandemic may have contributed to higher levels of anxiety disorders. Primary care physicians and other healthcare providers need to recognize the heightened risk of anxiety in these patient populations and actively screen for it using simple, efficient tools such as the GAD-7 scale. Comprehensive medical and psychological support is essential, especially during large-scale health crises like the SARS-CoV-2 outbreak. In-person interactions with healthcare staff appear more beneficial for the overall well-being of chronically ill patients than remote or virtual consultations.

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The study was questionnaire-based, and the Bioethics Committee of the Medical University of Silesia was informed.

References

1. Wang Y, Duan Z, Ma Z, Mao Y, Li X, Wilson A, et al. Epidemiology of mental health problems among patients with cancer during COVID-19 pandemic. Transl Psychiatry. 2020;10:263.
2. Alagoz S, Eren N, Ozcan SG, Atlı Z, Ozkul O, Belli H, et al. Impact of COVID-19 lockdown on mood status: A comparison of hemodialysis and oncology patients. Ther Apher Dial. 2022;4:781–9.
3. Ahmed N, Khderat AH, Sarsour A, Taher A, Hammoudi A, Hamdan Z, et al. The vulnerability of maintenance dialysis patients with COVID-19: Mortality and risk factors from a developing country. Ann Med. 2022;1:1511–9.
4. Ozturk S, Turgutalp K, Arici M, Odabas AR, Altiparmak MR, Aydin Z, et al. Mortality analysis of COVID-19 infection in chronic kidney disease, haemodialysis and renal transplant patients compared with patients without kidney disease: A nationwide analysis from Turkey. Nephrol Dial Transplant. 2020;12:2083–95.
5. Erthal IN, Alessi J, Teixeira JB, Jaeger EH, de Oliveira GB, Scherer GDLG, et al. Lifestyle pattern changes, eating disorders, and sleep quality in diabetes: How are the effects of 18 months of COVID-19 pandemic being felt? Acta Diabetol. 2022;10:1265–74.
6. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. Arch Intern Med. 2006;166:1092.
7. RStudio Support. Citing RStudio [Internet]. Available from: https://support.rstudio.com/hc/en-us/articles/206212048-Citing-RStudio (accessed 2023 Mar 18).
8. Wickham H, Averick M, Bryan J, Chang W, McGowan LDA, François R, et al. Welcome to the Tidyverse. J Open Source Softw. 2019;43:1686.
9. Santabárbara J, Lasheras I, Lipnicki DM, Bueno-Notivol J, Pérez-Moreno M, López-Antón R, et al. Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. Prog Neuropsychopharmacol Biol Psychiatry. 2021;109:110207.
10. Rajpal A, Rahimi L, Ismail-Beigi F. Factors leading to high morbidity and mortality of COVID-19 in patients with type 2 diabetes. J Diabetes. 2020;12:895–908.
11. Buscemi S, Corleo D, Randazzo C. Risk factors for COVID-19: Diabetes, hypertension, and obesity. Adv Exp Med Biol. 2021;1353:115–29.
12. Soeroto AY, Soetedjo NN, Purwiga A, Santoso P, Kulsum ID, Suryadinata H, et al. Effect of increased BMI and obesity on the outcome of COVID-19 adult patients: A systematic review and meta-analysis. Diabetes Metab Syndr. 2020;6:1897–904.
13. Debska-Slizien A. Current status of renal replacement therapy in Poland in 2020. Neprol Dial Pol. 2021;25:7–20.
14. Eberle C, Stichling S. Impact of COVID-19 lockdown on glycemic control in patients with type 1 and type 2 diabetes mellitus: A systematic review. Diabetol Metab Syndr. 2021;1:95.
15. Vishnevsky T, Cann A, Calhoun LG, Tedeschi RG, Demakis GJ. Gender differences in self-reported posttraumatic growth: A meta-analysis. Psychol Women Q. 2010;1:110–20.
16. Perrin PC, McCabe OL, Everly GS, Links JM. Preparing for an influenza pandemic: Mental health considerations. Prehosp Disaster Med. 2009;3:223–30.