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Depression, anxiety and stress in people on renal replacement therapy from the city of Chihuahua

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ABSTRACT

Introduction: Chronic kidney disease is a progressive condition that deteriorates quality of life. Patients not only face physical challenges, but also emotional and social ones, which can generate high levels of depression, anxiety, and stress.

Objective: To analyze the presence and intensity of depression, anxiety, and stress in people on renal replacement therapy from the city of Chihuahua.

Material and Method: We conducted a descriptive and cross-sectional study in a medical unit specialized in kidney disease in Chihuahua (Mexico). All patients on renal replacement therapy participated (n = 60). A sociodemographic form was applied for data collection, allowing the identification and characterization of participants. The DASS-21 Scale was used to assess the presence and intensity of affective states associated with depression, anxiety, and stress.

Results: Significant differences were observed according to the therapy. In peritoneal dialysis, 40% exhibited severe depression; 50%, moderate anxiety; and 45%, severe stress, while in hemodialysis the "Normal" category predominated in depression (55%) and anxiety (50%), with only 20% reporting severe stress. Additionally, a total of 83.3% reported constant thoughts about their illness and 31.7% hopelessness, evidencing a greater psychological impact in peritoneal dialysis.

Conclusions: Psychological impact in patients on renal replacement therapy, particularly on peritoneal dialysis, is highlighted. It is recommended to implement psychosocial interventions and develop comprehensive health policies that address their physical and emotional well-being holistically.

Keywords: renal replacement therapy; depression; anxiety and stress.

RESUMEN

Depresión, ansiedad y estrés en personas con terapia de sustitución renal de la ciudad de Chihuahua

Introducción: La enfermedad renal crónica es una afección progresiva que deteriora la calidad de vida. Los pacientes no solo enfrentan desafíos físicos, sino también emocionales y sociales, lo que puede generar elevados niveles de depresión, ansiedad y estrés.

Objetivo: Analizar la presencia e intensidad de depresión, ansiedad y estrés en personas en terapia de sustitución renal de la ciudad de Chihuahua.

Material y Método: Se realizó un estudio descriptivo y transversal en una unidad médica especializada en enfermedad renal de Chihuahua, participaron la totalidad de pacientes en terapia de sustitución renal (n=60). Para la recolección de datos se aplicó una cédula sociodemográfica, permitiendo identificar y caracterizar a los participantes. Para evaluar la presencia e intensidad de los estados afectivos asociados a la depresión, la ansiedad y el estrés se utilizó la Escala DASS-21.

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Resultados: Se observaron diferencias significativas según la terapia. En diálisis peritoneal, el 40% presentó depresión severa, el 50% ansiedad moderada y el 45% estrés severo, mientras que en hemodiálisis predominó la categoría "Normal" en depresión (55%) y ansiedad (50%), con solo el 20% con estrés severo. Además, el 83,3% reportó pensamientos constantes sobre su enfermedad y el 31,7% falta de esperanza, evidenciando un mayor impacto psicológico en diálisis peritoneal.

Conclusiones: Se destaca el impacto psicológico en pacientes con terapia de sustitución renal, particularmente en diálisis peritoneal. Se recomienda implementar intervenciones psicosociales y desarrollar políticas de salud integrales que aborden integralmente su bienestar tanto físico como emocional.

Palabras clave: terapia de sustitución renal; depresión; ansiedad y estrés.

INTRODUCTION

Chronic kidney disease (CKD) has emerged as a global health crisis, deeply affecting patients' quality of life[1]. Beyond clinical complications, CKD imposes physical, emotional, and social challenges that reshape the daily lives of those affected[2-3]. As disease progresses, renal replacement therapies such as hemodialysis, peritoneal dialysis, or kidney transplantation become essential for prolonging life[4]. However, these interventions affect the patient's autonomy, family environment, and social integration[5,6]. The demands of treatment, along with emotional and financial burdens, create additional challenges that influence therapeutic adherence and the perception of well-being[7,8]. This highlights the importance of approaching CKD from a multidimensional perspective that considers not only medical treatment but also psychosocial support strategies that promote the comprehensive well-being of affected individuals[9,10].

Globally, the prevalence of psychological disorders in individuals undergoing renal replacement therapy is alarmingly high[6]. It is estimated that between 20% and 30% of dialysis patients experience significant symptoms of depression[4]. The prevalence of anxiety is also elevated, with recent studies indicating it affects more than 30% of hemodialysis patients, while stress is also common due to treatment-related stressors such as dependence on machines, reduced autonomy, and physical side effects[4].

Nationwide, Mexico is facing a growing prevalence of CKD, with approximately 12 million people diagnosed, around 200,000 of whom require renal replacement therapy[11]. Recent studies show that up to 30% of dialysis patients in Mexico experience moderate to severe symptoms of depression, and between 20% and 40% suffer from significant anxiety and stress[7]. These statistics underscore the urgent need to implement psychosocial intervention strategies to improve this population's quality of life and complement medical treatments.

At state level, Chihuahua has one of the highest CKD rates in the country, affecting primarily the most vulnerable sectors of the population. In the city of Chihuahua, it is estimated that between 25% and 35% of hemodialysis patients report symptoms of depression, while approximately 30% experience significant levels of anxiety, indicating an urgent need for mental health care. However, there is a lack of detailed local studies addressing the specific psychological effects of renal replacement therapy in this region, limiting the healthcare system's ability to identify and effectively address these issues[7].

This study aims to analyze the presence and intensity of depression, anxiety, and stress in individuals undergoing renal replacement therapy in the city of Chihuahua. By evaluating these factors, the goal is to generate local data to inform specific mental health policies and contribute to the development of appropriate intervention strategies for this population.

MATERIAL AND METHOD

We conducted a cross-sectional descriptive observational study in individuals undergoing renal replacement therapy (peritoneal dialysis and hemodialysis) at a specialized renal disease unit in the city of Chihuahua. The sample included all individuals attending renal replacement therapy (n=60). Inclusion criteria required individuals to be undergoing dialysis therapy before completing the instruments and to be adults. Patients diagnosed with mental disorders, neurological conditions, or cognitive disabilities that impaired comprehension of the instruments were excluded.

Visits to the specialized medical unit were made on the dates and times assigned by the institution to coordinate patient access. Patients were given a detailed explanation of the study and were then asked to complete the instruments, beginning with an identification form that collected sociodemographic data to help understand and characterize participants.

The Depression Anxiety and Stress Scale (DASS-21), developed by Lovibond & Lovibond (1995)[12], was administered. This self-report instrument evaluates the presence and intensity of affective states of depression, anxiety, and stress. Each item is rated according to the presence and intensity of symptoms over the past week on a 4-point Likert scale (0–3). Each scale includes seven items, with total scores ranging from 0 to 21. The depression scale assesses dysphoria, lack of meaning, self-depreciation, disinterest, and anhedonia. The anxiety scale includes subjective and somatic symptoms of fear, autonomic arousal, situational anxiety, and anxious affect. The stress scale evaluates non-specific persistent arousal, difficulty relaxing, irritability, and impatience.

Instruments were completed based on the time participants could dedicate; in some cases, administration was paused and resumed as needed to complete the instruments fully while allowing necessary rest.

Statistical analysis

Data analysis was conducted using SPSS® version 29.0. Descriptive statistics (frequencies, proportions, point estimates with 95% confidence intervals, and measures of central tendency) were used. Inferential statistics were also employed, including Chi-square tests (X^2) to examine relationships between levels of depression, anxiety, and stress by type of renal replacement therapy and sociodemographic variables. A Linear Regression Model was developed to evaluate the effect of months on therapy and the depression, anxiety, and stress indices on the type of renal replacement therapy.

Ethical considerations

This study adhered to the General Health Law for Health Research; ethical considerations ensured the dignity and well-being of individuals involved in the study[13]. The study was approved by the Ethics and Research Committees of the Faculty of Nursing and Nutrition (FEN) at *Universidad Autónoma de Chihuahua* (UACH), registration No. SIP-CEINV/31/2023, following the guidelines of Mexico's General Health Law for Health Research. Informed consent was obtained and signed by all participants.

RESULTS

All individuals *(n=60)* undergoing renal replacement therapy (peritoneal dialysis and hemodialysis) at an outpatient medical unit specializing in kidney disease in Chihuahua participated.

Regarding sociodemographic characteristics, 65% *(n=39)* were men, and 35% *(n=21)* were women. A total of 30% *(n=18)* had secondary education, 28.3% *(n=17)* had high school education, and only 6.7% *(n=4)*, professional education. The mean age was 56.6 years (SD, 13.407), with a range from 18 to 86 years. The average time in months on renal replacement therapy was 17.25 (SD, 17.838), ranging from 1 to 96 months.

Table 1, shows the type of renal replacement therapy by gender. Among men, 25% *(n=15)* were on dialysis and 40% *(n=24)* on hemodialysis. Among women, 8.3% *(n=5)* were on dialysis and 26.7% *(n=16)* on hemodialysis. Regarding personal feelings about their kidney disease, 51.7% *(n=31)* felt satisfied with their current life; however, 83.3% *(n=50)* reported having persistent thoughts about the disease, and 31.7% *(n=19)* expressed hopelessness about the future.

Table 1. Sex-based Renal Replacement Therapy.

Variable *n*=60	Dialysis		Hemodialysis	
	f	%	*f*	%
Male	15	25.0	24	40.0
Female	5	8.3	16	26.7

f= frequency, **%**= percentage, **n=** total number of observations.

To meet the study's objective of analyzing depression, anxiety, and stress in individuals undergoing renal replacement therapy in Chihuahua, the following was found:

Table 2, shows depression, anxiety, and stress levels by gender. In men, the most frequent depression categories were "Normal" and "Extremely Severe," both at 30.8% *(n=12)*. In women, the "Normal" category was most prevalent at 52.4% *(n=11)*, followed by "Extremely Severe" at 28.6% *(n=6)*. No statistically significant difference was found in depression distribution by gender (Chi square test=5.136; p=0.274). For anxiety, the most common category among men was "Moderate" at 41% *(n=16)*, while women were mostly in the "Normal" category at 47.6% *(n=10)*, followed by "Moderate" at 19.0% *(n=4)*, again with no significant gender difference (Chi square test= 3.862; p=0.425).

For stress, the most common categories in men were "Extremely Severe" at 38.5% *(n=15)* and "Severe" at 28.2% *(n=11)*. Among women, "Normal" was most frequent at 52.4% *(n=11)*, with "Extremely Severe" being lower at 9.5% *(n=2)*, indicating a statistically significant gender difference in stress levels (Chi square test=12.153; *p*=0.016).

When cross-tabulating the variables of depression, anxiety, and stress by type of renal replacement therapy **(table 3)**, it was found that, regarding depression in patients undergoing peritoneal dialysis, the categories "Severe" and "Extremely Severe" had the highest frequencies, with 40.0% (n=8) each. In contrast, among hemodialysis patients, the "Normal" category was the most prevalent at 55.0% (n=22), followed by "Extremely Severe" at 25.0% (n=10), indicating a statistically significant difference (chi square test=19.127; p=0.001) in the distribution of depression levels between the two groups[2]. This suggests that patients on peritoneal dialysis have a higher prevalence of severe and extremely severe depression compared to those on hemodialysis. Regarding anxiety in peritoneal dialysis patients, the "Moderate" category was the most frequent at 50.0% *(n=10)*, followed by "Severe" at 30.0% *(n=6)*. In hemodialysis patients, the "Normal" category predominated at 50.0% *(n=20)*, followed by "Moderate" at 25.0% *(n=10)*, also revealing a statistically significant difference in the distribution of anxiety levels between the two groups (chi-square test=14.839; p=0.0005). Patients on peritoneal dialysis appear to exhibit higher levels of anxiety in the more severe categories compared to those on hemodialysis.

Similarly, for the variable of stress, there was a statistically significant difference in the distribution of stress levels between the two groups (chi-square test=14.597; p=0.006). This suggests that patients undergoing peritoneal dialysis experience higher levels of severe stress compared to those undergoing hemodialysis.

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Table 2. Levels of depression, anxiety, and stress by sex.

Category	Level	Male (f)	Male (%)	Female (f)	Female (%)	Chi-square test
Depression	Normal	12	30.8%	11	52.4%	5.136 P = 0.274
	Mild	1	2.6%	–	4.7%	
	Moderate	4	10.2%	2	9.5%	
	Severe	10	25.6%	–	4.7%	
	Extremely Severe	12	30.8%	6	28.6%	
Anxiety	Normal	11	28.2%	10	47.6%	3.862 P = 0.425
	Mild	2	5.1%	–	9.5%	
	Moderate	16	41.0%	–	19.0%	
	Severe	6	15.4%	–	14.3%	
	Extremely Severe	4	10.3%	2	9.5%	
Stress	Normal	10	25.6%	11	52.4%	12.153 P = 0.016
	Mild	–	0.0%	–	9.5%	
	Moderate	3	7.7%	–	0.0%	
	Severe	11	28.2%	6	28.6%	
	Extremely Severe	15	38.5%	2	9.5%	

f= frequency, **%**= percentage; ***p***= significance, ***n***= 60.

Table 3. Levels of depression, anxiety, and stress by type of renal replacement therapy.

Variable		Male		Female		
	Level	f	%	f	%	Chi-square
Depression	Normal	1	5.0%	22	55.0%	19.127 P=0.001
	Mild	0	0.0%	2	5.0%	
	Moderate	3	15.0%	3	7.5%	
	Severe	8	40.0%	3	7.5%	
	Extremely Severe	8	40.0%	10	25.0%	
Anxiety	Normal	10	0.0%	20	50.0%	14.839 P=0.005
	Mild	0	0.0%	3	7.5%	
	Moderate	5	25.0%	10	25.0%	
	Severe	3	15.0%	3	7.5%	
	Extremely Severe	2	10.0%	4	10.0%	
Stress	Normal	1	5.0%	11	27.5%	14.597 P=0.006
	Mild	0	0.0%	2	5.0%	
	Moderate	1	5.0%	1	2.5%	
	Severe	9	45.0%	3	7.5%	
	Extremely Severe	9	45.0%	8	20.0%	

f= frequency, **%**= percentage, **p**= significance level, **n**= 60.

Furthermore, **table 4** presents a Multiple Linear Regression model examining the effect of the study variables –depression, anxiety, and stress– on the type of renal replacement therapy. The model was found to be statistically significant [F(2,57)= 8.157; p=0.001], explaining 22.3% of the variability in the type of renal replacement therapy (R^2=0.223). Moreover, the depression, anxiety, and stress index showed a significant and negative effect (ß=−0.008; t=−3.947; p=0.001), with a 95% confidence interval (−0.013, −0.004), indicating that a higher index is associated with a lower probability of certain types of renal replacement therapy.

DISCUSSION

The results of the present study reveal significant levels of depression, anxiety, and stress among patients undergoing renal replacement therapy in the city of Chihuahua, with notable differences between treatment modalities (peritoneal dialysis and hemodialysis). These findings are consistent with previous studies that highlight the high prevalence of psychological disorders in patients with advanced chronic kidney disease (CKD), due to the physical, emotional, and social demands of treatment[4,6].

Regarding depression, patients on peritoneal dialysis showed higher levels in the "Severe" and "Extremely Severe" categories compared to hemodialysis patients, in whom the "Normal" category predominated. This difference may be attributed to the psychological burden associated with the home management of peritoneal dialysis, which requires greater autonomy and responsibility on the part of the patient. Previous studies have indicated that reduced self-efficacy and the perception of isolation in home-based treatment increase the likelihood of developing severe depressive symptoms[2,3].

As for anxiety, patients on peritoneal dialysis also presented higher levels in the "Moderate" and "Severe" categories. This finding is consistent with research indicating that patients managing treatments at home experience greater uncertainty regarding the effectiveness of the procedure and potential complications, which increases anxiety levels[4,6]. On the other hand, the present study's results suggest that hemodialysis patients report lower levels of anxiety, possibly due to the continuous clinical support provided in this setting. According to previous studies, when replacement therapy is carried out in a supervised clinical environment, it offers a sense of safety and support that may contribute to lower anxiety levels compared to peritoneal dialysis[10,14].

The variable stress also showed significant differences between the two groups, being more severe in patients on

Tabla 4. Multiple linear regression for the effect of depression, anxiety, and stress on type of renal replacement therapy.

Variable	B	SE	t	p-value	95% CI (LL)	95% CI (UL)
Constant	1.912	0.107	17.935	0.001	1.699	2.126
Time in Months on Renal Replacement Therapy	0.005	0.003	1.626	0.109	−0.001	0.012
Depression, Anxiety, and Stress Index	−0.008	0.002	−3.947	0.001	−0.013	−0.004

	SS	df	MS	F
Regression	2.967	2	1.483	8.157
Residual	10.366	57	0.182	

Model 1: R^2=0.223, SEE=0.426, p=0.001

B= beta coefficient, **SE=** standard error, **R^2=** coefficient of determination, **t=** Student's t, **SEE=** standard error of estimate, **SS=** sum of squares, **df=** degrees of freedom, **MS=** mean square, **CI=** confidence interval (**LL=** lower limit, **UL=** upper limit), **n=** 60.

peritoneal dialysis. This finding may be due to the physical and emotional demands involved in self-managing treatment, as reported in studies analyzing the relationship between stress and renal replacement therapy modalities[8]. Additionally, factors such as prolonged treatment duration, economic burden, and lack of psychosocial support contribute to heightened stress in this population[4,5].

Another relevant finding was the high proportion of patients who reported constant thoughts about their illness and a significant percentage who expressed hopelessness about the future[8]. This is associated with the intensity of suffering these patients endure–stemming from both the illness itself and the surrounding environment[2,4]. This highlights the need for psychosocial interventions aimed at improving patients' well-being and resilience. The literature supports that psychological support programs and cognitive-behavioral therapies can be effective in reducing the impact of these disorders on patients' quality of life[4,9].

In general terms, the results of this study are consistent with international literature, which reports high prevalence rates of depression, anxiety, and stress in patients with advanced CKD. However, a higher prevalence of these conditions was observed in patients in Chihuahua, which could be related to cultural and socioeconomic factors, as well as specific characteristics of the regional healthcare system[8].

This study has several limitations that should be considered when interpreting the results. First, the small sample size (n=60) limits the generalizability of the findings, even though the entire population from the selected unit was included. It is recommended that the study be extended to other institutions. Additionally, the cross-sectional design prevents causal inferences; certain confounding factors such as social support and comorbidities were not controlled, and the lack of longitudinal follow-up prevents the assessment of changes over time. Comparability between groups may be affected by the absence of randomization, and the results may be influenced by contextual factors specific to the medical unit where the study was conducted.

In conclusion, this study reveals that patients undergoing renal replacement therapy in the city of Chihuahua exhibit significant levels of depression, anxiety, and stress, with a higher prevalence of severe symptoms among those receiving peritoneal dialysis compared to hemodialysis patients. Although no statistically significant differences in depression and anxiety were observed between genders, men showed higher levels of severe stress. Additionally, most participants reported persistent thoughts about their illness, and a considerable proportion expressed a lack of hope for the future, highlighting a significant psychological impact. These findings underscore the need for psychosocial interventions aimed at mitigating these effects and improving the quality of life in this population, as well as the development of public policies that comprehensively address the physical and emotional aspects of patients with chronic kidney disease.

Conflicts of interest

The authors declare no conflicts of interest related to the research, authorship, and/or publication of this manuscript.

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