Advances in Consumer Research
https://acr-journal.com/
Volume-2 | Issue-4 | August 2025

Original Researcher Article

Psychological Profile and Quality of Life Among Chronic Kidney Disease Patients

Nasr Asfour[1], El- Sadek Mahdi[2], Sherif Helal[2], Islam Bayoumi[2] & Riham El-Eissawy[2]

[1]NeuroPsychiatric Registrar
Email: nasr.asfour@hotmail.com
[2]Amal Mental Health Complex-King Salman City Madinah -Department of Psychiatry.

Received:
05/08/2025
Revised:
16/08/2025
Accepted:
08/09/2025
Published:
17/09/2025

ABSTRACT

Background and purpose: Chronic kidney disease (CKD) is a growing public health concern that affects both physical health and psychosocial wellbeing. Beyond the clinical complications, CKD patients often face psychological challenges, particularly depression and anxiety, which can significantly impair their quality of life (QoL). This study aimed to assess the prevalence of depression and anxiety among CKD patients and to investigate their relationship with QoL domains. ***Material and methods:*** A cross-sectional study was conducted at the nephrology outpatient clinic of Al-Azhar University Hospitals in Cairo. A purposive sample of 81 patients with CKD (stages II–V) was recruited. Data were collected through face-to-face structured interviews using a questionnaire composed of four sections: sociodemographic and clinical characteristics, the Patient Health Questionnaire (PHQ-9) for depression, the Generalized Anxiety Disorder scale (GAD-7) for anxiety, and the World Health Organization Quality of Life–BREF (WHOQOL-BREF) for QoL assessment. ***Results:*** Depression was observed in 63% of patients, while 53.1% reported significant anxiety. Statistical analysis revealed a significant negative correlation between depression and QoL domains ($p < 0.001$) as well as between anxiety and QoL scores, indicating that greater psychological distress was associated with poorer perceived QoL. ***Conclusions:*** CKD patients are at high risk of depression and anxiety, which strongly impact their quality of life. Routine mental health screening and early psychological interventions should be integrated into CKD care to enhance patient outcomes.

Keywords: Chronic kidney disease, Quality of life, health, Psychological.

INTRODUCTION

Chronic kidney disease (CKD) is recognized as a major noncommunicable disease and one of the most pressing global health challenges, contributing substantially to morbidity, mortality, and healthcare costs [1,6]. The National Kidney Foundation (NKF), in collaboration with the Kidney Disease Outcomes Quality Initiative (KDOQI), issued comprehensive guidelines for the definition and classification of CKD in 2002 [2], which were later refined and adopted by kidney disease: Improving Global Outcomes (KDIGO) in 2004 [3,4]. According to these criteria, CKD is defined as kidney damage or a reduction in kidney function persisting for at least three months, irrespective of underlying etiology. The glomerular filtration rate (GFR) remains a reliable biomarker of renal function, with progressive decline indicating worsening disease severity. Staging is based on etiology, GFR, and albuminuria, which together facilitate accurate risk stratification and clinical management [5,9].

Globally, the prevalence of CKD is estimated at 11–13%, with stage 3 accounting for the majority of cases [6]. In the United States, CKD ranks as the eighth leading cause of mortality [7]. Beyond its clinical complications, CKD is strongly linked to psychosocial burdens. Patients frequently endure depression and anxiety, which contribute to functional impairment, suicidal ideation, poor sleep, immune dysfunction, and deteriorating nutritional status [1,8]. These conditions are often underdiagnosed and undertreated, further aggravating morbidity and mortality [1,12]. Evidence suggests that depression prevalence among CKD patients is substantially higher than in the general population, where lifetime prevalence rates range between 11% and 15% depending on socioeconomic context [14]. Regional studies, such as those conducted in the Middle East and North Africa, have reported depression prevalence between 13% and 18% [15]. Comparable findings have also been documented in South Asia and the Gulf region [12,13].

Research indicates that CKD patients with depression or anxiety exhibit significantly lower quality of life (QoL) scores across physical, psychological, social, and environmental domains [16–20]. Studies from different age groups and settings, including elderly patients [16], children and adolescents [17], and pre-dialysis populations [18], consistently highlight a strong negative association between psychological distress and QoL outcomes. Similar findings have been observed in hospital-based cohorts [19] and multicenter studies [20], reinforcing the global nature of this issue. Instruments such as the PHQ-9 and GAD-7 have been validated for use in CKD populations, providing reliable tools for screening depression and anxiety [10,11].

Despite growing awareness, there remains a lack of interventional and longitudinal research on psychological health in CKD patients, particularly in resource-limited settings where registry systems and mental health screening programs are absent. Furthermore, little is known about the biological and psychological mechanisms linking CKD to depression and anxiety, including the roles of chronic inflammation, neurotransmitter imbalances, and stress associated with long-term disease management.

Against this backdrop, the present study investigates the prevalence of depression, anxiety, and QoL among CKD patients attending the nephrology outpatient clinic at Al-Azhar University Hospitals in Cairo. It further explores the associations of these psychological outcomes with sociodemographic characteristics and metabolic profiles. By addressing this gap, the study contributes to a more comprehensive understanding of the psychosocial burden of CKD and underscores the need for integrated care that addresses both physical and psychological wellbeing.

MATERIAL AND METHODS

Study design and setting

This cross-sectional study was conducted at the nephrology outpatient clinic of Al-Azhar University Hospitals in Cairo to assess the prevalence of depression, anxiety, and quality of life (QoL) among patients with chronic kidney disease (CKD). Data were collected over a one-year period from October 2023 to October 2024.

Participants

Eligible participants included adults (≥18 years) diagnosed with CKD stages I–V. Exclusion criteria were patients younger than 18 years, individuals with cognitive impairments, pregnant women, and those with end-stage renal disease (ESRD) undergoing dialysis. All participants provided written informed consent prior to enrolment.

Sample size

The required sample size was calculated using Epi Info (Version 7) based on the following parameters: expected CKD frequency of 12%, confidence level of 90%, confidence limit of 5%, and a population size of 270. The final sample consisted of 81 patients, selected using random sampling techniques.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Al-Azhar University Hospitals. Participation was voluntary, and written informed consent was obtained from all respondents. Confidentiality and anonymity were maintained by assigning identification codes known only to the research team. All procedures adhered to institutional and national ethical guidelines.

Data collection and measures

Data were collected through structured face-to-face interviews, conducted by trained field researchers in the waiting areas of the nephrology clinic. Each interview lasted approximately 20 minutes. The questionnaire was divided into four sections:

Sociodemographic and clinical data: Age, gender, marital status, education level, occupation, medical records, and laboratory results. Kidney function was assessed using estimated glomerular filtration rate (GFR), calculated from serum creatinine using the CKD-EPI equation. CKD stages were classified as follows: stage 1 (GFR >90 mL/min/1.73 m²), stage 2 (60–89), stage 3 (30–59), stage 4 (15–29), and stage 5 (<15 or dialysis treatment).

Depression assessment: The Patient Health Questionnaire (PHQ-9) was used to evaluate depressive symptoms. Scores ranged from 0–27 and were categorized as: minimal/no depression (0–4), mild (5–9), moderate (10–14), and severe (15–21).

Anxiety assessment: The Generalized Anxiety Disorder scale (GAD-7) assessed anxiety severity, with scores ranging from 0–21. Categories included minimal (0–4), mild (5–9), moderate (10–14), and severe anxiety (15–21).

Quality of life assessment: The World Health Organization Quality of Life–BREF (WHOQOL-BREF) questionnaire was administered to evaluate QoL. It contains 26 items across four domains (physical health, psychological wellbeing, social relationships, and environment). Responses were rated on a five-point Likert scale, and raw scores were converted to a standardized 0–100 scale, with higher scores reflecting better quality of life.

Ethics approval and consent to participate. AlAzhar University ‘s institutional review board approved this study, and before any patients were enrolled, their signed informed permission was acquired.

RESULTS

Table (1): Sociodemographic characteristics of the studied participants.

Socio-demographic characteristics	All (n=81)	CK2 (n=25, 30.8%)	CK3 (n=34, 41.9%)	CK4&5(n=22, 27.3%)
Age (year)	65.3±11	57.80±10.7	72.4±7.8	64.8±14.3
Gender				
Male	46 (56.7%)	12 (48.0%)	22 (64.7%)	12 (54.5%)
female	35 (43.3%)	13 (52.0%)	12 (35.3%)	10 (45.5%)
Occupation				
Does not work	29 (35.8%)	9 (36%)	11 (32.5%)	9 (40.8%)
Housewife	9 (11.1%)	4 (16%)	2 (5.8%)	3 (13.6%)
Retired	29 (35.8%)	5 (20%)	19 (55.9%)	5 (22.8%)
Employee	14 (17.3%)	7 (28%)	2 (5.8%)	5 (22.8%)
Marital Status				
Single	14(17.2%)	4(16%)	7(20.5%)	3(13.6%)
Married	67(82.8%)	21(84%)	27(79.5%)	19(86.4%)
Educational level				
Illiterate	3(3.7%)	1(4%)	1(2.9%)	1(4.6%)
School Education	45(55.5%)	15(60%)	18(52.9%)	12(54.6%)
Diploma	10(12.3%)	4(16%)	4(11.7%)	2(9%)
University Degree	23(28.2%)	5(20%)	11(32.4%)	7(31.8%)
Smoking				
No	71(87.6%)	22(88%)	29(85.2%)	20(90.9%)
Yes	10(12.4%)	3(12%)	5(14.8%)	2(9.1)

The study included 81 patients with CKD, distributed as 25 at stage 2, 34 at stage 3, and 22 at stages 4 and 5. The mean age was 65.3 years, with stage 3 patients being the oldest group (72.4 ± 7.8 years). Males constituted the majority of participants (56.7%), although the gender distribution varied slightly across CKD stages. Most participants were married (82.8%), had at least basic education (96.3%), and were not smokers (87.6%). In terms of occupation, a considerable proportion were unemployed (35.8%) or retired (35.8%), reflecting the age structure of the sample. These findings indicate that CKD in this cohort was most prevalent among older, married males with at least some formal education and low smoking prevalence.

Table (2): Number of comorbidities and medications taken by the studied participants.

Number of comorbidities/medications	All (n=81)	CK2 (n=25, 30.8%)	CK3 (n=34, 41.9%)	CK4&5(n=22, 27.3%)
Number of comorbidities				
<5 Diseases	75 (92.5%)	23(92%)	32(94%)	20(90.9%)
≥5 Diseases	6 (7.5%)	2(8%)	2(6%)	2(9.1%)
Number of medications				
<5 medications	40 (49.3%)	18(72%)	16(47%)	6(27.2%)
≥5 medications	41 (50.7%)	7(28%)	18(53%)	16(72.8%)

A large majority of the participants (92.5%) reported fewer than five comorbid diseases, while only 7.5% had five or more. However, half of the patients (50.7%) were prescribed five or more medications, particularly those in the later CKD stages (72.8% in stages 4 and 5). This suggests that while the number of coexisting chronic conditions remained relatively low, the treatment burden increased with disease progression, highlighting the complexity of pharmacological management in advanced CKD.

Table (3): Degree of depression according to CKD stage among the studied participants.

Depression degree	All (n=81)	CK2 (n=25, 30.8%)	CK3 (n=34, 41.9%)	CK4&5(n=22, 27.3%)
No depression	30(37%)	9(36%)	13(38.2%)	8(36.3%)
Mild depression	31(38.2%)	10(40%)	17(50.1%)	4(18.1%)
Moderate depression	15(18.5%)	4(16%)	3(8.8%)	8(36.3%)
Severe depression	5(6.3%)	2(8%)	1(2.9%)	2(9.3%)

Overall, 63% of the patients exhibited depressive symptoms, ranging from mild to severe. Mild depression was the most common category (38.2%), followed by moderate depression (18.5%) and severe depression (6.3%). Stage 3 patients had the highest proportion of mild depression (50.1%), while stages 4 and 5 showed greater proportions of moderate (36.3%) and severe depression (9.3%). This pattern indicates that the severity of depression tends to increase with the advancement of CKD, underscoring the psychological burden of late-stage disease.

Table (4): Degree of Anxiety according to CKD stage among the studied participants.

Anxiety degree	All (n=81)	CK2 (n=25, 30.8%)	CK3 (n=34, 41.9%)	CK4&5(n=22, 27.3%)
No Anxiety	38(46.9%)	7(28%)	20(58.8%)	11(50%)
Mild Anxiety	22(27.1%)	8(32%)	9(26.5%)	5(22.8%)
Moderate Anxiety	18(22.3%)	10(40%)	5(14.7%)	3(13.6%)
Severe Anxiety	3(3.7%)	0(0%)	0(0%)	3(13.6%)

Anxiety was reported by 53.1% of the participants, with mild (27.1%) and moderate (22.3%) levels being the most frequent. Severe anxiety was uncommon overall (3.7%) but was observed exclusively in stage 4 and 5 patients (13.6%). Notably, stage 2 patients had the highest percentage of moderate anxiety (40%). These results suggest that while anxiety is prevalent across all CKD stages, its severity appears to escalate in advanced disease, mirroring trends observed in depression.

Table (5): QOL domains according to CKD stage

Quality of life domains	All (n=81)	CK2 (n=25, 30.8%)	CK3 (n=34, 41.9%)	CK4&5(n=22, 27.3%)
Physical health	59.2±14.6	62.2±15.6	63.2±15.9	57.2±16.4
Psychological	61.8±13.7	63.9±9.7	65.7±12.1	58.4±16.7
Social relationship	70.2±17.6	75.8±19	73.4±13	71.5±17
Environment	66.2±14.2	63.8±9.1	69.5±12.6	64.1±15.9

The mean quality of life scores across domains revealed moderate functioning overall. The highest scores were observed in the social relationship domain (70.2 ± 17.6), while the lowest were in physical health (59.2 ± 14.6). Patients in stages 2 and 3 tended to report better psychological and physical health compared to those in stages 4 and 5, where declines were evident, particularly in psychological wellbeing (58.4 ± 16.7). These results demonstrate that QoL is progressively impaired as CKD advances, with physical and psychological dimensions being the most affected.

Table (6): Depression and Anxiety scores correlation

Variable	Depression score		Anxiety score	
	Correlation Coefficient	P-value	Correlation Coefficient	P-value
Physical health	-0.55	0.000	-0.47	0.000
Psychological	-0.41	0.000	-0.32	0.000
Social relationship	-0.35	0.001	-0.24	0.017
Environment	-0.32	0.000	-0.35	0.001

There was a significant negative correlation between both depression and anxiety scores and all QoL domains. Depression showed the strongest negative association with physical health ($r = -0.55$, $p < 0.001$), followed by psychological wellbeing ($r = -0.41$, $p < 0.001$). Similarly, anxiety correlated most strongly with physical health ($r = -0.47$, $p < 0.001$). These findings indicate that higher levels of depression and anxiety are consistently associated with poorer QoL across physical, psychological, social, and environmental domains. The results emphasize the critical impact of psychological distress on the lived experience of CKD patients.

DISCUSSION

Psychological wellbeing constitutes an essential component of overall health, yet conditions such as depression and anxiety are frequently overlooked or remain undiagnosed in clinical practice. This study examined the prevalence of these psychological disorders among CKD patients and explored their associations with quality of life [QoL] and sociodemographic characteristics. The results revealed that 63% of patients attending the nephrology clinic at Al-Azhar University Hospitals experienced depressive symptoms. This prevalence aligns with findings from previous studies [12,13], despite variations in assessment methods. Notably, 24.8% of participants exhibited moderate to severe depression, a figure comparable to the 27% reported by Shaf et al. in Pakistan [13]. In contrast, the lifetime prevalence of depression in the general population has been reported to range between 14.6% in high-income countries and 11.1% in low-income countries [14]. Regionally, Razzak et al. documented depression rates of 13–18% across the Middle East and North Africa [15]. The substantially higher prevalence identified in the present study underscores the considerable psychological burden of CKD, which may be influenced by factors such as age, gender, comorbidity burden, and regional health disparities. This study also demonstrated significant correlations between depression and QoL domains, including physical health, psychological wellbeing, social relationships, and environmental factors [$p < 0.001$ for most domains]. These findings are consistent with recent research on elderly CKD patients, which confirmed that depression significantly impairs multiple dimensions of QoL when measured with the KDQOL-36 instrument [16]. In addition to depression, anxiety was reported by 53.1% of the study participants. Although this prevalence was lower than in some previous studies, where estimates ranged from 57.1% to 71% [8,17], it remains a substantial concern. The chronic nature of CKD, coupled with the demands of ongoing treatment regimens, medication adherence, frequent medical evaluations, and dietary restrictions, may contribute to heightened anxiety in affected individuals. Moreover, anxiety was found to be negatively correlated with all QoL domains, including environmental, social, psychological, and physical health [p-values ranging from <0.001 to 0.017]. These results align with the findings of Lee et al., who reported significant negative associations between anxiety and WHOQOL-BREF domain scores in pre-dialysis CKD patients [18]. Similarly, Moreira et al. observed that anxiety adversely affected QoL in children and adolescents with pre-dialysis CKD [17]. Comparable evidence from other studies further supports the consistent negative impact of anxiety on QoL among CKD patients [19,20]. Taken together, these findings emphasize the dual psychological burden of depression and anxiety in CKD patients and their profound influence on QoL. They highlight the need for integrating psychological assessment and interventions into standard CKD care, particularly in resource-limited settings where such conditions are frequently underdiagnosed and untreated.

CONCLUSION

Patients with chronic kidney disease (CKD), particularly those with comorbid conditions, are highly vulnerable to psychological distress, including depression and anxiety. Early identification of these mental health concerns through routine screening during follow-up visits is critical. The present study demonstrated a significant negative association between psychological disorders and quality of life, underscoring the importance of timely intervention. Integrating psychiatric screening programs and targeted psychological support into CKD management could substantially enhance patients' wellbeing and health outcomes. Nephrologists and other healthcare providers are encouraged to raise awareness of the psychological dimensions of CKD and to adopt a holistic approach that addresses both physical and mental health.

Limitations

This study recruited 81 participants exclusively from the nephrology outpatient clinics of Al-Azhar University Hospital, which restricts the generalizability of the findings to broader populations. The limited sample size also reduced the ability to fully compare depression and anxiety prevalence across the four CKD stages. Additionally, uneven distribution of patients among the stages constrained the depth of subgroup analysis. Future research should include larger, more diverse samples from multiple healthcare centers to improve representativeness and to validate the observed associations.

Data availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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