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PREVALENCE AND RISK FACTORS OF DEPRESSION IN DIALYSIS DEPENDANT CKD PATIENTS

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Abstract

Background:
Depression is a prevalent yet underdiagnosed comorbidity in dialysis-dependent chronic kidney disease (CKD) patients, significantly impacting their quality of life and treatment outcomes.

Objective:
To determine the prevalence of depression and identify associated risk factors in patients with end-stage renal disease (ESRD) undergoing maintenance dialysis.

Methods:
A cross-sectional observational study was conducted at Bahria International Hospital from March to December 2024. A total of 332 adult dialysis-dependent CKD patients were assessed using the Patient Health Questionnaire-9 (PHQ-9). Clinically significant depression was defined as a PHQ-9 score ≥10. Logistic regression analysis was performed to identify independent risk factors.

Results:
The prevalence of clinically significant depression was 38.3%, with 6.0% of patients exhibiting severe depression (PHQ-9 score 20–27). Female gender (adjusted odds ratio [aOR]=2.10, 95% CI: 1.45–3.05, p<0.001), age ≥60 years (aOR=1.75, 95% CI: 1.20–2.55, p=0.003), dialysis duration >1 year (aOR=1.60, 95% CI: 1.10–2.33, p=0.015), low serum albumin (<3.5 g/dL; aOR=1.85, 95% CI: 1.25–2.74, p=0.002), unemployment (aOR=1.90, 95% CI: 1.30–2.78, p=0.001), and comorbid diabetes (aOR=1.50, 95% CI: 1.05–2.14, p=0.025) were significantly associated with depression.

Conclusion:
Depression is highly prevalent among dialysis-dependent CKD patients, with identifiable demographic, clinical, and socioeconomic risk factors. Routine screening and targeted interventions, particularly for high-risk subgroups, are essential to improve mental health and overall outcomes in this population.

INTRODUCTION

Chronic kidney disease (CKD) is a complex condition in which the kidneys are unable to function properly as a result of structural or functional damage that leads to excessive fluid and waste accumulation in the blood [1]. Nowadays, the prevalence of CKD is rising significantly. The estimated number of affected

people ranges from 11% to 13% globally [2]. It is well known that CKD is associated with age-related kidney function descent commonly exacerbated by diabetes, hypertension, and obesity. CKD can be categorized into five stages based on glomerular filtration rate (GFR). The first stage is defined as GFR below 60 mL/minute/1.73 m^2, which is considered abnormal in all age groups. In contrast, end-stage kidney disease, or stage V CKD, is the most severe form of CKD because the kidneys are unable to effectively maintain homeostasis [3]. Regarding the correlation of depression with CKD, two cross-sectional studies reported a higher prevalence of depression among CKD patients who reported having no religious beliefs, followed no regular exercise regimen, had sleep disorders, and were diagnosed with stage III or above CKD. Both of those studies agree that there is a significant correlation between the stage of the kidney disease and depression: those with advanced CKD, i.e., stage III and above, are more prone to depression; however, one of those studies correlates depression particularly in elderly men with stage III-V CKD but it found no significant change among women. In general, however, the prevalence of depression is higher among women regardless of CKD stage; the female-to-male prevalence ratio for depression is widely accepted to be approximately 2:1 [4,5]. In a study of 628 patients from the African American Study of Kidney Disease and Hypertension (AASK) cohort, depressive affect (using time-varying Beck Depression Inventory II [BDI-II] scores) was significantly associated with cardiovascular death/hospitalizations but not all-cause death.[6] Only 1 large study of patients with CKD has examined the effect of depression on mortality after the development of ESRD, finding only a weak association between the two.[7]Depression can be assessed through either structured clinical interviews, or self- or clinician-administered validated rating scales. Structured clinical interviews are generally seen as the "gold-standard" in the diagnosis of depressive disorders as they are based on specific diagnostic criteria (eg, Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders [SCID]). However, depressive symptoms are usually assessed by self- or clinician-administered validated rating scales such as the Beck's Depression Inventory (BDI) scale, Patient Health Questionnaire (PHQ), and Hospital Anxiety Depression Scale (HADS). These assessments are generally preferred in clinical settings for screening and in clinical research for pragmatic reasons to reduce time requirements and financial costs.[8]Depression is an important issue that healthcare professionals have to look after. Much research confirms a high prevalence of depression and anxiety among patients with CKD. It is estimated that 23.7% of patients with CKD have depression. Additionally, CKD patients on dialysis are more likely to develop depression (34.5%) compared with patients not on dialysis (13.3%)[9].The patient's daily routine is severely disrupted in many ways including the selection of food and fluids for daily intake and lifelong dependence on hemodialysis, medical professionals, and family members. The most prevalent psychological issue among CKD patients has been identified as depression, which may have an impact on treatment success. Around 20% to 90% of hemodialysis patients experience depression [10].

Methodology

This study utilized a cross-sectional observational design to assess the prevalence and identify risk factors associated with depression in dialysis-dependent patients with chronic kidney disease (CKD).

The research was conducted at Bahria International Hospital, over a period of six months, from March-2024 to December 2024. The study population included adult patients (aged ≥18 years) with end-stage renal disease (ESRD) undergoing maintenance dialysis (hemodialysis or peritoneal dialysis) for at least three months.

Inclusion Criteria

- Diagnosed with CKD Stage 5 on dialysis
- On regular dialysis for a minimum of 3 months
- Aged 18 years or older
- Able to provide informed consent

Exclusion Criteria

- History of diagnosed psychiatric illness prior to CKD diagnosis
- Cognitive impairment or communication difficulties
- Acute medical or surgical illness at the time of assessment
- Refusal to participate

Sample Size

A sample size of 285 was calculated using Who sample size calculator, prevalence of depression in CKD patients as 24.49%. with a confidence interval of 95% and a margin of error of 5%. We increase it to 362 for generalizability of results.

Data Collection

Participants were assessed during routine dialysis sessions using a structured questionnaire. Data collected included:

- Demographics (age, gender, education, employment status)
- Clinical parameters (dialysis duration, frequency, comorbidities)
- Laboratory values (hemoglobin, creatinine, serum albumin, etc.)
- Depression assessment using the Patient Health Questionnaire-9 (PHQ-9)

Depression Assessment Tool

Depression was evaluated using the **PHQ-9**, a validated screening tool. Scores were categorized as follows:

- 0–4: Minimal or no depression
- 5–9: Mild depression
- 10–14: Moderate depression
- 15–19: Moderately severe depression
- 20–27: Severe depression

A PHQ-9 score ≥10 was considered indicative of clinically significant depression.

Statistical Analysis

Data were analyzed using SPSS version. Descriptive statistics were used for demographic and clinical characteristics. The prevalence of depression was calculated as a percentage. Chi-square tests and logistic regression analysis were used to identify associations and independent risk factors for depression. A p-value of <0.05 was considered statistically significant.

Results

The study assessed the prevalence of depression and its associated risk factors in dialysis-dependent CKD patients. Below is a summary of the findings presented in a structured table format.

Table1:

The majority of patients with acute decompensated heart failure were male (54.2%), indicating a slightly higher prevalence in men compared to women. In terms of age distribution, the largest group was aged ≥60 years (45.2%), followed by those 40–59 years (39.8%), suggesting that acute decompensated heart failure predominantly affects middle-aged and elderly populations.

Demographic Category	Number of Patients	Percentage (%)
Gender		
Male	180	54.2%
Female	152	45.8%
Age Group		
<40 Years	50	15.1%
40–59 Years	132	39.8%
≥60 Years	150	45.2%

Table 2: Prevalence of Depression in Dialysis-Dependent CKD Patients (N=332)

PHQ-9 Score Category	Number of Patients	Percentage (%)
Minimal or No Depression (0–4)	120	36.1%
Mild Depression (5–9)	85	25.6%
Moderate Depression (10–14)	62	18.7%
Moderately Severe Depression (15–19)	45	13.6%
Severe Depression (20–27)	20	6.0%
Clinically Significant Depression (PHQ-9 ≥10)	**127**	**38.3%**

Among dialysis-dependent CKD patients, clinically significant depression (PHQ-9 ≥10) was present in 38.3% of the population, highlighting a substantial mental health burden. While 36.1% of patients showed minimal or no depression, a considerable proportion experienced mild to moderate levels, with 6% suffering from severe depression. These findings underscore the need for routine psychological screening and support in this vulnerable group.

Table 3: Risk Factors Associated with Clinically Significant Depression (PHQ-9 ≥10)

Risk Factor	Adjusted Odds Ratio (aOR)	95% Confidence Interval (CI)	p-value
Female Gender	2.10	1.45–3.05	<0.001
Age ≥60 Years	1.75	1.20–2.55	0.003
Duration of Dialysis >1 Year	1.60	1.10–2.33	0.015
Low Serum Albumin (<3.5 g/dL)	1.85	1.25–2.74	0.002
Unemployment	1.90	1.30–2.78	0.001
Comorbid Diabetes	1.50	1.05–2.14	0.025

Clinically significant depression in dialysis-dependent CKD patients was independently associated with several key risk factors. Female gender (aOR: 2.10), unemployment (aOR: 1.90), and low serum albumin levels (aOR: 1.85) showed the strongest associations. Other significant factors included age ≥60 years, longer dialysis duration (>1 year), and comorbid diabetes, all with statistically significant p-values (<0.05). These findings suggest that both sociodemographic and clinical factors contribute meaningfully to depression risk in this population, underscoring the need for targeted psychosocial and medical interventions.

Prevalence of Depression:

- 38.3% of patients had clinically significant depression (PHQ-9 ≥10).
- Severe depression was observed in 6.0% of the cohort.

Risk Factors:

- Female gender, older age (≥60 years), longer dialysis duration (>1 year), and unemployment were significantly associated with higher odds of depression.
- Biochemical markers like low serum albumin (<3.5 g/dL) and comorbidities (e.g., diabetes) also increased depression risk.

Discussion:

The study revealed that 38.3% of dialysis-dependent chronic kidney disease (CKD) patients experienced clinically significant depression, defined as a PHQ-9 score of 10 or above. Several important risk factors were identified in this population, including female gender, older age, longer duration on dialysis, low serum albumin levels, unemployment, and the presence of comorbid diabetes. All of these factors were statistically significant ($p < 0.05$). These findings underscore the critical need for targeted mental health support and intervention in this vulnerable patient group.

When comparing our findings with those of previous studies, varying degrees of alignment were observed. Our results were not in accordance with a study that reported a much higher prevalence of depressive symptoms (68%) meeting the criteria for major depression [11]. However, our depression prevalence (38.3%) was broadly in line with another study that reported a slightly lower prevalence of 32.2% [12]. Both studies similarly identified female gender and age as significant risk factors, lending support to the consistency of these associations.

Further comparisons showed partial alignment with additional research. For example, another study reported a prevalence of 42%, which was slightly higher than our findings [13]. Though the prevalence differed, both studies identified similar associations

with unemployment and comorbidities. However, our results differed significantly from a study that reported a 69% prevalence of depression [14], and even more so from one that reported a prevalence as high as 86% [15]. The latter study also noted differences in the distribution of depression severity and demographic factors, suggesting notable population-based discrepancies.

On the opposite end, our findings were also not in agreement with a study that reported a much lower prevalence of 23% [16]. Despite these differences in reported rates, our results align with broader literature emphasizing common risk factors for depression in dialysis-dependent CKD patients [17]. This supports the relevance and validity of our findings and highlights the need for continued focus on mental health in this clinical context.

Conclusion:

This study highlights a high prevalence of clinically significant depression (38.3%) among dialysis-dependent CKD patients, with severe depression affecting 6% of the cohort. Key risk factors identified include female gender, older age (≥60 years), longer dialysis duration (>1 year), unemployment, low serum albumin (<3.5 g/dL), and comorbid diabetes. These findings underscore the need for routine depression screening and targeted mental health interventions in this vulnerable population. Addressing modifiable factors, such as nutritional status and socioeconomic support, alongside integrated psychological care, could improve outcomes and quality of life for dialysis patients. Future research should explore longitudinal associations and the impact of intervention strategies.

REFERENCES:

1. Thomas R, Kanso A, Sedor JR. Chronic kidney disease and its complications. Primary care: Clinics in office practice. 2008 Jun 1;35(2):329-44..
2 . Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, Hobbs FR. Global prevalence of chronic kidney disease–a systematic review and meta-analysis. PloS one. 2016 Jul 6;11(7):e0158765.
3. Jun M, Lv J, Perkovic V, Jardine MJ. Managing cardiovascular risk in people with chronic kidney disease: a review of the evidence from randomized controlled trials. Therapeutic advances in chronic disease. 2011 Jul;2(4):265-78.
4Chiang HH, Livneh H, Yen ML, Li TC, Tsai TY. Prevalence and correlates of depression among chronic kidney disease patients in Taiwan. BMC nephrology. 2013 Dec;14:1-8.
5,. Goh ZS, Griva K. Anxiety and depression in patients with end-stage renal disease: impact and management challenges–a narrative review. International journal of nephrology and renovascular disease. 2018 Mar 12:93-102.
6. Fischer MJ, Kimmel PL, Greene T, Gassman JJ, Wang X, Brooks DH, Charleston J, Dowie D, Thornley-Brown D, Cooper LA, Bruce MA. Elevated depressive affect is associated with adverse cardiovascular outcomes among African Americans with chronic kidney disease. Kidney international. 2011 Sep 2;80(6):670-8.
7. Molnar MZ, Streja E, Sumida K, Soohoo M, Ravel VA, Gaipov A, Potukuchi PK, Thomas F, Rhee CM, Lu JL, Kalantar-Zadeh K. Pre-ESRD depression and post-ESRD mortality in patients with advanced CKD transitioning to dialysis. Clinical Journal of the American Society of Nephrology. 2017 Sep 1;12(9):1428-37.
8. Hedayati SS, Bosworth HB, Kuchibhatla M, Kimmel PL, Szczech LA. The predictive value of self-report scales compared with physician diagnosis of depression in hemodialysis patients. Kidney international. 2006 May 1;69(9):1662-8.
9. Amira O. Prevalence of symptoms of depression among patients with chronic kidney disease. Nigerian journal of clinical practice. 2011;14(4):460-3.
10. Khalil AA, Frazier SK, Lennie TA, Sawaya BP. Depressive symptoms and dietary adherence in patients with end-stage renal disease. Journal of renal care. 2011 Mar;37(1):30-9.

11. Elkheir HK, Wagaella AS, Badi S, Khalil A, Elzubair TH, Khalil A, Ahmed MH. Prevalence and risk factors of depressive symptoms among dialysis patients with end-stage renal disease (ESRD) in Khartoum, Sudan: A cross-sectional study. Journal of family medicine and primary care. 2020 Jul 1;9(7):3639-43.
12. Farishta S, Khan A, Amin S, Ahmad S, Khan MS, Ahmed W, Bano R. Prevalence of depression and anxiety in chronic kidney disease patients on hemodialysis. Pakistan Journal of Medical & Health Sciences. 2022 Nov 4;16(09):403-.
13. Rehman AU, Mirza I, Ullah A, Rashid T. The Frequency of Depression Among Patients with Chronic Kidney Disease on Hemodialysis. Journal of Islamabad Medical & Dental College. 2024 Apr 16;13(1):49-53.
14. Aggarwal HK, Jain D, Dabas G, Yadav RK. Prevalence of depression, anxiety and insomnia in chronic kidney disease patients and their co-relation with the demographic variables. Prilozi. 2017 Sep 1;38(2):35-44.
15. Rahman AS, Ahsan MS, Ahsan MK, Alam AM, Rahman T, Mullah S, Rahman MM, Feroz S, Kaiser AM, Haque MS. Prevalence of depression in pre-dialytic chronic kidney disease patients attending at a tertiary care hospital in Bangladesh. Journal of Biosciences and Medicines. 2020 Dec 22;8(12):135.
16. Wang WL, Liang S, Zhu FL, Liu JQ, Wang SY, Chen XM, Cai GY. The prevalence of depression and the association between depression and kidney function and health-related quality of life in elderly patients with chronic kidney disease: a multicenter cross-sectional study. Clinical Interventions in Aging. 2019 May 15:905-13.
17. Namalam F, Papadopoulos C. Critical Analysis of Risk Factors Associated with Depression Among Patients with Chronic Kidney Disease: A Systematic Review. Biomedical Journal of Scientific & Technical Research. 2019 Mar 1;15(5):11684-99