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Prevalence and Associated Factors of Anxiety and Depression in Hemodialysis Patients: A Cross-sectional Study

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Abstract

Background: Anxiety and depression are common psychological challenges among patients with chronic kidney disease (CKD) undergoing hemodialysis (HD), yet their prevalence and associated factors remain underreported in Vietnam.

Objectives: This study aimed to assess the prevalence of anxiety and depression and identify associated factors among CKD patients receiving HD at University Medical Center Ho Chi Minh City (UMC HCMC).

Methods: A cross-sectional study was conducted from February to March 2024 involving 108 CKD patients on HD. Anxiety and depression were screened using the Hospital Anxiety and Depression Scale (HADS). Sociodemographic, clinical, and lifestyle data were collected through interviewer-administered questionnaires. Statistical analysis included chi-square and generalized linear models (GLMs) to identify factors associated with anxiety and depression.

Results: The prevalence of anxiety and depression was 29.6% and 40.7%, respectively, with 13.0% of patients experiencing both conditions. Anxiety was associated with age (40 - 59 years), smoking, and economic status, while depression was linked to age, education level, ethnicity (notably Hoa ethnicity), HD complications, diabetes comorbidity, physical activity, and external social support. These findings were consistent with previous international studies.

Conclusions: Anxiety and depression are prevalent among CKD patients undergoing HD in Vietnam, influenced by multiple demographic, clinical, and lifestyle factors. Integrating routine psychological screening and multidisciplinary interventions into HD care is essential to improve mental health and overall quality of life in this population.

Keywords: Chronic Kidney Disease, Hemodialysis, Anxiety, Depression

1. Background

Chronic kidney disease (CKD) is a prevalent condition posing significant global health risks, with an estimated prevalence of approximately 13.4% (1). End-stage renal disease (ESRD), the most severe stage of CKD, is characterized by a glomerular filtration rate (GFR) less than 15 mL/min/1.73 m^2 and can lead to mortality without renal replacement therapy (RRT) (2). Currently, nearly 4 million people rely on RRT, with hemodialysis (HD) being the most common modality (69%). Although

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HD sustains life, it is associated with substantial limitations in cost, accessibility, and treatment outcomes, with considerable disparities observed across countries (3).

Patients undergoing HD face numerous psychological stresses due to physical changes and disease-related factors, resulting in high rates of anxiety and depression (4, 5). Uncontrolled mental disorders adversely affect treatment processes and prognosis. Previous studies have reported depression prevalence ranging from 28.2% to 85.98% and anxiety disorders from 23.2% to 84.11% in HD patients. Contributing factors include age, gender, occupation, duration of dialysis, smoking, physical activity, and comorbidities (6-9). In addition to the physical and financial burden, HD patients in low- and middle-income countries often receive limited psychosocial support, and mental health screening is not routinely integrated into dialysis care.

The burden of CKD is rapidly increasing in low- and middle-income countries, including Vietnam (10), driven by the rise of diabetes, hypertension, and population aging. Yet, mental health issues among Vietnamese HD patients remain under-investigated, especially in the southern region. Existing care models still focus mainly on biomedical parameters, overlooking emotional and psychological needs. This lack of contextual data hinders the development of targeted interventions to support mental well-being in this vulnerable group.

2. Objectives

This study aims to investigate the prevalence of anxiety and depression disorders and the related factors in CKD patients undergoing HD, to provide evidence for early detection strategies and to propose appropriate measures to enhance mental healthcare for these patients in Vietnam.

3. Methods

3.1. Study Design

A cross-sectional study was conducted from February to March 2024 at the Department of Nephrology-Dialysis, University Medical Center Ho Chi Minh City (UMC HCMC), to assess the prevalence and factors associated with anxiety and depression among CKD patients on HD. Eligible participants were adults aged 18 years or older who were undergoing HD and provided informed consent to participate. Exclusion criteria included emergency cases, ongoing cancer treatment, hearing or cognitive impairments, diagnosed psychiatric disorders, or incomplete responses to the Anxiety and Depression Assessment Scales. Participants were identified and selected based on patient lists and medical records.

The sample size was calculated using the formula for estimating a proportion. Based on a study by Qawaqzeh et al. (11), which reported depression and anxiety rates of 55.2% and 50%, respectively, in HD patients in Jordan, with d = 0.1, the minimum sample size was 95 for depression and 97 for anxiety. Allowing a 10% attrition rate, the final sample size was 108 patients.

3.2. Data Collection

Data were gathered through a pre-designed, interviewer-administered questionnaire consisting of multiple-choice questions. A convenience sampling method was employed to recruit participants who met the inclusion criteria. The questionnaire comprised a total of 28 items, including 5 items on sociodemographic characteristics, 5 on clinical characteristics, 3 on living habits (which included sub-questions on exercise frequency), 1 related to supportive relationships, and 14 items from the Hospital Anxiety and Depression Scale (HADS).

3.3. Hospital Anxiety and Depression Scale

Anxiety and depression were assessed using the HADS, developed by Zigmond and Snaith in 1983 (12). The HADS is a widely used, validated, and concise tool consisting of 14 items — 7 assessing anxiety and 7 assessing depression. Each item is scored from 0 to 3, with a maximum score of 21 points for each subscale, indicating symptom severity. Although the anxiety and depression items are interspersed, they are scored separately using established cut-off thresholds to identify symptom levels (13).

The HADS is efficient, typically requiring only 2 - 5 minutes to complete, and is considered easy to score (14). In studies conducted in Vietnam, the HADS has demonstrated good internal consistency, with

Cronbach's alpha coefficients of 0.80 or higher for both subscales and the overall scale (15, 16).

3.4. Statistical Analysis

Data were entered using Epidata 4.6 and analyzed with Stata 17. Continuous variables are presented as mean ± standard deviation (SD), and categorical variables as frequencies and percentages. Chi-square or Fisher's exact tests were used to examine associations between variables. A generalized linear model (GLM) estimated prevalence ratios (PR) with 95% confidence intervals for ordinal or nominal predictors and binary outcomes. Statistical significance was set at $P < 0.05$.

3.5. Ethical Consideration

This study was approved by the Biomedical Ethics Committee of the University of Medicine and Pharmacy at Ho Chi Minh City (approval No. 231047-DHYD) and conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the research.

4. Results

Of 115 screened HD patients, 108 met the inclusion criteria and were analyzed. Exclusions (n = 7) comprised the following: Refusal to participate (n = 2), non-CKD (n = 2), emergency dialysis (n = 2), and active cancer treatment (n = 1).

4.1. Participant Characteristics

Table 1 summarizes the general characteristics of the 108 study participants. The mean age was 59.5 ± 18.6 years (range: 19 - 96), with 55.6% aged 60 years or older. Females comprised 61.1% of the sample, and 87.0% identified as Kinh ethnicity. Most participants had attained at least a junior high school education or higher. The majority reported a medium economic status. Regarding clinical characteristics, the most common duration of HD was between one and less than three years (48.1%). Most patients (80.5%) received HD three times per week. Smoking and alcohol consumption were uncommon, reported by 6.5% and 2.8% of participants, respectively. Approximately half of the participants (49.1%) engaged in regular exercise.

Table 1. General Characteristics of Patients (N = 108) [a]

Characteristics	Values
Demographic characteristics	
Age (mean ± SD)	59.5 ± 18.6
Age group (y)	
< 20	2 (1.8)
20 - 39	19 (17.6)
40 - 59	27 (25.0)
≥ 60	60 (55.6)
Sex	
Female	66 (61.1)
Male	42 (38.9)
Race	
Kinh ethnicity	94 (87.0)
Hoa ethnicity	14 (13.0)
Academic level	
Know how to read and write	7 (6.5)
Elementary	19 (17.6)
Junior high school	23 (21.3)
High school	22 (20.4)
Above high school	37 (34.2)
Home economics	
Lack	5 (4.6)
Medium	75 (69.4)
Wealthier	26 (24.1)
Rich	2 (1.9)
Clinical characteristics	
Duration of HD (y)	
< 1	26 (24.1)
1 to < 3	52 (48.1)
3 to < 5	23 (21.3)
≥ 5	7 (6.5)
Frequency of HD/week	
2 times	18 (16.7)
3 times	87 (80.5)
> 3 times	3 (2.8)
Complications during HD	45 (41.7)
Comorbidities (n = 102)	
Hypertension	81 (79.4)
Diabetes	51 (50.0)
Cardiovascular	53 (52.0)
Other diseases	48 (47.1)
Living habits characteristics	
Habits	
Smoking	7 (6.5)
Drinking alcohol	3 (2.8)
Doing exercise	53 (49.1)
Number of exercise days (n = 53)	
< 2	5 (9.4)
2 - 5	21 (39.6)
≥ 5	27 (51.0)
Supportive relationships	
Support outside the family	24 (22.2)

Abbreviations: SD, standard deviation; HD, hemodialysis.

[a] Values are expressed as No. (%) unless indicated.

4.2. Prevalence of Anxiety and Depression

Among the 108 patients, 40.7% exhibited signs of depression, with 36.1% classified as having mild symptoms, while 23.2% showed no signs of depression.

Table 2. Prevalence of Anxiety and Depression Based on Hospital Anxiety and Depression Scale Scores (N = 108) [a]

HADS Scores	Depression	Anxiety
Normal (0 - 7 points)	25 (23.2)	45 (41.7)
Borderline abnormal (8 - 10 points)	39 (36.1)	31 (28.7)
Abnormal (11 - 21 points)	44 (40.7)	32 (29.6)
Both depression and anxiety		
No	94 (87.0)	-
Yes	14 (13.0)	-

Abbreviation: HADS, Hospital Anxiety and Depression Scale.

[a] Values are expressed as No. (%).

Regarding anxiety, 29.6% of patients presented symptoms, including 28.7% with mild anxiety, and 41.7% reported no anxiety symptoms. Furthermore, 13.0% of patients were diagnosed with both anxiety and depression disorders (Table 2).

4.3. Factors Associated with Anxiety and Depression

Factors associated with anxiety and depression are summarized in Table 3. Anxiety was significantly more prevalent in patients aged 40 - 59 compared to those under 40 years (51.8% vs. 14.3%, P = 0.023), and in smokers (71.4% vs. 28.6%, P = 0.023). Conversely, anxiety was less common in patients with wealthier economic status (11.5%, P = 0.001) and was absent in those undergoing HD more than three times per week (P < 0.001).

Depression was associated with a wider range of factors, including older age (P = 0.001), Hoa ethnicity (71.4% vs. 36.2% in Kinh, P = 0.002), lower educational attainment (P < 0.001), and the presence of diabetes (P = 0.009). Clinical factors such as complications during HD (P = 0.024) and lifestyle factors like lower physical activity (< 5 days/week, P = 0.023) were also significant predictors. Finally, a lack of external family support was significantly associated with depression (P = 0.024).

5. Discussion

Depression and anxiety remain significant psychological burdens among patients undergoing RRT (6-9). From February to March 2024, 108 CKD patients on HD at UMC HCMC were surveyed; nearly one-third had anxiety, over 40% had depression, and about 13% experienced both. These rates exceed those in the general population (17), but remain lower than rates reported for other chronic illnesses such as cancer (18-20).

Globally, anxiety and depression rates among CKD patients vary. Seeman et al. reported rates of 40.8% for depression, 39.6% for anxiety, and 24.1% for both, while Alshelleh et al. and Elezi et al. found rates as high as 85.98% and 84.11%, respectively (9, 21, 22). In contrast, a study from the Arab region found lower prevalence rates, with 24.6% of CKD patients experiencing depression and 19.7% experiencing anxiety in a sample of 122 patients. In Vietnam, few single-center studies exist, and our anxiety rate was five times higher than that reported in another study, despite using the same HADS. Differences across studies may stem from symptom overlap with uremic syndrome, which can obscure accurate detection of depression (23, 24).

Significantly, patients with complications during HD or comorbidities were at greater risk of anxiety and depression. Demographic and lifestyle factors also had negative impacts. Those aged 40 - 59 had a 3.63-fold higher anxiety rate than those under 40 years (P = 0.023), and smokers had a 2.67-fold higher rate than non-smokers (P = 0.023). This aligns with Nagy et al., who also found higher anxiety risk in smokers, whereas Gerogianni et al. reported that older age is associated with both anxiety and depression, consistent with our findings (8, 25). Better economic status was linked to lower anxiety (P = 0.001), likely due to improved healthcare access and family support, which also aligns with the findings of Qawaqzeh et al. (11).

Furthermore, we observed significant differences in depression rates by ethnicity, particularly among the Hoa ethnicity, which has been rarely addressed in previous studies. Education level was associated with

Table 3. Factors Related to Anxiety and Depression (N = 108) [a]

Characteristic	Anxiety			Depression		
	Yes	No	P-Value	Yes	No	P-Value
Demographic characteristics						
Age group (y)						
< 40	3 (14.3)	18 (85.7)	-	2 (9.5)	19 (90.5)	-
40 - 59	14 (51.8)	13 (48.2)	0.023	10 (37.0)	17 (63.0)	0.001
≥ 60	15 (25.0)	45 (75.0)	0.336	32 (53.3)	28 (46.7)	
Sex						
Female	17 (25.8)	49 (74.2)	0.269	30 (45.5)	36 (54.5)	0.211
Male	15 (35.7)	27 (64.3)	-	14 (33.3)	28 (66.7)	-
Ethnicity						
Kinh ethnicity	28 (29.8)	66 (70.2)	-	34 (36.2)	60 (63.8)	-
Hoa ethnicity	4 (28.6)	10 (71.4)	0.927	10 (71.4)	4 (28.6)	0.002
Education level						
Literate	1 (14.3)	6 (85.7)	-	6 (85.7)	1 (14.3)	-
Elementary	4 (21.0)	15 (79.0)	0.707	12 (63.2)	7 (36.8)	-
Junior high school	10 (43.5)	13 (56.5)	0.246	11 (47.8)	12 (52.2)	< 0.001
High school	9 (40.9)	13 (59.1)	0.276	5 (22.7)	17 (77.3)	-
Above high school	8 (21.6)	29 (78.4)	0.673	10 (27.0)	27 (73.0)	-
Socioeconomic status						
Low	3 (60.0)	2 (40.0)	-	2 (40.0)	3 (60.0)	-
Medium	26 (34.7)	49 (65.3)	-	32 (42.7)	43 (57.3)	0.909
Wealthier	3 (11.5)	23 (88.5)	0.001	9 (34.6)	17 (65.4)	0.814
Rich	0	2 (100)	-	1 (50.0)	1 (50.0)	0.804
Clinical characteristics						
HD duration (y)						
< 1	8 (30.8)	18 (69.2)	-	8 (30.8)	18 (69.2)	-
1 to < 3	13 (25.0)	39 (75.0)	0.586	23 (44.2)	29 (55.8)	0.278
3 to < 5	10 (43.5)	13 (56.5)	0.363	11 (47.8)	12 (52.2)	0.230
≥ 5	1 (14.3)	6 (85.7)	0.432	2 (28.6)	5 (71.4)	0.912
HD frequency/week						
2 times	6 (33.3)	12 (66.7)	-	5 (27.8)	13 (72.2)	-
3 times	26 (29.9)	61 (70.1)	0.770	37 (42.5)	50 (57.5)	0.289
> 3 times	0	3 (100)	< 0.001	2 (66.7)	1 (33.3)	0.118
Complications during HD	12 (26.7)	33 (73.3)	0.569	24 (53.3)	21 (46.7)	0.024
Comorbidities (n = 102)						
Hypertension	26 (32.1)	55 (67.9)	0.242	35 (43.2)	46 (56.8)	0.672
Diabetes	15 (29.4)	36 (70.6)	1.000	28 (54.9)	23 (45.1)	0.009
Cardiovascular	15 (28.3)	38 (71.7)	0.798	25 (47.2)	28 (52.8)	0.286
Other diseases	11 (22.9)	37 (77.1)	0.175	21 (43.7)	27 (56.3)	0.759
Life style characteristics						
Habits						
Smoke	5 (71.4)	2 (28.6)	0.023 [b]	2 (28.6)	5 (71.4)	0.698 [b]
Drink alcohol	2 (66.7)	1 (33.3)	0.209 [b]	0	3 (100)	0.269 [b]
Do exercise	15 (28.3)	38 (71.7)	0.767	16 (30.2)	37 (69.8)	0.029
Number of exercise days (n = 53)						
< 2	1 (20.0)	4 (80.0)	-	3 (60.0)	2 (40.0)	-
2 - 5	5 (23.8)	16 (76.2)	0.860	8 (38.1)	13 (61.9)	0.023
≥ 5	9 (33.3)	18 (66.7)	0.588	5 (18.5)	22 (81.5)	-
Supportive relationships						
Support outside the family	10 (41.7)	14 (58.3)	0.143	5 (20.8)	19 (79.2)	0.024

Abbreviation: HD, hemodialysis.

[a] Values are expressed as No. (%).

[b] Fisher exact test.

depression; a study in Mexico similarly reported lower depression rates among patients with higher education (P = 0.001) (26). Our study also showed that those with a history of complications during HD had a 1.68-fold higher depression rate (P = 0.024), which is in line with Meng et al., who found a 4.36-fold increase (7). Additionally, patients with diabetes had a 4.4-fold higher risk of depression compared to those without

diabetes, consistent with Aatif et al. (6). Regular physical activity correlated with lower depression (P = 0.023), supporting Al-Jabi et al., who found a 4.43-fold higher risk among inactive individuals (27).

The single-center, cross-sectional design with a modest sample size (n = 108) may limit generalizability and the ability to establish causality. Potential selection bias from convenience sampling also warrants caution. Therefore, these results require validation through larger, multicenter studies.

5.1. Conclusions

This study shows a relatively high prevalence of anxiety and depression among CKD patients undergoing HD. Anxiety was associated with factors such as age group, smoking status, and economic level, while depression was linked to age, educational attainment, ethnicity, complications during HD, diabetes comorbidities, physical activity, and availability of external support. These findings highlight the urgent need for integrating psychological assessment and tailored mental health interventions into routine care for CKD patients on HD. Early identification and management of mental health issues can improve patients' psychological well-being, enhance adherence to treatment, and ultimately lead to better clinical outcomes and quality of life. Healthcare systems should prioritize multidisciplinary approaches, including mental health professionals and social support services, to address the complex biopsychosocial needs of this vulnerable population.

5.2. Limitations

The single-center, cross-sectional design with a modest sample size may limit generalizability and the ability to establish causality. Potential selection bias from convenience sampling also warrants caution. Therefore, future research should employ multicenter recruitment strategies, larger sample sizes, and longitudinal designs to validate these findings and further explore psychosocial determinants of mental health among HD patients in Vietnam.

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Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

Authors' Contribution: Study concept and design: H. T. B. and N. V. T.; Acquisition of data: U. T. N. and H. N. P. T.; Analysis and interpretation of data: H. T. V., T. L. T. T. N., and L. T. N.; Drafting of the manuscript: U. T. N.; Review and editing of the manuscript: All authors; Critical revision of the manuscript for important intellectual content: N. V. T. and L. T. N.; Supervision: N. V. T. and H. N. P. T. All authors read and approved the final manuscript.

Conflict of Interests Statement: The authors declare no conflict of interest.

Data Availability: The dataset presented in this study is available upon reasonable request from the corresponding author during submission or after publication. The data are not publicly available due to institutional regulations of the hospital, which restrict the sharing of patient-related information to protect confidentiality.

Ethical Approval: The study protocol was reviewed and approved by the Biomedical Research Ethics Committee of the University of Medicine and Pharmacy at Ho Chi Minh City (approval number 231047/ĐHYD-HĐ).

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