ASSESSMENT OF ANXIETY DISORDER USING THE DASS-21 AND RELATED FACTORS IN MAINTENANCE HEMODIALYSIS PATIENTS

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Abstract

Objectives: To describe the characteristics of anxiety disorders using the DASS-21 (depression - anxiety - stress scale-21) and some related factors in patients with maintenance hemodialysis at Military Hospital 103. ***Methods:*** A cross-sectional descriptive study was conducted on 60 patients with maintenance hemodialysis treated at the Department of Nephrology - Hemodialysis, Military Hospital 103, from August 2023 to May 2024. Patients' anxiety disorders were evaluated using the DASS-21. The Spearman correlation analysis and Mann-Whitney U test were used to analyze the data. ***Results:*** The rate of patients with anxiety disorders was 35.0%. The anxiety disorder score was negatively and significantly correlated with age. The group with the hemodialysis duration of more than 24 months showed significantly higher anxiety scores than the group with the hemodialysis duration of less than 12 months. ***Conclusion:*** The rate of anxiety disorders was high among end-stage renal disease patients with maintenance hemodialysis. Age and hemodialysis duration were factors related to anxiety symptoms in patients with maintenance hemodialysis.

Keywords: Anxiety disorders; DASS-21; Hemodialysis; End-stage renal disease.

INTRODUCTION

Increased anxiety disorders have been reported in patients with chronic kidney disease, especially in patients undergoing maintenance hemodialysis [1, 2]. The prevalence of anxiety disorders in hemodialysis patients ranges from 12% to 52% [1], with higher rates in Europe and Asia [2]. The pathogenesis of anxiety includes many factors in hemodialysis patients, such as comorbidities, chronic pain, chronic inflammation, increased fatigue, uremia, and sleep disturbance, etc. In addition,

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anxiety disorders can lead to decreased quality of life, increased suicidal ideation, sleep disturbances, impaired immune system, and worsening nutritional status. These are all causes of worsening disease and increased mortality in hemodialysis patients. In Vietnam, studies on anxiety disorders in patients undergoing maintenance hemodialysis have been reported [3, 4], but inconsistent results were found. A study by Nguyen Thi Quynh Van et al. reported that the rate of anxiety disorders in patients undergoing hemodialysis at Bach Mai Hospital in 2015 was 40.4% [3]. In contrast, Luong Cong Minh et al. reported that the rate of anxiety disorders in patients undergoing hemodialysis at Nguyen Tri Phuong Hospital was 5.9% [4]. Therefore, we conducted this study to: *Describe the characteristics of anxiety disorders and some related factors in patients undergoing maintenance hemodialysis and treated at Military Hospital 103 from August 2023 to May 2024.*

MATERIALS AND METHODS

1. Subjects

Including 60 patients undergoing maintenance hemodialysis at the Department of Nephrology - Hemodialysis, Military Hospital 103, from August 2023 to May 2024.

* *Inclusion criteria:* Aged ≥ 18 years old and diagnosed as stage 5 chronic kidney disease due to all causes and undergoing maintenance hemodialysis; patients who had started hemodialysis for at least 3 months; patients agreed to participate in this study.

* *Exclusion criteria:* Patients had a history of mental disorders, traumatic brain injury, or use of psychotropic drugs before being diagnosed with chronic kidney disease.

* *Demographic, clinical, and subclinical data:* Age, gender, blood pressure, dialysis duration, body mass index (BMI), medical history, anemia, biochemical test results: Glucose (mmol/L), urea (mmol/L), creatinine (umol/L), uric acid (umol/L), GOT (UI/L), GPT (UI/L), CRP (mg/L), NA+ (mmol/L), K+ (mmol/L), Cl- (mmol/L), Ca++ (mmol/L), albumin (g/L), protein (g/L), cholesterol (mmol/L), triglyceride (mmol/L) of patients were collected before hemodialysis session.

2. Methods

* *Study design*: A cross-sectional descriptive study.

* *Sample size and selection*: Convenient sampling was performed based on the inclusion and exclusion criteria. A total of 60 patients were recruited during the study period.

* *Assessment of anxiety disorder:* The DASS-21 includes 7 questions with a scale from 0 - 3 to assess anxiety

disorders that are widely used in the world to assess patients' anxiety disorders. The patient was asked to answer the anxiety questionnaires on the day of hospital administration. The anxiety score was calculated by the sum of the component scores, then the obtained result was multiplied by 2 with the level of anxiety disorders assessed as follows: Normal (0 - 7 points), mild (8 - 9 points), moderate (10 - 14 points), severe (15 - 19 points), extremely severe (≥ 20 points) [5].

* *Data analysis:* SPSS 21.0 statistical analysis software was used to analyze the data. Descriptive statistics were used to describe patient's characteristics and anxiety disorder scores. Spearman correlation test was used to analyze the correlation between anxiety disorder scores with age and biochemical test values. Mann-Whitney U test was used to compare anxiety disorder scores among patients with different characteristics. The p-value < 0.05 was determined to be statistically significant.

3. Ethics

This study has been approved by the Ethics Council of the Vietnam Military Medical University according to decision No. 2575/QĐ-HYQY dated June 30, 2023. The Department of Nephrology, Military Hospital 103 granted permission for the use and publication of the research data. The authors declare to have no conflicts of interest.

RESULTS

1. Characteristics of the study's participants.

Table 1. Characteristics of the study's subjects.

Characteristics	Median, n	(IQ1, IQ3), [%]
Age (years)	37.0	(31.25, 48.0)
Gender (% male subjects)	25	[41.7]
Height (cm)	160.0	(155.25, 166.0)
Weight (kg)	55.0	(51.0, 58.75)
BMI (kg/m^2)	21.3	(19.3, 22.9)
Smoking status (% yes)	7	[11.7]
Alcohol consumption (% yes)	5	[8.3]
Medical history (% yes)	24	[40.0]
Hemodialysis duration (months)	12.0	(6.0, 36.0)

(n: Number of subjects; SD: Standard deviation; BMI: Body mass index)

Table 1 shows the characteristics of the study subjects. The median (IQ1, IQ2) age was 37.0 (31.25, 48.0) years with 24 (41.7%) subjects of the study were male. The median BMI was 21.2 kg/m^2. 7 (11.7%) and 5 (8.3%) subjects consumed alcohol and smoked cigarettes, respectively. 24 (40.0%) subjects had comorbidity with at least one disease (5 patients with type 2 diabetes, 4 patients with hepatitis B, 7 patients with hepatitis C, 4 patients with coronary artery disease, 1 patient with heart failure, 1 patient with thyroid cancer, and 2 patient with sinusitis). The median duration of hemodialysis was 12.0 months.

2. The rate of anxiety disorders

In a total of 60 patients, there were 21 (35.0%) patients who showed signs of anxiety disorders. Of these, 9 (15.0%) and 7 (11.7%) patients were at mild and moderate levels, respectively, while 1 (1.7%) patient showed severe levels and 4 (6.7%) patients showed extreme levels. The number of subjects without symptoms of anxiety disorders was 39 (65.0%) of the total subjects.

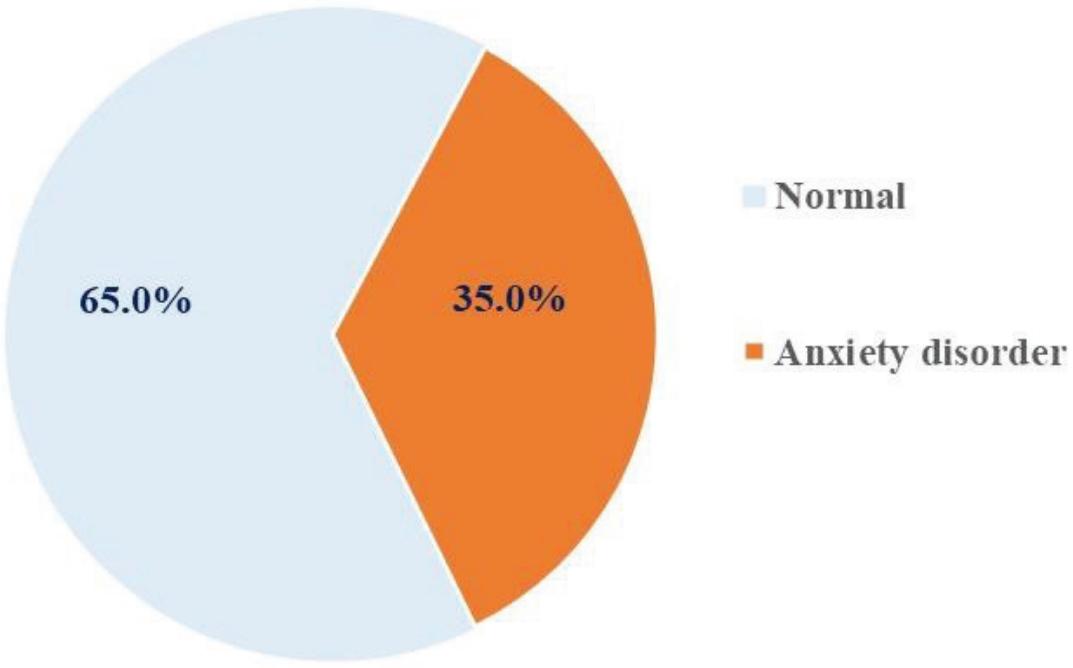

Figure 1. The rate of patients with anxiety disorders.

3. The relationship between anxiety disorders and some clinical characteristics

Table 2. The relationship between anxiety disorder assessment scores and some clinical characteristics.

Characteristics	Units	n	Anxiety score Median (IQ1, IQ3)	p
Gender	Male	25	2.0 (0.5, 5.0)	0.855
	Female	35	2.0 (1.0, 5.0)	
Medical history	Yes	36	2.0 (0.0, 4.75)	0.153
	No	24	2.0 (1.0, 5.75)	
BMI	< 18.5 kg/m^2	7	1.0 (0.0, 5.0)	
	18.5 - 24.9 kg/m^2	49	2.0 (1.0, 5.0)	0.305#
	> 24.9 kg/m^2	4	0.5 (0.0, 2.5)	0.527#
Causes of chronic kidney disease	Chronic glomerulonephritis	37	2.0 (0.0, 7.0)	0.969
	Others	23	2.0 (1.0, 5.0)	
Duration of hemodialysis	< 12 months	32	2.0 (0.25, 5.0)	
	12 - 24 months	9	3.0 (0.5, 5.5)	0.385*
	> 24 months	19	5.0 (1.0, 10.0)	0.048*

*(n: Number of subjects; SD: Standard deviation; *: As compared with group of patients with duration of hemodialysis < 12 months; #: As compared with group of patients with BMI < 18.5 kg/m^2)*

Table 2 shows the relationship between the anxiety disorder score using the DASS-21 and some clinical characteristics of the patients. The results showed that the group with hemodialysis duration over 24 months had a statistically significant increase in the anxiety disorder score as compared with the group with hemodialysis duration under 12 months ($p < 0.05$). No significant difference was observed in the anxiety disorder score between the groups with differences in gender, comorbidities, BMI, cause of renal failure (*Table 2*) or hypertension,

anemia (unpublished data).

4. The correlation between anxiety disorder assessment scores with age and some paraclinical indicators

Table 3. The correlation between anxiety disorder scores with age and some paraclinical indicators.

Indices	Anxiety score	
	r	p
Age	-0.346	0.045
Glucose (mmol/L)	-0.196	0.133
Ure (mmol/L)	0.124	0.345
Creatinine (umol/L)	0.006	0.961
Acid uric (umol/L)	-0.033	0.804
GOT (UI/L)	-0.070	0.594
GPT (UI/L)	-0.128	0.331
NA + (mmol/L)	0.196	0.134
K + (mmol/L)	0.009	0.946
Cl- (mmol/L)	0.112	0.393
Ca ++ (mmol/L)	0.101	0.441
Albumin (g/L)	0.059	0.654
Protein (g/L)	-0.033	0.800
Cholesterol (mmol/L)	-0.018	0.894
Triglyceride (mmol/L)	-0.094	0.474

Table 3 shows the correlation between anxiety disorder assessment scores with age and biochemical indices. The results showed that age had a negative and significant correlation with anxiety disorder scores (r = -0.346, p = 0.045). There was no significant correlation between biochemical indices with anxiety disorder

assessment scores ($p > 0.05$).

DISCUSSION

The present study was carried out on 60 patients undergoing maintenance hemodialysis from August 2023 to May 2024 and used the DASS-21 to assess anxiety disorders. The rate of anxiety disorders in 60 hemodialysis patients was 35.0%. In a previous study, Nguyen Thi Quynh Van et al. reported that the rate of hemodialysis patients with anxiety disorders at Bach Mai Hospital was 40.4% [3]. The results of the study by Nguyen Thi Quynh Van and our study are higher than those in the study reported by Luong Cong Minh et al. The author reported the rate of anxiety disorders in hemodialysis patients at Nguyen Tri Phuong Hospital was 5.9% [4]. However, our study result is similar to reports from previous studies worldwide. Lee et al. collected 208 patients with chronic kidney disease and reported that the rate of patients with anxiety disorders in patients with stage 5 chronic kidney disease was 34.3% [6]. In a meta-analysis of 6 studies with a total of 578 patients with maintenance hemodialysis, Murtagh et al. reported that the rate of anxiety disorders ranged from 12% to 52%, with an average rate of 38% [1]. Moreover, in a meta-analysis of 87 studies from 44 countries worldwide, Baxter et al. reported that the rate of anxiety disorders in the general population was 7.3% [7].

These findings indicate that the rate of anxiety disorders in hemodialysis patients in our study is about 5 times higher than those in the general population, suggesting, increased neuropsychiatric disorders, especially anxiety disorders might be found in hemodialysis patients.

Previous studies have also shown the important role of the “brain-renal axis” in an increase in anxiety disorders, which are thought to be related to secondary inflammation due to increased urea levels, oxidative stress due to increased cytokine production, and microvascular damage in the brain [8]. In addition, patients with hemodialysis also face stressors such as treatment costs, adherence to complex medication regimens, diet/fluid intake, and management of related complications. This increases the risks of increasing anxiety disorders or other psychiatric disorders such as depression.

Investigating factors related to anxiety disorders, we found that age was negatively and statistically significantly correlated with anxiety disorder scores. This result indicates an increased risk of anxiety disorders in young patients with

hemodialysis. According to a study by the American Psychiatric Association, stress about work, finances, and family are the most common causes of increased anxiety rates in young people compared to middle-aged and elderly people [9]. However, these factors were not measured in our study. Therefore, further studies, including social factors, are necessary to investigate anxiety disorders in hemodialysis patients.

In addition, prolonged dialysis time associated with increased anxiety disorders was also observed in our study. This result is similar to the study by Qawaqzeh et al. [10]. Central nervous system complications due to hyperuremia are thought to be related to the accumulation of urea metabolites in the blood. The longer the dialysis time, the more urea metabolites accumulate in the blood and the central nervous system, leading to effects on the patient's neuropsychiatric condition. Therefore, early control, detection, and treatment of increased blood urea concentration play a very important role in the management of hemodialysis patients.

However, as our study was conducted with a small sample size, some other factors, such as family income or fatigue level, which have an impact on anxiety disorders in patients with maintenance hemodialysis, were reported in previous studies [10] but were not evaluated in our study.

CONCLUSION

The rate of anxiety disorders in patients with maintenance hemodialysis is 35.0%. Age and duration of hemodialysis are factors affecting the expression of anxiety disorders in patients with maintenance hemodialysis.

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