Prevalence of Anxiety and Depression in Hemodialysis Patients in SKUH

Original Article

Eman Mohamed Roshdy[1], Manal El Deeb[1], Hossam El khatib[2] and Mohamed Alaa[1]

[1]Department of Internal Medicine, [2]Department of Neuropsychiatry, Faculty of Medicine, Misr University for Science and Technology (MUST)

ABSTRACT

Background: Worldwide, the number of patients requiring hemodialysis due to end-stage renal disease (ESRD) is on the rise. Both the physical and mental health of patients are negatively affected by these circumstances when they are combined.

Aim of the Work: In the current study we aimed to detect the prevalence and predictors of depression and anxiety in hemodialysis patients. We enrolled sixty (60) patients with ESRD on Renal replacement therapy (hemodialysis) from HD units of The Memorial Souad Kafafi University Hospital (SKUH).

Patients and Methods: This study is a prospective, Cross-sectional study, sixty (60) patients with ESRD on Renal replacement therapy (hemodialysis) will be recruited from HD units of The Memorial Souad Kafafi University Hospital (SKUH).

Results: The mean age of the present study HD patients was 56.08 ± 13.1 years and mean duration of HD was 5.8 ± 4.8 years and the mean duration of HD was 30.5± 27.66 months, there was male predominance as they represented 60% of cases. For total GADS-7 anxiety score, the mean total score in all studied patients was 4.36 ± 3.3, there were 37 anxious patients (61.7%) and the mean total score of total Hamilton Depression Rating Scale (HDRS)in all studied patients was 9.8 ± 5.08 that was mainly mild, there were (45%) of cases had depression. There was significant association between female gender and occurrence depression or anxiety among HD patients.

Conclusion: Anxiety and depression are prevalent among (38.3% and 45 %) Egyptian HD patients respectively and female gender as well as Volume overload and Dyspnea are associated with them.

Key Words: anxiety, depression in SKUH

Received: 19 March 2024, **Accepted:** 01 May 2024

Corresponding Author: Eman Mohamed Roshdy, MSc, Department of Internal Medicine, Faculty of Medicine, Misr University for Science and Technology (MUST), **Tel.:** +2 010 0303 5750, **E-mail**: emanroshdy199@gmail.com

ISSN: 2812-5509, 2024, Vol. 2, No. 1

INTRODUCTION

Kidney damage resulting from many etiologies that has persisted for longer than three months is known as chronic kidney disease (CKD). A significant percentage of CKD patients will eventually develop end-stage renal disease (ESRD), which calls for the use of renal replacement therapy (RRT)[1].

Every year, the number of people with end-stage renal disease (ESRD) increases globally. Simultaneously, the number of people undergoing hemodialysis (HD) increases[2]. The effects of HD therapy are time-consuming, costly, and invasive, necessitating multidisciplinary and all-encompassing care for the patients and their families. Patients' lives are negatively impacted by this group of circumstances on a physical and psychological level[3].

Health professionals have long been interested in psychiatric disorders in patients with end-stage renal disease (ESRD) because of their impact on patient morbidity and healthcare expenses. People with kidney illness, especially those with renal failure undergoing continuous dialysis or transplantation, may experience psychological issues. These issues are referred to as psycho-nephrology[4].

With greater prevalence and incidence rates in this population than in the general population, depression and anxiety are thought to be the most prevalent psychological disorders associated with end-stage renal disease (ESRD[5,6]. The World Health Organization estimates that in 2015, the global prevalence rates of anxiety and depression were 3.6% and 4.4%, respectively, with an increase of 18% in cases reported between 2005 and 2015[7].

The National Institute of Mental Health defines anxiety disorder as an overwhelming, illogical fear of commonplace events. There is a lot of overlap between uremic and depressive symptoms, and diagnosing depression in ESRD patients might be challenging at times. But clinical

DOI: 10.21608/ARCMED.2024.277951.1048

depression is a real illness that causes severe subjective suffering as well as impairments to social and professional performance[4].

The estimated rates of anxiety and depression in patients with end-stage renal illness are not precise; they can vary from 0% to 100% based on the diagnostic standards, evaluation method, and demographic features. (Kimmel & Peterson, 2005). An extensive analysis of fifty-five papers showed that among patients with end-stage renal illness, the prevalence rates of anxiety and depression were, respectively, 38% and 27%[8]. Unhealthy behaviors like smoking, eating poorly, leading a sedentary lifestyle, and not following treatment regimens are also linked to anxiety and depression. These elements result in higher clinical event risks and the requirement for emergency services, which raises the expense of healthcare[9]. For better understanding of affective disorders and associated factors in end-stage renal disease, further studies are needed.

AIM OF THE STUDY

The aim of the study is to detect the prevalence and predictors of depression and anxiety in hemodialysis patients.

The primary objectives of the research are to detect compliance of patient to renal replacement therapy (RRT) (hemodialysis) and effect of depression and anxiety on compliance to RRT and its frequency, investigate the effect of depression on hypertension during session, evaluate the impact of socioeconomic state on compliance of patient to renal replacement therapy (RRT) and its relation to depression and anxiety.

SUBJECT AND METHODS

This study is a prospective, Cross-sectional study. Sixty (60) patients with ESRD on Renal replacement therapy (hemodialysis) will be recruited from HD units of The Memorial Souad Kafafi University Hospital (SKUH).

Inclusion criteria

Adults with stable clinical condition on regular HD, hemodialysis for at least 6 months, age ≥ 18 years, both sexes, willingness to provide good verbal agreement to the questionnaire.

Exclusion criteria

Patients suffering from major visual or hearing impairments, severe cerebral vascular disease, patients with chronic liver disease, major heart, lung diseases or malignancies that can add additional psychological burden.

Method

Explanation of the nature and purpose of the research before taking informed consent.

Full history taking

Personal history for age, sex, marital state, work status, educational level, present history of ESKD regarding onset, cause and duration, medical and drugs history, duration of hemodialysis, number of sessions per week and duration of each session, patient compliance for treatment, history of any psychiatric illness before HD.

Laboratory investigation

The results of the most recent routine laboratory testing will be recorded, including: complete blood count (CBC), renal and liver function tests, c-reactive protein (CRP) (mg/L), serum Albumin (mg/dL), intact parathormone (iPTH) (pg/mL), corrected serum calcium (Ca) (mg/dL), serum phosphorus (mg/dL).

Assessment of depression and anxiety

Hamilton Depression Rating Scale (HDRS)

The HDRS (also known as the Ham-D) is the most widely used clinician-administered depression assessment scale. It contains 17 items (HDRS17) pertaining to symptoms of depression experienced over the past week. The HDRS was originally developed for hospital inpatients, thus the emphasis on melancholic and physical symptoms of depression.

GAD-7 (General Anxiety Disorder-7)

GAD-7 consists of seven items measuring worry and anxiety symptoms. Each item is scored on a four-point Likert scale (0–3) with total scores ranging from 0 to 21 with higher scores reflecting greater anxiety severity. Scores above 10 are considered to be in the clinical range. The GAD-7 has shown good reliability and construct validity.

Statistical analysis

Data were analyzed using Statistical Program for Social Science (SPSS) version 24. Qualitative data were expressed as frequency and percentage. Quantitative data were expressed as mean ±SD for normally distributed data. Mean (average): the central value of a discrete set of numbers, specifically the sum of values divided by the number of values. Standard deviation (SD): is the measure of dispersion of a set of values. A low SD indicates that the values tend to be close to the mean of the set, while a high SD indicate that the values are spread out over a wider range. Probability (*p-value*): *p-value* < 0.05 was considered significant, *p-value* < 0.001 was considered as highly significant, *p-value*> 0.05 was considered insignificant.

RESULTS

This table (Table 1) shows the description of demographic data in all studied patients. As regard age, the mean age of all studied patients was 56.08 ± 13.1 years with minimum age of 23 years and maximum age of 82 years.

As regard sex, there were 36 males (60%) and 24 females (40%) in the studied patients. As regard socioeconomic status (SES), there were 22 patients (36.7%) of low SES, 29 patients (48.3%) of moderate SES and 9 patients (15%) of high SES in all studied patients. As regard chronic diseases, there were 31 patients (51.7%) with DM and 43 patients (71.7%) with HTN in all studied patients.

Table 1: Description of demographic data in all studied patients

		Studied patients (N = 60)	
Age (years)	Mean ±SD	56.08 ± 13.1	
	Min - Max	23 – 82	
Sex	Male	36	60%
	Female	24	40%
Socioeconomic status	Low	22	36.7%
	Moderate	29	48.3%
	High	9	15%
Chronic diseases	DM	31	51.7%
	HTN	43	71.7%

This table (Table 2) shows no statistical significant correlation (p-value = 0.258) between depression and age of the studied patients. Statistically significant (p-value = 0.006) increased percentage of female patients in depressed patients (16 patients, 59.3%) when compared with non-depressed patients (8 patients, 24.3%) and also decreased percentage of male patients in depressed patients (11 patients, 40.7%) when compared with non-depressed patients (25 patients, 75.8%). No statistical significant correlation (p-value = 0.306) between depression and SES in the studied patients.

Statistically significant (p-value = 0.035) increased percentage of DM in depressed patients (18 patients, 66.7%) when compared with non-depressed patients (13 patients, 39.4%). No statistical significant correlation (*p-value* = 0.708) between depression and HTN in the studied patients.

Table 2: Correlation between Depression and demographic data of the studied patients

		Depression				Stat. test	*P-value*
		No (N = 33)		Yes (N = 27)			
Age (years)	Mean	57.8		53.9		T = 1.14	0.258 NS
	±SD	14.5		11.1			
Sex	Male	25	75.8%	11	40.7%	X2 = 7.5	0.006 S
	Female	8	24.3%	16	59.3%		
SES	Low	14	42.4%	8	29.6%	X2 = 2.37	0.306 NS
	Moderate	13	39.4%	16	59.3%		
	High	6	18.2%	3	11.1%		
DM	No	20	60.6%	9	33.3%	X2 = 4.4	0.035 S
	Yes	13	39.4%	18	66.7%		
HTN	No	10	30.3%	7	25.9%	X2 = 0.14	0.708 NS
	Yes	23	69.7%	20	74.1%		

X2: Chi-square test. S: *p-value* < 0.05 is considered non-significant

This table (Table 3) shows no statistical significant correlation (*p-value* > 0.05) between depression and complications of the studied patients except for: volume overload, there was statistically significant (*p-value*= 0.049) increased percentage of volume overload in depressed patients (3 patients, 11.1%) when compared with non-depressed patients (0 patients, 0%). Dyspnea, there was statistically significant (*p-value* = 0.022) increased percentage of dyspnea in depressed patients (4 patients, 14.8%) when compared with non-depressed patients (0 patients, 0%).

This table (Table 4) shows no statistical significant correlation (*p-value* = 0.728) between depression and compliance of the studied patients.

This table (Table 5) shows no statistical significant correlation (*p-value* = 0.689) between Anxiety and age of the studied patients. Statistically significant (*p-value* = 0.039) increased percentage of female patients in anxious patients (13 patients, 56.5%) when compared with non-anxious patients (11 patients, 29.7%) and also decreased percentage of male patients in anxious patients (10 patients, 43.5%) when compared with non- anxious patients (26 patients, 70.3%).

No statistical significant correlation (*p-value* = 0.722) between Anxiety and SES in the studied patients. No statistical significant correlation (p-value = 0.098) between Anxiety and SES in the studied patients. No statistical significant correlation (*p-value* = 0.761) between Anxiety and HTN in the studied patients.

This table (Table 6) shows no statistical significant correlation (*p-value* = 0.468) between Anxiety and HD duration of the studied patients. No statistical significant correlation (*p-value* = 0.274) between Anxiety and HD entire length of the studied patients.

No statistical significant correlation (*p-value* = 0.066) between Anxiety and average weight gain of the studied patients. No statistical significant correlation (*p-value* = 0.582) between Anxiety and vascular access of the studied patients.

This table (Table 7) shows no statistical significant correlation (*p-value* > 0.05) between anxiety and studied laboratory data in the studied patients.

This table (Table 8) shows no statistical significant correlation (*p-value* > 0.05) between anxiety and complications of the studied patients except for volume overload, there was statistically significant (*p-value* = 0.024) increased percentage of volume overload in anxious patients (3 patients, 13%) when compared with non- anxious patients (0 patients, 0%). Dyspnea, there was statistically significant (*p-value* = 0.009) increased percentage of dyspnea in anxious patients (4 patients, 17.4%) when compared with non- anxious patients (0 patients, 0%).

This table (Table 9) shows no statistical significant correlation (*p-value* = 0.905) between Anxiety and compliance of the studied patients.

Table 3: Correlation between Depression and complications of the studied patients.

	1No (N = 33)		Depression				X^2	*P-value*
			Yes (N = 27)					
Complication types	Complications	No	11	33.3%	7	25.9%	0.38	0.533 NS
		Yes	22	66.7%	20	74.1%		
	Intra-dialytic hypertension		8	24.2%	9	33.3%	0.6	0.437 NS
	Hypotension		10	30.3%	5	18.5%	1.1	0.294 NS
	Hypoglycemia		3	9.1%	2	7.4%	0.05	0.814 NS
	Fatigue		1	3%	0	0%	0.83	0.362 NS
	Volume overload		0	0%	3	11.1%	3.8	0.049 S
	Dyspnea		0	0%	4	14.8%	5.2	0.022 S
	Chest pain		1	3%	2	7.4%	0.59	0.439 NS
	Cramps		0	0%	1	3.7%	1.24	0.265 NS

S: *p-value* < 0.05 is considered significant. X^2: Chi-square test. NS: *p-value* > 0.05 is considered non-significant.

Table 4: Correlation between Depression and compliance of the studied patients.

		Depression				X^2	*P-value*
		No (N = 33)		Yes (N = 27)			
Compliance	Not compliant	6	18.2%	4	14.8%	0.12	0.728 NS
	Compliant	27	81.8%	23	85.2%		

X^2: Chi-square test. NS: *p-value* > 0.05 is considered non-significant.

Table 5: Correlation between Anxiety and demographic data of the studied patients.

		Anxiety				Stat. test	*P-value*
		No (N = 37)		Yes (N = 23)			
Age (years)	Mean	56.6		55.2		T = 0.4	0.689 NS
	±SD	14.1		11.6			
Sex	Male	26	70.3%	10	43.5%	X^2 = 4.2	0.039 S
	Female	11	29.7%	13	56.5%		
SES	Low	15	40.5%	7	30.4%	X^2 = 0.65	0.722 NS
	Moderate	17	45.9%	12	52.2%		
	High	5	13.5%	4	17.4%		
DM	No	21	56.8%	8	34.8%	X^2 = 2.7	0.098 NS
	Yes	16	43.2%	15	65.2%		
HTN	No	11	29.7%	6	26.1%	X^2 = 0.09	0.761 NS
	Yes	26	70.3%	17	73.9%		

X^2: Chi-square test. S: *p-value* < 0.05 is considered non-significant. T: independent sample T test.
NS: *p-value* > 0.05 is considered non-significant.

Table 6: Correlation between Anxiety and dialysis vintage of the studied patients.

		Anxiety				Stat. test	*P-value*
		No (N = 37)		Yes (N = 23)			
HD duration (years)	Mean	6.24		5.28		T = 0.73	0.468 NS
	±SD	5.49		3.76			
HD entire length (hours)	Mean	3.92		3.98		T = 1.1	0.274 NS
	±SD	0.25		0.10			
Average weight gain (kg)	Mean	2.32		2.76		T = 1.8	0.066 NS
	±SD	0.93		0.82			
Vascular access	AVF	28	75.7%	16	69.6%	X^2 = 1.08	0.582 NS
	Permicath	7	18.9%	4	17.4%		
	Double J lumen	2	5.4%	3	13%		

X^2: Chi-square test. T: independent sample T test. NS: *p-value* > 0.05 is considered non-significant.

Table 7: Correlation between Anxiety and laboratory data of the studied patients.

		Anxiety				T	*P-value*
		No (N = 37)		Yes (N = 23)			
Hb	Mean ±SD	9.9	± 1.2	9.6	± 1.3	0.89	0.374 NS
PLT	Mean ±SD	264.9	± 80.7	287.8	± 85.3	1.03	0.303 NS
TLC	Mean ±SD	6.6	± 2.2	6.4	± 2.2	0.35	0.728 NS
Creat	Mean ±SD	6.7	± 2.0	7.5	± 2.3	1.36	0.179 NS
Urea	Mean ±SD	105.6	± 45.1	122.4	± 37.9	1.48	0.145 NS
ALT	Mean ±SD	8.7	± 10.2	7.1	± 8.9	0.6	0.546 NS
AST	Mean ±SD	5.5	± 3.9	6.9	± 4.6	1.26	0.212 NS
Phosphorous	Mean ±SD	4.5	± 1.6	5.2	± 1.4	1.81	0.075 NS
Ca	Mean ±SD	9.4	± 0.9	9.5	± 0.8	0.34	0.729 NS
PTH	Mean ±SD	135.7	± 211.2	218.7	± 315.5	1.21	0.231 NS
ALB	Mean ±SD	3.2	± 0.5	3.4	± 0.4	1.4	0.166 NS
CRP	Mean ±SD	34.1	± 66.9	25.6	± 32.9	0.5	0.616 NS

X^2: Chi-square test. NS: *p-value* > 0.05 is considered non-significant.

Table 8: Correlation between anxiety and complications of the studied patients.

		Anxiety				X^2	*P-value*
		No (N = 37)		Yes (N = 23)			
Complications	No	11	29.7%	7	30.4%	0.003	0.954 NS
	Yes	26	70.3%	16	69.6%		
Complication types	Intra-dialytic hypertension	10	27%	7	30.4%	0.081	0.776 NS
	Hypotension	11	29.7%	4	17.4%	1.15	0.283 NS
	Hypoglycemia	4	10.8%	1	4.3%	0.77	0.379 NS
	Fatigue	2	5.4%	0	4.3%	0.63	0.427 NS
	Volume overload	0	0%	3	13%	5.08	0.024 S
	Dyspnea	0	0%	4	17.4%	6.8	0.009 S
	Chest pain	1	2.7%	2	8.7%	1.07	0.3 NS
	Cramps	0	0%	1	4.3%	1.63	0.201 NS

S: *p-value* < 0.05 is considered significant. X^2: Chi-square test. NS: *p-value* > 0.05 is considered non-significant.

Table 9: Correlation between anxiety and compliance of the studied patients.

		Anxiety				X^2	*P-value*
		No (N = 37)		Yes (N = 23)			
Compliance	No	6	16.2%	4	17.4%	0.014	0.905 NS
	Yes	31	83.8%	19	82.6%		

X^2: Chi-square test. NS: *p-value* > 0.05 is considered non-significant.

DISCUSSION

End-stage renal disease (ESRD) patients are increasing in number worldwide every year, and hemodialysis (HD) patients are increasing as well . The effects of HD therapy are time-consuming, expensive, and invasive, requiring patients and their families to get extensive, multidisciplinary care. The patients' lives are negatively impacted by this set of conditions on both a physical and psychological level[10].

The influence of psychiatric disorders on morbidity and healthcare expenses has drawn the attention of medical professionals to ESRD patients. Patients with kidney sickness, particularly those with renal failure undergoing dialysis or transplantation, may experience psychological challenges. This condition is known as psycho-nephrology[11].

The most prevalent mental health conditions among ESRD patients are anxiety and depression, which are around three times more common than in the general population[12]. Anxiety disorder is an excessive and unreasonable fear of ordinary situations, according to the National Institute of Mental Health. It might be challenging to differentiate depression in ESRD since uremic and depressive symptoms frequently coincide[13].

Clinical depression, on the other hand, is a disease that affects health-related quality of life (QOL), causes significant subjective distress, and impairs social and vocational functioning. Risk factors for anxiety and depression disorders include suicidal behavior, morbidity, bad quality of life, disability, and mortality[14].

In the current study we aimed to detect the prevalence and predictors of depression and anxiety in hemodialysis patients. We enrolled sixty (60) patients with ESRD on Renal replacement therapy (hemodialysis),

In the present study we used Hamilton Depression Rating Scale (HDRS), (also known as the Ham-D) it is the most widely used clinician-administered depression assessment scale. Furthermore, we used GAD-7 (General Anxiety Disorder-7) for assessment of anxiety

The mean age of the present study HD patients was 56.08 ± 13.1 years and mean duration of HD was 5.8 ± 4.8 years and the mean duration of HD was 30.5± 27.66 months in accordance with[4] (Kamel *et al*) studying Egypt as the mean age of the studied cases was about 60 years and the mean duration of HD was 30.5± 27.66 months, regarding[15] (Farag and El-Sayed, 2022)patients undergoing dialysis in Egypt in 2020 , half of them are aged ≥55 years

lower age was mentioned in[16] (Mosleh *et al*.,) study the median age was 51.5 years. The median duration of illness since diagnosis was 4 years in Saudi Arabia and The mean age of patients[17] (Gadia *et al*., from western Rajasthan was around 42.22 (± 11.2) years. Age in their study distribution showed around 50% of the patients belonged to the age group of 41-60 years, 44% were in age group of 21-40 years, and 2% were below 20 years of age. (Jadhav *et al*., 2014)[18] also observed that mean age of the patient in their study was 45.70 years

The variation in age between studies may due to the differ in study location, the etiology of CKD , and the differ in diagnosis strategy in each county

In our study, there was male predominance as they represented 60% of cases in harmony with[4] (Kamel *et al*.,),[19,17,20] (Gaipov *et al*.,), (Gadia *et al*.,) and (Meng *et al*.,) as they reported male represented more than half of the cases.

Numerous research conducted on experimental animals suggest that sex hormones may play a part in this sexual inequality. Male renal damage development may be caused, at least in part, by the negative effects of testosterone. Additionally, it has been claimed that bodybuilders who take anabolic steroids develop tubulointerstitial disease and focal glomerulosclerosis[21]. A recent study by Zhang *et al*. showed that since EGFR expression was lower in the kidneys of adult females, it was possible that sex hormone-dependent variations in EGFR expression could have a role in males' tendency to develop CKD[22].

The most prevalent form of ESKD is hypertension (41%), which is followed by diabetes (14%), while glomerulonephritis is the main diagnosis in 3% of dialysis patients. The percentage of ESKD cases with unclear etiology ranges from 13%[23] to (Bello *et al*.,) and 22%[24] (Hassaballa *et al*.),

In Egypt, glomerulonephritis (16%) and hypertension (30%) were the most prevalent causes of end-stage kidney disease (ESKD), while diabetes (13%), according to the first annual report of the Egyptian Society of Nephrology[15]. (Farag and El-Sayed,) in our study Regarding related comorbidities with HD we found (51.7%) had DM and (71.7%) had HTN in all studied patients.

In the same line[4] (Kamel *et al*.) study found that 21.6% of the cases had DM and 40.6% of the cases had hypertension. Additionally, the majority of patients (61.4%) in[25] (Nagy *et al*., study had hypertension, 14.4% had diabetes,

In the present study we found, for total GADS-7 anxiety score, the mean total score in all studied patients was 4.36 ± 3.3, there were 37 anxious patients (38.8%) and the mean total score of total Hamilton Depression Rating Scale (HDRS) in all studied patients was 9.8 ± 5.08 that was mainly mild, there were (45%) of cases had depression

These results are lower than that was reported in a study done by (Nagy *et al*.)[25], The incidence of borderline cases is 26.2%, while the frequency of abnormal cases is 49.6%. Moreover, depression was widespread, With normal, borderline, and abnormal cases making up 16.8, 28.2, and 55% of the patients, respectively, the median HADS-depression score was 10. 55% of abnormal cases and 28.2% of borderline cases.Moreover,[4] (Kamel *et al*.,) investigation on 524 HD patients in Egypt. observed that borderline and abnormal anxiety cases had a prevalence rate of 51% and 33.7%, respectively, and abnormal depression cases had a prevalence rate of 52.3% and 31.9%. These data demonstrate the significant prevalence of anxiety and depression among HD patients.

Also in Malaysia where[26] (Khan *et al*.,) found ,157 patient (71.3%) had depression at baseline, and 169 (78.2%) had depression on 2nd evaluation and 181 (84.9%) on the final visit

(Ravaghi *et al*.,[27] meta-analysis suggested the prevalence of depression among Iranian patients undergoing HD was 62.0%

However, lower results were found by (Turkistani *et al*.,)[28], who evaluated 286 Saudi HD patients and discovered that 21.1 and 23.3% of patients, respectively, had elevated anxiety and depression scores.

Furthermore, (Mosleh *et al*.,)[15] study in Saudi showed that 19.7 and 24.6% of 122 HD patients, respectively, had abnormal anxiety and depression symptoms, which is much lower than our findings.

However, the study done by (Fischer *et al*.,)[29], discovered that among 3853 people with mild-to-moderate chronic kidney disease (CKD) involved in the Chronic Renal Insufficiency Cohort (CRIC) and Hispanic CRIC (HCRIC) investigations, the incidence of depression symptoms was 27.4% utilizing a Beck's Depression Inventory (BDI) with a cutoff of 11.

A multicenter study by (Gerogianni *et al*.,)[30] found that in Greek patients receiving HD, the prevalence rates of anxiety and depression were 35.9% and 29.4%, respectively.

Reports have shown that the prevalence rates of depression and anxiety among Kuwaiti patients undergoing HD were 21.7% and 21.4%, respectively)[31], and those among patients in Saudi Arabia were 23.3% and 21.1%, respectively[28].

A recent review and meta-analysis by (Palmer et a[6] They investigated on the depression prevalence in HD populations. They discovered 216 studies involving 55,982 CKD or ESRD patients. Depression was found in 39.3% of ESRD dialysis patients when assessed by screening questionnaires and 22.8% of patients when assessed by clinical interview. Depression was found in individuals with CKD at a rate of 21.4% in clinical interviews and 26.5% in screening questionnaires. When depression was diagnosed by questionnaires, the prevalence rates were greater in ESRD than in CKD (39.3% vs. 26.5%), but they were equal when depression was diagnosed by clinical interview (22.8% vs. 21.4%). This discrepancy is probably caused by uremic symptoms, which include lethargy, sleeplessness, and poor appetite in ESRD populations and may resemble somatic depressive symptoms when assessed using questionnaires[32].

We also think there are a number of other possible explanations for these comparatively varied rates, including cultural variations, the impact of seasonal changes on depression, and the potentially stressful nature of the dialysis unit interview setting.

Studies that used different scales and survey results from the same population gathered using different scales showed different results, so we considered that these differences in the prevalence of depression and anxiety could be due to differences in the assessment approaches for these conditions or to real differences in their prevalence. The symptom check list-90, the Beck depression inventory, the state-trait anxiety inventory, and the Center for Epidemiologic Studies depression scale were among these instruments.

In the present study, there was insignificant association between age and occurrence depression or anxiety among HD patients.

In agreement with (Gadia *et al*.,)[17] who found depressive symptoms in all age group of patients, although the association between depression and age was not statistically significant. Similarly, a study from Saudi Arabia by (Sheayria *et al*., 2015)[33] in patients on dialysis, also found that depression was not related to age.

However in (Mosleh *et al*.,)[16] study they found older age was significantly associated with depression among the participants (P = 0.003). In addition, in (Alshelleh *et al*.,)[34] study among Jordanian patients, age had a moderate positive correlation with depression scores.

In the current study, females reported significantly higher levels of anxiety and depression than males.

Similarly (Gadia *et al*., 2020)[17] reported high prevalence of depression and anxiety was observed in females than in males

In a study from Saudi Arabia,[16] also reported anxiety symptoms were more prevalent among females than males ($P = 0.04$). This finding is congruent with those of (Nagy *et al*.,[25], (Gerogianni *et al*.,)[30], as well as (Delgado-Domínguez *et al*.,[35].

However, (Lee *et al*.,)[36] study showed higher male depression scores. On the other hand, our finding contradicts the findings of (Kamel *et al*.,)[4], (Kao *et al*.,)[37], (Sheayria *et al*.,[33] and (Yoong *et al*.,),[38] who found no significant differences in anxiety levels between men and women in respective investigations.

There are gender variations in a wide range of anxiety-related cognitive and physiological processes. Progesterone and estrogens have a significant impact on the neurotransmitter systems linked to anxiety and the eradication of fear, whereas testosterone has anxiolytic properties[39,40].

It's possible that women are more likely than men to suffer from anxiety disorders due to differences in their social and occupational standing, societal standards, and social obligations. In Arabic-speaking nations, women also experience more stringent societal restrictions and shoulder a disproportionate amount of domestic chores in comparison to men. Because of this, they may be more vulnerable to anxiety issues. Social anxiety affects women more frequently than it does males, according to the review by Asher *et al*. Evidence from the self-construal theory, which demonstrated that women's everyday life pleasure decreases more than men's does, in fact, support the authors' claim[41].

In the present study we did not find significant association between anxiety or depression and socioeconomic level, comorbidities, dialysis duration, vascular access, complications except for Volume overload and Dyspnea that was significantly higher in cases with anxiety or depression

The present study findings regarding socioeconomic level were in line with those of (Kamel *et al*.,)[4,37,38], (Kao *et al*.,), and (Yoong *et al*., . However, Patients who were not working were more anxious than those who were in (Nagy *et al*., 2023)[25] and (Gerogianni *et al*.,)[30].

Non-work in working-age patients may be associated with a lack of financial means and, as a result, a loss of self-esteem. There may also be psychological concerns and anxiousness. In addition, it is possible that considerable anxiety makes it difficult for patients to work. Furthermore, time consuming in hemodialysis sessions could cause both anxiety and inability to work.

The findings of our study regarding HD duration were in consistence with the findings of (Gerogianni *et al*.,)[30] and (Yoong *et al*.,)[38] who reported no significant differences in HD duration among persons with varied levels of anxiety.

On the other hand (Nagy *et al*.,)[25] and Kamel *et al*.,[4] found that Patients with higher degrees of anxiety and depression had a significantly longer duration of HD.

Anxiety in HD patients may be associated with dialysis procedures, such as transportation problems, extended stays in dialysis units, and extended sitting times. In addition, patients may experience unfavorable results that cause them to become distressed. Anxiety may also be linked to symptoms associated with dialysis, side effects, and access issues—all of which are frequent worries for HD patients[42].

(Kimmel *et al*.,)[43] identified the same pattern, observing an initial increase in anxiety, which decreased later, probably as patients adapted to the treatment regime

In this study we did not find significant association between depression or anxiety and comorbidities in differ with (Kamel *et al*.,)[4] study, as the most of the studied cases with abnormal anxiety scale had chronic illnesses, namely hypertension or diabetes. Indeed, the risk of depression and anxiety in patients with CKD had been described to be associated with various clinical parameters. Comorbidities may increase the likelihood of anxiety and depression developing. Patients with depressive symptoms, for example, were found to have comorbid illnesses such as hypertension, diabetes, cardiovascular disease, hypoalbuminemia, and substance abuse[42].

The presence and severity of comorbidities are likely to have a major negative impact on patients' quality of life, number of suffering episodes, challenges during treatment, and overall medical expenses. These factors may also be responsible for the association between the number of comorbidities and the onset of depression. Different scales for diagnosing depression, varying socioeconomic conditions, and variations in the logistics of dialysis services across national borders could all account for this discrepancy. According to laboratory results, there was little difference between anxiety and depression in the current investigation.

On opposite side (Kamel *et al*.)[4] study showed a positive correlation between CRP levels and the occurrence of depression. Some studies found a link between CRP and depression)[44,45], while others found no link[46,47].

(Taraz *et al*.,)[47] discovered a link between serum CRP levels and the occurrence of depression in their study, and more than half of those patients died from cardiovascular disease.

Other research has discovered a link between depression and inflammatory and immune responses[48].

Larger-scale studies are needed to look into other confounding factors that may play a role in the development of depression in this vulnerable population.

In the current study, 16.7% of patients not compliance to HD, according to the National Kidney Foundation, 50% of patients undergoing HD do not adhere to their HD regimen[49], while medication non-adherence rates range between 12.5 and 98.6%, resulting in a higher proportion of morbidity and mortality[50].

Non-adherence to the HD regimen is caused by the disease, as well as the complexity of the HD regimen and the increased burden of co-morbidity[51]. Non-adherence is caused by a variety of variables, including age, race, low income, cultural considerations, or a lack of health literacy, especially among groups who are poor and ethnic minorities. A number of variables, including those pertaining to HD patients, the HD regimen, the severity of the renal disease, socioeconomic circumstances, and treatment perceptions by the patients, are known to affect the efficacy of efforts to increase HD patient adherence[52].

In the current study, we did not find significant association between compliance and anxiety or depression These results contradict reports in the literature that suggest there is an inverse relationship between depression and anxiety symptoms and treatment adherence[53,54,55].

The analysis performed does not allow for the establishment of a relationship of cause and effect between the psychological variables and treatment adherence, that is, whether the presence of depression would be the cause or consequence of adherence to treatment.

CONCLUSION

Anxiety and depression are prevalent among (38.3% and 45 %) Egyptian HD patients respectively and female gender as well as Volume overload and Dyspnea are associated with them.

CONFLICT OF INTERESTS

There are no conflicts of interest.

REFERENCES

1. Bikbov, B., Purcell, C. A., Levey, A. S., Smith, M., Abdoli, A., Abebe, M.,*et al*. (2020): Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The lancet, 395(10225), 709-733.

2. El Nahas, M.A., & Bello, A. K. (2005). Chronic kidney disease: the global challenge. Lancet (London, England), 365(9456), 331–340.

3. Chilcot, J., Wellsted, D., Da Silva-Gane, M., & Farrington, K. (2008). Depression on dialysis. Nephron. Clinical practice, 108(4), c256–c264.

4. Kamel, R. A. E., Fouad, M., & Goda, T. M. (2022): Anxiety and depression among hemodialysis patients in Egypt. Zagazig University Medical Journal, 28(3), 594-604.

5. Feroze, U., Martin, D., Kalantar-Zadeh, K., Kim, J. C., Reina-Patton, A., & Kopple, J. D. (2012). Anxiety and depression in maintenance dialysis patients: preliminary data of a cross-sectional study and brief literature review. Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 22(1), 207–210.

6. Palmer, S., Vecchio, M., Craig, J. C., Tonelli, M., Johnson, D. W., Nicolucci, A., Pellegrini, F., Saglimbene, V., Logroscino, G., Fishbane, S., & Strippoli, G. F. (2013). Prevalence of depression in chronic kidney disease: systematic review and meta-analysis of observational studies. Kidney international, 84(1), 179–191.

7. Depression, W. H. O. (2017): Other common mental disorders: global health estimates. Geneva: World Health Organization, 24.

8. Murtagh, F. E., Addington-Hall, J., & Higginson, I. J. (2007). The prevalence of symptoms in end-stage renal disease: a systematic review. Advances in chronic kidney disease, 14(1), 82–99.

9. Brito, D. C. S., Machado, E. L., Reis, I. A., Carmo, L. P. F. D., & Cherchiglia, M. L. (2019). Depression and anxiety among patients undergoing dialysis and kidney transplantation: a cross-sectional study. Sao Paulo medical journal = Revista paulista de medicina, 137(2), 137–147.

10. Thurlow, J. S., Joshi, M., Yan, G., Norris, K. C., Agodoa, L. Y., Yuan, C. M., & Nee, R. (2021). Global Epidemiology of End-Stage Kidney Disease and Disparities in Kidney Replacement Therapy. American journal of nephrology, 52(2), 98–107.

11. Kimmel, P. L., Fwu, C. W., Abbott, K. C., Moxey-Mims, M. M., Mendley, S., Norton, J. M., & Eggers, P. W. (2019). Psychiatric Illness and Mortality in Hospitalized ESKD Dialysis Patients. Clinical journal of the American Society of Nephrology : CJASN, 14(9), 1363–1371.

12. Goh, Z. S., & Griva, K. (2018). Anxiety and depression in patients with end-stage renal disease: impact and management challenges - a narrative review. International journal of nephrology and renovascular disease, 11, 93–102.

13. Bornivelli, C., Aperis, G., Giannikouris, I., Paliouras, C., & Alivanis, P. (2012). Relationship between depression, clinical and biochemical parameters in patients undergoing haemodialysis. Journal of renal care, 38(2), 93–97.

14. Hedayati, S. S., Bosworth, H. B., Briley, L. P., Sloane, R. J., Pieper, C. F., Kimmel, P. L., & Szczech, L. A. (2008). Death or hospitalization of patients on chronic hemodialysis is associated with a physician-based diagnosis of depression. Kidney international, 74(7), 930–936.

15. Farag, Y. M. K., & El-Sayed, E. (2022). Global Dialysis Perspective: Egypt. Kidney360, 3(7), 1263–1268.

16. Mosleh, H., Alenezi, M., Al Johani, S., Alsani, A., Fairaq, G., & Bedaiwi, R. (2020). Prevalence and Factors of Anxiety and Depression in Chronic Kidney Disease Patients Undergoing Hemodialysis: A Cross-sectional Single-Center Study in Saudi Arabia. Cureus, 12(1), e6668.

17. Gadia, P., Awasthi, A., Jain, S., & Koolwal, G. D. (2020). Depression and anxiety in patients of chronic kidney disease undergoing haemodialysis: A study from western Rajasthan. Journal of family medicine and primary care, 9(8), 4282–4286.

18. Jadhav, BS, Dhavale, HS, Dere, SS & Dadarwala, DD (2014). Psychiatric morbidity, quality of life and caregiver burden in patients undergoing hemodialysis. 2014. 7, 722-727.

19. Gaipov, A., Issanov, A., Kadyrzhanuly, K., Galiyeva, D., Khvan, M., Aljofan, M., Molnar, M. Z., & Kovesdy, C. P. (2020). Epidemiology of dialysis-treated end-stage renal disease patients in Kazakhstan: data from nationwide large-scale registry 2014-2018. BMC nephrology, 21(1), 407.

20. Meng, L., Chen, D., Yang, Y., Zheng, Y., & Hui, R. (2012). Depression increases the risk of hypertension incidence: a meta-analysis of prospective cohort studies. Journal of hypertension, 30(5), 842–851.

21. Herlitz, L. C., Markowitz, G. S., Farris, A. B., Schwimmer, J. A., Stokes, M. B., Kunis, C., Colvin, R. B., & D'Agati, V. D. (2010). Development of focal segmental glomerulosclerosis after anabolic steroid abuse. Journal of the American Society of Nephrology: JASN, 21(1), 163–172.

22. Zhang, M. Z., Sasaki, K., Li, Y., Li, Z., Pan, Y., Jin, G. N., Wang, Y., Niu, A., Wang, S., Fan, X., Chen, J. C., Borza, C., Yang, H., Pozzi, A., Fogo, A. B., & Harris, R. C. (2019). The Role of the EGF Receptor in Sex Differences in Kidney Injury. Journal of the American Society of Nephrology: JASN, 30(9), 1659–1673.

23. Bello, A. K., Levin, A., Lunney, M., Osman, M. A., Ye, F., Ashuntantang, G. E., Bellorin-Font, E., Benghanem Gharbi, M., Davison, S. N., Ghnaimat, M., Harden, P., Htay, H., Jha, V., Kalantar-Zadeh, K., Kerr, P. G., Klarenbach, S., Kovesdy, C. P., Luyckx, V. A., Neuen, B. L., O'Donoghue, D., … Johnson, D. W. (2019). Status of care for end stage kidney disease in countries and regions worldwide: international cross sectional survey. BMJ (Clinical research ed.), 367, l5873.

24. Hassaballa, M, El-Wakil, H, Elsharkawy, M, Khamis, S, El Tantawy, T, Wahby, W, *et al*. Egyptian renal data system (ERDS) 2020: an annual report of end-stage kidney disease patients on regular hemodialysis. 2022. 22, 1.

25. Nagy, E., Tharwat, S., Elsayed, A. M., Shabaka, S. A. E., & Nassar, M. K. (2023). Anxiety and depression in maintenance hemodialysis patients: prevalence and their effects on health-related quality of life. International urology and nephrology, 55(11), 2905–2914.

26. Khan, A., Khan, A. H., Adnan, A. S., Sulaiman, S. A. S., & Mushtaq, S. (2019). Prevalence and predictors of depression among hemodialysis patients: a prospective follow-up study. BMC public health, 19(1), 531.

27. Ravaghi, H., Behzadifar, M., Behzadifar, M., Taheri Mirghaed, M., Aryankhesal, A., Salemi, M., & Bragazzi, N. L. (2017). Prevalence of Depression in Hemodialysis Patients in Iran: a Systematic Review and Meta-analysis. Iranian journal of kidney diseases, 11(2), 90–98.

28. Turkistani, I., Nuqali, A., Badawi, M., Taibah, O., Alserihy, O., Morad, M., & Kalantan, E. (2014). The prevalence of anxiety and depression among end-stage renal disease patients on hemodialysis in Saudi Arabia. Renal failure, 36(10), 1510–1515.

29. Fischer, M. J., Xie, D., Jordan, N., Kop, W. J., Krousel-Wood, M., Tamura, M. K., ... & CRIC Study Group Investigators. (2012). Factors associated with depressive symptoms and use of antidepressant medications among participants in the Chronic Renal Insufficiency Cohort (CRIC) and Hispanic-CRIC Studies. American journal of kidney diseases, 60(1), 27-38.

30. Gerogianni, G., Lianos, E., Kouzoupis, A., Polikandrioti, M., & Grapsa, E. (2018). The role of socio-demographic factors in depression and anxiety of patients on hemodialysis: an observational cross-sectional study. International urology and nephrology, 50(1), 143–154.

31. Al-Shammari, N., Al-Modahka, A., Al-Ansari, E., Al-Kandari, M., Ibrahim, K. A., Al-Sanea, J., Al-Sabah, R., & Albatineh, A. N. (2021). Prevalence of depression, anxiety, and their associations among end-stage renal disease patients on maintenance hemodialysis: a multi-center population-based study. Psychology, health & medicine, 26(9), 1134–1142.

32. Hedayati, S. S., Yalamanchili, V., & Finkelstein, F. O. (2012). A practical approach to the treatment of depression in patients with chronic kidney disease and end-stage renal disease. Kidney international, 81(3), 247–255.

33. Sheayria, F., Karkar, A. M., Almenawi, L. A., Alreemawi, R., Awn, N., Alzenim, M. M., Hejaili, F. F., Shaheen, F. A., & Al Sayyari, A. A. (2015). Stroke-free status and depression scores among Saudi dialysis patients. Renal failure, 37(3), 392–397.

34. Alshelleh, S., Alhawari, H., Alhouri, A., Abu-Hussein, B., & Oweis, A. (2023). Level of Depression and Anxiety on Quality of Life Among Patients Undergoing Hemodialysis. International journal of general medicine, 16, 1783–1795.

35. Delgado-Domínguez, C. J., Sanz-Gómez, S., López-Herradón, A., Díaz Espejo, B., Lamas González, O., de Los Santos Roig, M., Berdud Godoy, I., Rincón Bello, A., & Ramos Sánchez, R. (2021). Influence of Depression and Anxiety on Hemodialysis Patients: The Value of Multidisciplinary Care. International journal of environmental research and public health, 18(7), 3544.

36. Lee, M. J., Lee, E., Park, B., & Park, I. (2022). Mental illness in patients with end-stage kidney disease in South Korea: a nationwide cohort study. Kidney research and clinical practice, 41(2), 231–241.

37. Kao, Y. Y., Lee, W. C., Wang, R. H., & Chen, J. B. (2020). Correlation of sociodemographic profiles with psychological problems among hospitalized patients receiving unplanned hemodialysis. Renal failure, 42(1), 255–262.

38. Yoong, R. K., Mooppil, N., Khoo, E. Y., Newman, S. P., Lee, V. Y., Kang, A. W., & Griva, K. (2017). Prevalence and determinants of anxiety and depression in end stage renal disease (ESRD). A comparison between ESRD patients with and without coexisting diabetes mellitus. Journal of psychosomatic research, 94, 68–72.

39. Lebron-Milad, K., & Milad, M. R. (2012). Sex differences, gonadal hormones and the fear extinction network: implications for anxiety disorders. Biology of mood & anxiety disorders, 2, 3.

40. McHenry, J., Carrier, N., Hull, E., & Kabbaj, M. (2014). Sex differences in anxiety and depression: role of testosterone. Frontiers in neuroendocrinology, 35(1), 42–57.

41. Asher, M., Asnaani, A., & Aderka, I. M. (2017). Gender differences in social anxiety disorder: A review. Clinical psychology review, 56, 1–12.

42. Griva, K., Li, Z. H., Lai, A. Y., Choong, M. C., & Foo, M. W. (2013). Perspectives of patients, families, and health care professionals on decision-making about dialysis modality--the good, the bad, and the misunderstandings!. Peritoneal dialysis international: journal of the International Society for Peritoneal Dialysis, 33(3), 280–289.

43. Kimmel, P. L., & Peterson, R. A. (2005). Depression in end-stage renal disease patients treated with hemodialysis: tools, correlates, outcomes, and needs. Seminars in dialysis, 18(2), 91–97.

44. Su, S. F., Ng, H. Y., Huang, T. L., Chi, P. J., Lee, Y. T., Lai, C. R., Lin, Y. H., Huang, P. C., & Lee, C. T. (2012). Survey of depression by Beck Depression Inventory in uremic patients undergoing hemodialysis and hemodiafiltration. Therapeutic apheresis and dialysis: official peer-reviewed journal of the International Society for Apheresis, the Japanese Society for Apheresis, the Japanese Society for Dialysis Therapy, 16(6), 573–579.

45. Jhamb, M., Argyropoulos, C., Steel, J. L., Plantinga, L., Wu, A. W., Fink, N. E., Powe, N. R., Meyer, K. B., Unruh, M. L., & Choices for Healthy Outcomes in Caring for End-Stage Renal Disease (CHOICE) Study (2009). Correlates and outcomes of fatigue among incident dialysis patients. Clinical journal of the American Society of Nephrology : CJASN, 4(11), 1779–1786.

46. Uglešić, B., Ljutić, D., Lasić, D., Jeličić, I., Višić, V., Glavina, T., Šundov, Ž., Puljiz, Ž., Cvitanović, M. Ž., & Meter, A. (2015). Depression and serum interleukin-6 levels in patients on dialysis. Psychiatria Danubina, 27(2), 168–173.

47. Taraz, M., Khatami, M. R., Dashti-Khavidaki, S., Akhonzadeh, S., Noorbala, A. A., Ghaeli, P., & Taraz, S. (2013). Sertraline decreases serum level of interleukin-6 (IL-6) in hemodialysis patients with depression: results of a randomized double-blind, placebo-controlled clinical trial. International immunopharmacology, 17(3), 917–923.

48. Kiecolt-Glaser, J. K., & Glaser, R. (2002). Depression and immune function: central pathways to morbidity and mortality. Journal of psychosomatic research, 53(4), 873–876.

49. Estrella, M. M., Jaar, B. G., Cavanaugh, K. L., Fox, C. H., Perazella, M. A., Soman, S. S., Howell, E., Rocco, M. V., Choi, M. J., & National Kidney Foundation (2013). Perceptions and use of the national kidney foundation KDOQI guidelines: a survey of U.S. renal healthcare providers. BMC nephrology, 14, 230.

50. Ghimire, S., Castelino, R. L., Lioufas, N. M., Peterson, G. M., & Zaidi, S. T. (2015). Nonadherence to Medication Therapy in Haemodialysis Patients: A Systematic Review. PloS one, 10(12), e0144119.

51. Parker, K., Bull-Engelstad, I., Aasebø, W., von der Lippe, N., Reier-Nilsen, M., Os, I., & Stavem, K. (2019). Medication regimen complexity and medication adherence in elderly patients with chronic kidney disease. Hemodialysis international. International Symposium on Home Hemodialysis, 23(3), 333–342.

52. Alikari, V., Tsironi, M., Matziou, V., Tzavella, F., Stathoulis, J., Babatsikou, F., ... & Zyga, S. (2019). The impact of education on knowledge, adherence and quality of life among patients on haemodialysis. Quality of Life Research, 28, 73-83.

53. Ossareh, S., Tabrizian, S., Zebarjadi, M., & Joodat, R. S. (2014). Prevalence of depression in maintenance hemodialysis patients and its correlation with adherence to medications. Iranian journal of kidney diseases, 8(6), 467–474.

54. Ibrahim, S., Hossam, M., & Belal, D. (2015). Study of non-compliance among chronic hemodialysis patients and its impact on patients' outcomes. Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 26(2), 243–249.

55. Nabolsi, M. M., Wardam, L., & Al-Halabi, J. O. (2015). Quality of life, depression, adherence to treatment and illness perception of patients on haemodialysis. International journal of nursing practice, 21(1), 1–10.