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Depression among Egyptian End Stage Renal Disease Patients Under Maintenance Hemodialysis

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Abstract

A common, preventable, and treatable disease characterised by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities, typically resulting from extensive exposure to noxious particles or gases, and influenced by host factors including abnormal lung development is Chronic Obstructive Pulmonary Disease (COPD). Patients hospitalised to the intensive care unit (ICU) with AECOPD were analysed, and the DECAF score and the previously established BAP65 score were compared to see which is better at predicting mortality and the requirement for IMV. Methods: Fifty patients were enrolled in the trial, all of whom had been transferred from our emergency room to the intensive care unit due to an exacerbation of their COPD. FindingsBUN >25 (21.43 percent in discharged group vs. 62.50 percent in died group, P = 0.018), Altered mental status (11.90 percent in discharged group vs. 50.00 percent in died group, P = 0.026), and pulse >109 bpm (21.43 percent in discharged group vs. 75.00 percent in died group, P = 0.002) were significantly different between survivors and died patients. For patients above the age of 65, there was no statistically significant difference between the released and deceased groups (40.48 percent vs. 75.00 percent, P = 0.073). Conclusions: COPD is a severe health disease that affects patient health and life, and represents a burden for the health systems. The mean value of the BAP 65 score was 2.191.04 in the discharged group, and 3.751.58 in the dying group, with a very significant difference between groups (P= 0.001). Death from COPD exacerbation is preventable, making early identification and care of the disease crucial. The prognosis of a patient undergoing AECOPD may be evaluated using not only clinical judgement, but also the BAP65/DECAF scoring systems, which take into account a number of parameters.

Keywords: Depression, ESRD, quality of life, hemodialysis.

1. Introduction

A decrease in glomerular filtration rate or an increase in urine albumin excretion, or both, are diagnostic of chronic kidney disease (CKD). The term "end-stage renal disease" refers to a condition in which the patient's glomerular filtration rate (GFR) is less than 15 mL/min owing to progressive kidney failure [1].

Third-stage chronic kidney disease has a lifetime risk of over 50%, which is far greater than the risk seen in people with diabetes and which increases substantially with age. Evidenced by a decline in renal function, a decline in quality of life, and an increase in mortality and morbidity rates [2].

Fluid retention causes edoema, hyperkalemia, cardiovascular illness, bone fractures, anaemia, and an increased risk of infection are all complications of end stage renal disease (ESRD), which eventually need dialysis or a kidney transplant [3, 4].

In Egypt, hemodialysis (HD) is the standard treatment for kidney failure. HD attempts to bring about an interior environment and homeostasis restoration. Appropriate prescription according to patient- and device-dependent characteristics is necessary for optimal treatment of the patient receiving long-term HD [5].

When a patient reaches the end stage of chronic kidney disease (CKD), the condition is incurable, and the patient must endure life-sustaining therapies that may be taxing on the body and mind. Fatigue, sexual dysfunction, unemployment, financial strain, lack of transportation choices, insurance and social service barriers, and depression after dialysis all contribute significantly [6].

Depression is a prevalent psychological illness among people with end-stage renal failure. Depression is reported to be much more common among HD patients than among the general population [7, 8].

Patients with end-stage renal disease (ESRD) who undergo routine hemodialysis (HD) had a 46% higher risk of developing depression than the general population [9]. Low performance status, decreased physical activity, and a deteriorating quality of life are all indicators that a patient has depression and is living with ESRD. ESRD patients have been shown to have much higher rates of depression than individuals with cancer or congestive heart failure (CHF) [10].

Patient quality of life is strongly correlated with depressive symptoms (QOL). It has been shown that depression rates among HD patients are impacted by marital status, with divorced and widowed women experiencing a worse quality of life [6]

Depression's impact on mortality in ESRD patients has been shown to be inconsistently. This conclusion has been disputed by other research, while others have reported an increased chance of death from any cause. Depression in ESRD patients admitted to the hospital has been linked to a lengthier stay [11].

In order to evaluate the prevalence and severity of depression in ESRD patients on maintenance hemodialysis and to identify clinical and laboratory

predictors for severe depression, we undertook a cross-sectional observational research.

2. Patients and methods

Between January 2020 and June 2020, we surveyed patients undergoing routine hemodialysis at Embaba's public hospital and the Fever hospital. Patients on chronic hemodialysis for end-stage renal disease who were both clinically stable and cognitively intact were included. Patients with acute renal failure, hemodynamic instability, or who required transfer from the intensive care unit to the high-discipline unit were not included in this analysis.

The patients' ages, sexes, chronic conditions, places of residence, marital and occupational statuses, and socioeconomic backgrounds were all meticulously documented.

Dialysis treatment (Hemodialysis or peritoneal dialysis), frequency of HD treatments, vascular access (Mahurkar or AV fistula >> previously removed, blocked, or replaced), and other factors were all carefully evaluated for each patient.

All patients had a complete blood count (CBC), kidney function test (urea, S. creatinine, urea reduction rate), liver function test (Alanine Transaminase, Aspartate Transaminase, Total Bilirubin, Albumin), serum calcium level, serum phosphorus level, and parathyroid hormone level (PTH)

The Arabic validated Beck Depression Questionnaire is a 21-item, multiple-choice self-report inventory used to categorise depressive symptoms into mild, moderate, and severe categories [12]. Quality of life in ESRD patients on maintenance dialysis was evaluated using the PCASEE quality of life scale, an Arabic validation of the original Psychometric Tests Measuring Quality of Life [13].

Sample Size (2.1)

The sample size was calculated using STATA 14.2 with the following parameters: predicted increase of 10% in Egyptian patients, power of 80%, type I error of 0.05, and a prevalence of depressive disorders among ESRD patients on routine HD of 11.8% [11]. A total of 100 people would make up the sample.

2.2 Number crunching

Quantitative data were expressed as mean, standard deviation, and range (for a parametric distribution) or as a median and interquartile range (IQR) (for a non-parametric distribution) using SPSS 26th version for statistical analysis. In order to make comparisons across sets of qualitative data, we used one-way ANOVA for parametric data and the Kruskal-Wallis test for non-parametric data. The Chi2 test was used to make comparisons between qualitative variables provided as frequencies and percentages. To evaluate the efficacy of diagnostic tools for clinical depression, a sensitivity analysis was performed. The cutoff for significance was set at 0.05. [14].

3. Results

Patients on maintenance hemodialysis at the Embaba Public Hospital and the Embaba Fever Hospital were included in a prospective cross section research that was performed between January 2020 and June 2020. For this study, we enrolled a total of 110 patients with chronic renal failure who were receiving routine hemodialysis in a hospital setting.

The average age was 54 12.1, and there were 45.5% women and 54.5% men in the group. Patients who were married made up the largest single demographic at 79.1%, followed by those who were single at 12.7%. Positive hepatitis virology tests were found in 66.4% of the sample, with 23.6% of patients having HBV and 42.8% having HCV. The frequency of comorbidities was 28.2%, with hypertension present in 22.8% and polycystic kidney present in 3 (2.7%).

The AV shunt was used more often than the central line (77.3 percent vs. 22.7%). Of the patients included in the analysis, 63.6% attended therapy at a frequency of 3 times per week, 36.4% attended therapy irregularly or skipped sessions, and 3.0% attended therapy for just 2 times per week. Patients' lengths of time on dialysis varied widely, from 6 months to 20 years.

The average Beck Depression Inventory score was 28.17 (the scale goes from 0 to 64). Of those who indicated depression, 51.8% said they were just mildly depressed, 28.2% were moderately depressed, and 20% were severely depressed.

Patients had mean values of 8.3 0.9 mg/dL of calcium, 5.8 2.9 mg/dL of uric acid, 9.2 1.4 mg/dL of haemoglobin, and 231.5 130.6 ng/dL of parathormone.

According to the results of the quality of life evaluation, the Somatic component averaged 14.2 6.1. We found that people scored a mean of 83.7 31.2 on the Quality of life scale, with a mean of 14.8 6.1 for the cognitive component, 13.6 5.9 for the emotive, 13.9 6.5 for the social, 13.7 6.7 for the economic, and 13.7 7.1 for the ego function.

Beck's total score was positively connected with creatinine level (r= 0.277, p= 0.004) in a correlation matrix including age, dialysis efficiency, and laboratory results. The calcium level was inversely related to the Beck's scale (r= -0.34, p0.0001). There was a significant inverse relationship between haemoglobin and Beck's scale (r= -0.353, p0.0001).

Table (1) correlation matrix between patients' demographics and laboratory findings and Beck's score

		Beck's score
Age (years)	r	0.014
	P value	0.444
Creatinine (mg/dL)	r	**0.277****
	P value	**0.004**
Calcium (mg/dL)	r	**-.340****
	P value	**0.0001**
Uric acid (mg/dL)	r	-0.005
	P value	0.961
Hemoglobin (gm/dL)	r	**-0.353****
	P value	**0.0001**
Parathormone (ng/dL)	r	0.141
	P value	0.142
Efficiency of dialysis	r	0.074
	P value	0.444

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlation matrix between age, efficacy of dialysis and laboratory findings and total score of quality of life showed that creatinine was negatively associated with quality of life with r=-0.258 and p value 0.008. Calcium and hemoglobin level was positively correlated with quality of life with quality of life with r= 0.243, r= 0.358 and p values 0.012, 0.0001 respectively

Table (2) Correlations matrix between quality of life and patient's demographics and laboratory findings.

		QoL score
Age (years)	r	-0.148
	P value	0.131
Efficiency of dialysis	r	0.037
	P value	0.704
Uric acid (mg/dL)	r	-0.048
	P value	0.625
Hemoglobin (gm/dL)	r	**0.358****
	P value	**0.0001**
Parathormone (ng/dL)	r	-0.136
	P value	0.162

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Comparison of efficacy of dialysis, duration of dialysis, hepatitis status, comorbidities, vascular access, and severity of depression showed that there was no statistically significant difference based on severity of depression with p values >0.05. Higher number of sessions per week was significantly associated with severe depression with p values 0.0001.

Table (3) Comparison of patient's demographics and medical history according to severity of depression

		Beck's depression scale						P value
		Mild		Moderate		Severe		
		Mean/ median	SD/ (range)	Mean	SD	Mean	SD	
Age (years)		54.2	14.2	51.4	11.1	57.7	11.3	0.216
Gender	Female	27	47.4%	16	51.6%	7	31.8%	0.331
	Male	30	52.6%	15	48.4%	15	68.2%	
Marital status	Divorced	1	1.8%	0	0.0%	0	0.0%	0.694
	Married	48	84.20%	22	71.00%	17	77.30%	
	Single	6	10.60%	7	22.60%	5	22.70%	
	Widow	2	3.50%	2	6.50%	0	0.00%	0.216
Duration of dialysis (years)		6	1-20	3.5	2-5	3	0.25-7	0.364
Efficiency of dialysis		1.6	.4	1.7	.5	1.5	.4	0.276
Comorbidities	Free	42	73.7%	23	74.2%	14	63.6%	0.128
	Blind	0	0.0%	0	0.0%	1	4.5%	
	DM, HTN	0	0.0%	0	0.0%	1	4.5%	
	HTN	15	26.3%	5	16.1%	5	22.7%	

	Polycystic kidney	0	0.0%	2	6.5%	1	4.5%	
	RCC	0	0.0%	1	3.2%	0	0.0%	
Hepatitis virus	Negative	21	36.8%	9	29.0%	7	31.8%	0.323
	HBV	9	15.8%	9	29.0%	8	36.4%	
	HCV	27	47.4%	13	41.9%	7	31.8%	
Vascular access	AV shunt	46	80.7%	25	80.6%	14	63.6%	0.252
	Central line	11	14.1%	6	19.4%	8	36.4%	
Number of sessions per week	2	1	1.8%	0	0.0%	2	9.1%	**0.0001***
	3	50	87.7%	16	51.6%	4	18.2%	
	Uncompliant with sessions	6	10.5%	15	48.4%	16	72.7%	

*Significant

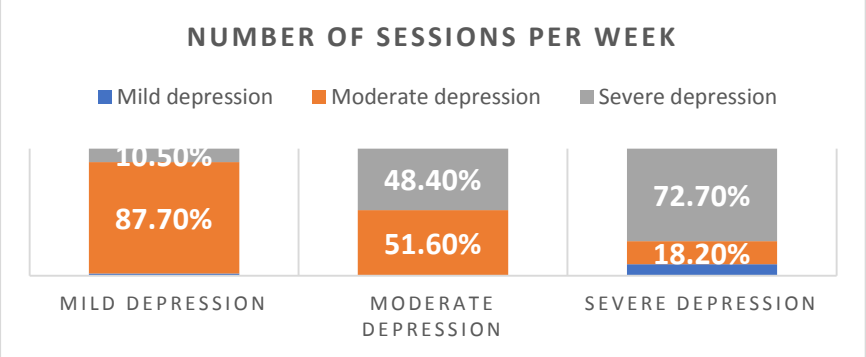

Fig. (1) bar chart showing distribution of severity of depression according to number of sessions.

Comparison laboratory findings and severity of depression showed that there was a statistically significant difference based on severity of depression as severe depression was associated with higher creatinine level with p value 0.013, and lower calcium level with p value 0.0001, lower hemoglobin level p value 0.001, and higher parathormone levels with p value 0.0001.

Table (4) Comparison of patient's laboratory findings and severity of depression.

	Beck's grade						**P value**	**Post Hoc**
	Mild		Moderate		Severe			
	Mean/ median	SD/ (range)	Mean	SD	Mean	SD		
Creatinine (mg/dL)	8.8	1.7	9.6	2.5	10.1	1.7	0.013	P1=0.135, P2= 0.021, P3= 1.0
Calcium (mg/dL)	8.6	.6	8.3	1.0	7.6	.8	<0.001	P1= 0.516, P2= <0.001, P3= 0.006
Uric acid (mg/dL)	5.7	3.7	6.0	1.7	5.5	1.8	0.825	
Hemoglobin (gm/dL)	9.6	1.4	9.1	1.3	8.3	1.3	0.001	P1= 0.333, P2= 0.001, P3= 0.124
Parathormone (ng/dL)	128	**50-210**	**228**	**110-350**	324	**131-400**	<0.001*	P1= 0.036, P2= 0.024, P3=0.0001
QoL score	105	**47-140**	74	**36-119**	37	**9-81**	<0.001*	P1= 0.015, P2= <0.001, P3=<0.001

P1; mild vs moderate, P2; mild vs severe, P3; moderate vs severe.

Creatinine can significantly predict severe depression using a cutoff point 9 mg/dL. With sensitivity 77.3%, specificity 50.6% and p value 0.036. Calcium can significantly predict severe depression using a cutoff point 8 mg/dL. With sensitivity 77.2%, specificity 49.1% and p value 0.001. Hemoglobin can significantly predict severe depression using a cutoff point 9 gm/dL. With sensitivity 67.3%, specificity 63.5% and p value 0.001. Parathormone can significantly predict severe depression using a cutoff point 248 ng/dL. With sensitivity 90.9%, specificity 72.7% and p value 0.001. Total score of QOL can significantly predict severe depression using a cutoff point 83 points. With sensitivity 82.1%, specificity 84.3% and p value 0.001.

Table (5) sensitivity analysis showing predictability of severe depression according to laboratory findings and QoL score.

Variable	AUC	P	Cutoff	Sensitivity	Specificity	95% Confidence Interval
Creatinine (mg/dL)	.645	.036	9	77.3%	50.6%	0.519-0.771
Calcium (mg/dL)	.680	.001	8	77.2%	49.1%	0.577-0.782
Hemoglobin (gm/dL)	.685	.001	9	67.3%	63.5%	0.583-0.787
PTH (pg/mL)	.733	.001	248	90.9%	72.7%	0.636-0.83
QOL	.909	<0.001	83	82.1%	84.3%	0.854-0.964

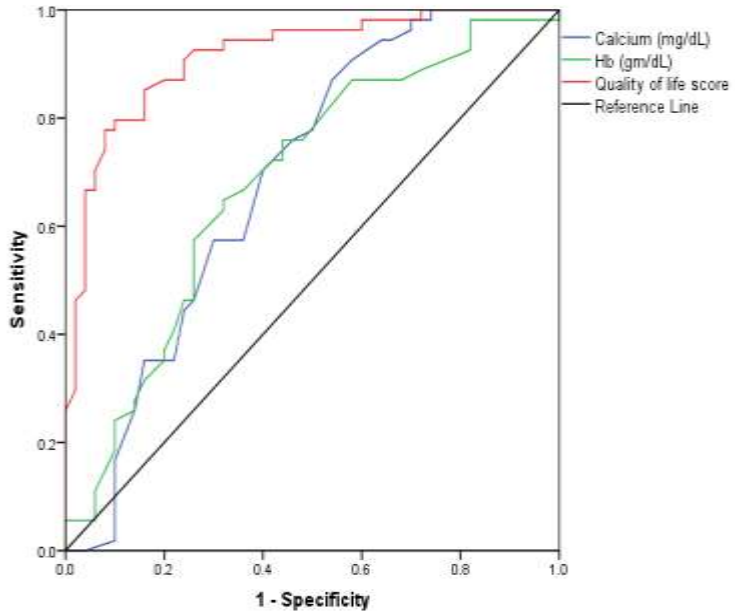

Fig. (2) ROC curve showing predictability of severe depression according to calcium, hemoglobin levels and total QOL score.

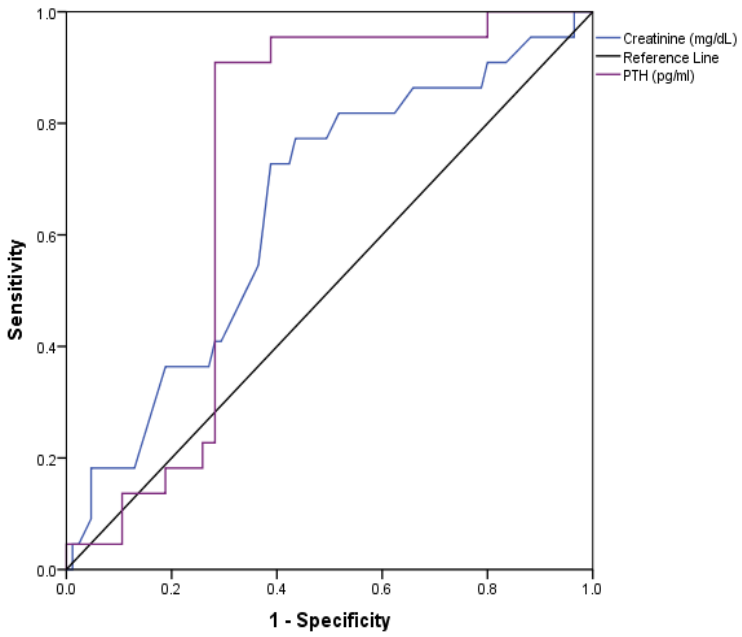

Fig. (3) ROC curve showing predictability of severe depression according to creatinine and parathormone level

4. Discussion

When a patient reaches the end stage of chronic kidney disease (CKD), the condition is incurable, and the patient must endure life-sustaining therapies that may be taxing on the body and mind. Fatigue, sexual dysfunction, unemployment, financial strain, lack of transportation choices, insurance and social service barriers, and depression after dialysis all contribute significantly [6].

Depression is one of the most frequent psychological illnesses in people with end-stage renal disease (ESRD). Depression affects anywhere from 40.8% to 70% of the ESRD population, which is much greater than the general population [15, 16].

Large meta-analyses have shown that people with CKD stage 5D are more likely to experience depressive symptoms (34.3%) than those with CKD stages 1-5 (26.5%) or transplant recipients (26.6%) and have suggested that self-report scales may overestimate the presence of depression, especially in the dialysis setting [17].

Because there is a lack of information about depression in Egyptian ESRD patients on regular hemodialysis, we conducted a prospective cross section study to describe the severity of depressive disorders and quality of life for ESRD patients on regular hemodialysis in correlations with patient's characteristics. This study included ESRD patients receiving regular hemodialysis at Embaba public hospital and Fever hospital of Embaba between January 2020 and June 2020. For this study, we enrolled a total of 110 patients with chronic renal failure who were receiving routine hemodialysis in a hospital setting. The average age was 54 12.1, and there were 45.5% women and 54.5% men in the group. A whopping 79.1 percent of patients reported being married.

Findings were consistent with the most recent annual report from the Egyptian Society of Nephrology, which also noted that patients aged 55–70 make up the largest age group presenting with CKD. Additionally, subsequent reports showed a gradual increase in the incidence of ESRD among the same age groups compared to earlier statistics. Approximately 58% of the population was male and 42% was female, according to the yearly report [18]. Many other country's reports mirrored this trend as well [19, 20].

The mean age of the HD patients in the present investigation is similar with the mean age of ESRD patients reported in a large epidemiological study (52.80 13.82 years, n = 21).

Positive hepatitis virology test results were found in 66.4% of patients; this includes 23% of those tested positive for hepatitis B virus and 42.7% of those tested positive for hepatitis C virus. The incidence of comorbidities was 28.2%.

Barsoum indicated that hypertension is the most frequently proven aetiology of ESRD [22], and a large-scale investigation at Ain-Shams university confirmed these results [23].

Consistent with prior studies, we found that hepatitis B and hepatitis C are the most frequent viral infections in people with renal impairment [24]. More than 75% of hepatitis C virus seropositive HD patients had positive PCR results, making oral direct acting antiviral drug combinations an appropriate therapeutic option [18].

Due to a compromised immune response, blood transfusions, and use of HD equipment, patients with ESKD have a higher risk than the general population of contracting hepatitis B virus and hepatitis virus infections [25].

Our results indicated that Arteriovenous fistulas were used for vascular access in 77.3% of cases, whereas central lines were used in 22.7% of cases. One-third of patients had inconsistent or nonexistent attendance. Patients' lengths of time on dialysis varied widely, from 6 months to 20 years.

Eighty-eight percent of HD patients use Arteriovenous fistulas as vascular access during their RRT sessions, which is similar with the predominance of employing Arteriovenous fistulas as the normal vascular access for hemodialysis in industrialised nations [26]. A recent research done in Behira governorate found that AVF for HD was used by 94.9 percent of patients, leading to a decrease in central line-associated problems such infection, haemorrhage, and sepsis [21].

According to our findings, the average Beck Depression Inventory score was 28.17, with a range of 7. Of those who indicated depression, 51.8% said they were just mildly depressed, 28.2% were moderately depressed, and 20% were severely depressed.

Wilson et al., who examined doctors, nurses, and patients in HD units, observed that 24.2% of HD patients were diagnosed with depression using beck's score; the actual rate of depression was much higher (27). According to Atayolu et alstudy, .'s 56.8 percent of HD patients in their group had depression [28].

It has been established in many studies that between 25 and 50 percent of CKD patients on dialysis suffer from mild to severe depression. In their research, Smith et al. found that 47% of CKD sufferers also had depression [29].

Wuerth et al. found that 49% of CKD patients also had depression, therefore our results are consistent with theirs [30]. According to research conducted at Jakarta's Cipto Mangunkusumo Hospital, 31.1% of CKD patients on hemodialysis in Indonesia suffer from depression [31].

Patients with CKD who are depressed have a worse prognosis due to the negative effects of depression on medication adherence, dialysis attendance, quality of life, and death [2, 7].

The proportion of severe depression, however, was comparable to that reported by Hedayati et al., who found that 21% of 272 HD patients had severe depression [32].

Many studies had described the relationship between depression and poor compliance to HD

sessions prior to the current study; these studies also emphasised the role of social support and psychological support for patients with ESRD to improve their survival, compliance to sessions, access to health care, psychosocial and nutritional status, immune function, and levels of depression [33-35].

We believe that the low compliance of patients with severe depression was caused by their overall poor health and the presence of co-occurring medical conditions. Patients may also have been unable to afford private health care due to limited access and high out-of-pocket costs associated with private HD facilities.

According to our findings, there was a significant correlation between the Beck's total score and creatinine level (r= 0.277, p= 0.004). There was a significant correlation between calcium levels and Beck's scores (r= -0.34, p0.0001). Beck's score was adversely connected with haemoglobin level (r= -0.353, p0.0001).

We also found a statistically significant difference between depression severity and laboratory findings, with severe depression correlated to higher creatinine levels (p = 0.013), lower calcium levels (p = 0.0001, lower haemoglobin levels (p = 0.001), and higher parathormone levels (p = 0.0001) in our analysis.

Studies demonstrated that reduced haemoglobin levels were identified among the elderly and postpartum mothers with depression and anxiety disorders [36, 37].

For every 100 pg/dL rise in PTH levels, the likelihood of depression increased by 6.3%, according to the results of a research, and individuals with depression had higher PTH levels (431 vs. 282 pg/dL) and lower blood albumin levels (3.67 vs. 3.83 g/dL) (38).

Parathyroid hormone (PTH) concentration has also been shown to correlate with BDI scores, as has been documented for ESRD patients needing parathyroidectomy [39]. In two separate trials, researchers found that individuals experiencing depression had significantly higher PTH levels (mean PTH, 217 vs. 75 pg/dL) [40].

Although the average ages of the patients were 55 and 49.1 years old. Interestingly, PTH levels in CKD patients are higher with age than in a younger group with similar estimated glomerular filtration rates (41), although in HD patients, the relationship between age and PTH levels is inverse. No one knows whether treating hyperparathyroidism helps ESRD patients' depression [42].

None of the aforementioned studies found a link between ESRD patients' calcium, haemoglobin, or creatinine levels and the frequency with which they experienced depression while receiving standard HD treatment [38-42].

While we did detect a relationship between calcium and depression severity in HD patients, Kamel et al. found no such link between calcium and either haemoglobin or creatinine. [43].

Additionally, Molnar et al. found no correlation between depressive episode frequency and serum calcium, haemoglobin, or creatinine levels [44].

We think the present study's limited sample size compared to previous studies in the literature that included >500 HD patients explains the discrepancy in results.

Creatinine may strongly predict severe depression using a cutoff value of 9 mg/dl, as shown in the present research, which used a sensitivity analysis to evaluate predictors for severe depression and its cutoff points. A p-value of 0.036 indicates a 77.3 percent sensitivity, 50.6 percent specificity, and no significant bias. Using 8 mg/dl as a threshold, calcium may strongly predict clinical depression. With a p-value of 0.001, 77.2 percent sensitivity, and 49.1 percent specificity. With a threshold of 9 g/dl, haemoglobin may reliably predict clinically serious depression. Sixty-seven point three percent sensitivity, sixty-three point five percent specificity, and a p value of 0.001. Using a threshold of 248 ng/dl, parathormone may strongly predict clinical depression. With a p-value of 0.001, 90.9 percent sensitivity, and 72.7 percent specificity.

This is the first study to our knowledge to use a sensitivity analysis to predict severe depression in ESRD patients; nevertheless, further research is required to determine the best diagnostic or prognostic cutoff point, since this population may benefit from specialised care and referral to a psychiatrist.

Minimum scores were recorded in the social, economic, and ego function dimensions of quality of life, however all dimensions were significantly reduced among research participants (0 score). In this study, we showed that a total QOL score of 83 points or below is a strong predictor of clinical depression. A p-value of 0.001 indicates 82.1% sensitivity and 84.3 % specificity.

Patient data were acquired from a public hospital in a middle-low income nation; as a result, these individuals were disproportionately influenced by the study's focus on the social component and chronic diseases, which in turn explains our results.

In addition to the fact that depression is one of the key indicators of poor quality of life and the need for early therapy to prevent additional difficulties leading to suicide attempts, the relationship between qol and depression is extremely complicated [45, 46].

Creatinine was shown to have a negative correlation with life satisfaction (r=-0.258, p=0.08) in the present investigation. Life satisfaction was favourably connected to both calcium and haemoglobin levels (r=0.243, r=0.358, p=0.012, p=0.0001, respectively). There is a correlation between normal calcium levels, haemoglobin levels, and parathormone levels and an improvement in quality of life in comorbid patients, particularly the elderly, consistent with these results [47-49].

Consistent with the findings of Santos et al., we discovered that low haemoglobin levels were related to a worse quality of life [46].

Another research found that higher Hgb levels were linked to better scores across the board on the SF-36's four physical domains, the energy/vitality domain, the physical composite score, and the kidney disease subscale [50].

Previous research has shown that the physical aspects of quality of life in ESRD suffer the most, and that mineral metabolism indicators like calcium and parathormone levels, as well as inflammatory markers, are poor predictors of QOL [51].

Parathormone concentrations between 150 and 300 pg/ml, serum calcium concentrations below 2.10 mmol/L, and serum phosphorus concentrations over 1.78 mmol/L were associated with the greatest quality of life in HD patients, according to another research [52].

The small sample size, absence of randomization of commonly seen HD patients in our dialysis unit, and the exclusion of individuals without ESRD all work against the broad applicability of our findings to the CKD population as a whole.

5. Conclusion

Calcium, haemoglobin, creatinine, and parathormone levels were all related with severity of depression and quality of life; we determined that depression was common among Egyptian HD patients, with 20% suffering from severe depression. Severe depression may be predicted in ESRD patients receiving regular HD based on their calcium, haemoglobin, creatinine, and parathormone levels.

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