Universal Journal of Public Health 13(2): 329-335, 2025
DOI: 10.13189/ujph.2025.130205 http://www.hrpub.org

Prevalence of Major Depressive Symptoms among Iraqi Chronic Renal Failure Patients Undergoing Regular Hemodialysis: A Cross-Sectional Study

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Received October 17, 2024; Revised January 26, 2025; Accepted February 19, 2025

Cite This Paper in the Following Citation Styles

(a): *[1] Ghazwan Alhashem , "Prevalence of Major Depressive Symptoms among Iraqi Chronic Renal Failure Patients Undergoing Regular Hemodialysis: A Cross-Sectional Study," Universal Journal of Public Health, Vol. 13, No. 2, pp. 329 - 335, 2025. DOI: 10.13189/ujph.2025.130205.*

(b): *Ghazwan Alhashem (2025). Prevalence of Major Depressive Symptoms among Iraqi Chronic Renal Failure Patients Undergoing Regular Hemodialysis: A Cross-Sectional Study. Universal Journal of Public Health, 13(2), 329 - 335. DOI: 10.13189/ujph.2025.130205.*

Abstract End-stage renal disease patients undergoing routine hemodialysis procedures are at high risk of mental health deterioration including depression. The objective of the current study is to assess the prevalence of depressive symptoms among Iraqi hemodialysis patient and their association with sociodemographic factors. A cross-sectional multi-center study was conducted at 5 major hemodialysis centers in Iraq from July to December 2023. PHQ-8 scale was applied to assess depression among study participants using a cut-off score of 10 to determine the presence of depression. Chi-squared and logistic regressions were performed to investigate the association between the presence of depression and other sociodemographic data. A total of 341 chronic renal failure patients undergoing hemodialysis were included. The sample comprised 211 (61.9%) males and 130 (38.1%) females, with age groups represented as follows: 244 (71.6%) adults and 97 (28.4%) elderly. Hemodialysis frequency included 157 (46.0%) once a week, 97 (28.4%) twice a week, and 87 (25.5%) thrice a week. Work problems due to hemodialysis were reported by 122 (35.8%) participants, while financial issues, side effects, and negative hepatitis tests were prevalent among the majority 269 (78.9%), 302 (88.6%), and 286 (83.9%) respectively. Different age groups experience adverse effects and negative hepatitis showed a significant association with the presence of depression (> 10 PHQ-8 score) in both chi-square and binary logistic regression tests ($p < 0.05$). The prevalence of depression among hemodialysis patients is higher than the global average. Elderly patients and coexistence of side effects showed a higher depression level, while, interestingly, depression seems lower in hepatitis-positive patients in the current study sample. Iraqi hemodialysis patients would benefit from mental health support, and further experimental studies are needed to comprehend the multifactorial causes of depression for such patients.

Keywords Hemodialysis, ESRD, Depression, PHQ-8, Iraq

1. Introduction

Hemodialysis (HD) is a common method for renal replacement therapy in individuals with end- stage renal disease (ESRD) [1]. In fact, regular HD procedures and routines can make ESRD patients highly vulnerable to mental health issues risk including depression [2]. Major depressive symptoms have been reported to be the most common mental health illness in patients with ESRD [3,4]. Long-term HD adversely affects ESRD patients including both psychosocial and physical impacts which ultimately can lead to deterioration i n the quality of life [5]. On the other hand, the presence of depression may

negatively impact HD clinical outcomes because of poorer adherence to HD prescriptions, fluid restrictions, and other coexisting disease treatments [6]. Moreover, the presence of depression can lead to an increase in the hospitalization risk in ESRD patients and mortality [7,8]. Several studies have been performed worldwide to assess mental health issues among HD patients.

However, different studies showed inconsistency in the prevalence rate according to the screening tool that was applied [5,9]. A review reported that the depression prevalence is 13.1–76.3% and higher in dialysis compared to transplant patients [8]. A meta-analysis study estimated that 39% of HD patients suffered from depressive symptoms when any screening tool was applied while only 23% for interview-based assessment [10]. In Iraq, a study found a varying degree of depression among HD patients [11]. However, another study reported that 80% of Iraqi HD patients suffered from depression [12].

The current evidence about the prevalence of depression among Iraqi patients with ESRD is scarce with only a few studies pointing out psychiatric issues with such a condition. Therefore, filling this research gap is important. This study aims to investigate the prevalence of depressive symptoms among Iraqi patients with end-stage renal disease undergoing regular hemodialysis. We also investigated the association between depression and each of the sociodemographic factors, the presence of adverse effects that any patient has suffered from hemodialysis procedures, and pre- existing hepatitis.

2. Method

A cross-sectional study was conducted between July and December 2023 at 5 major Iraqi hospitals in Karbala Province (Al_Imam Al_hussain Medical City, Imam Al-Hassan Al-Mujtaba Teaching Hospital), Babil province (Murjan Teaching Hospital, and Imam Alsadiq hospital) and Alsamawa province (Al-Hussain teaching hospital) which serves most of hemodialysis in the middle Euphrates area in Iraq. Inclusion criteria were chronic renal failure patients undergoing regular dialysis who were Iraqi citizens and native Arabic speakers. However, exclusion criteria included a history of diagnosed depression, current diagnosed depression, or the use of antidepressant medications. A total of 351 participants who had voluntarily completed a written form of the sociodemographic, PHQ-8 questionnaire were included in the current study analysis. The protocol of the study was approved by the research ethics committee at AlSafwa University College under decision number A/197 issued on June 18, 2023. All participants answered yes to a written informed consent before being included in the study.

2.1. Measures

2.1.1. Sample Size

The G*power 3.1 software was used to compute the sample size by applying the following:

X^2 Goodness-of-fit tests: contingency tables, effect size 0.3, Power 0.8, and a significant level 0.05, and the formula indicated a minimum sample size of 181 participants. The current study recruited more participants (341) to account for possible missing data.

2.1.2. Demographic Data

Demographic data were collected from the patients through interviews, including gender, age (<65 adults and ≥ 65 elderly), education, economic status, occupation, renal failure, distance from dialysis center, number of outpatient/inpatient visits per week, time since initiation of dialysis (months), work problems or absence due to caregiving (yes, no), having financial problems due to caregiving(yes/No), and having any side effects (yes/No).

2.1.3. PHQ-8

Measuring depressive symptoms was done using The Patient Health Questionnaire (PHQ-8). The PHQ-8 contains eight questions and follows the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DMS-V). The response of participants depended on a Likert item ranging scale (0, 1, 2, 3) for choice not at all, several days, more than half days, and nearly every day respectively. The total score of the Likert items ranges from 0 to 24 where the range scores applied are 0-4, 5-9, 10-14, 15-19 and 20-24 for normal, mild, moderate, moderately severe and severe depressive symptoms respectively. After the total scores of PHQ-8 were calculated, the presence of depression was determined using 10 as a cut-off score according to Kroenke et al. measure [13].

2.2. Statistical Analysis

All analyses were performed using statistical packages of social science version 26 (IBM, NY, USA). Sociodemographic data were presented as absolute frequency and percentages. Chi-Squared test was performed to assess the association between sociodemographic factors and the presence of depression. Logistic regression was applied for any variables associated with the presence of depression $p < 0.05$.

3. Results

3.1. Sociodemographic Data

The initial total sample size was 351 participants. However, 10 individuals were excluded (7 participants suffered from acute renal failure while 3 participants were non-Iraq citizens). Therefore, the total number of chronic renal failure patients undergoing regular hemodialysis recruited in this study was 341. All participants answer yes

to written informed consent. The sample consisted of 211 (61.9%) males and 130 (38.1%) females. The number of participants for each age group was 244 (71.6%) adults (<65 years) and 97 (28.4%) elderly (≥ 65 years). A total of 157 (46.0%) have one hemodialysis session per week while 97 (28.4%) and 87 (25.5%) have two and three hemodialysis sessions per week respectively. The work problems due to regular hemodialysis directly affected 122 (35.8%) of the participants. Moreover, the majority of respondents have a financial issue 269 (78.9%), suffer from side effects 302 (88.6%), and negative test for any form of hepatitis 286 (83.9%) as presented in table 1.

3.2. Depressive Symptoms Scores

3.2.1. Presence of Depression with Sociodemographic Factors

The presence of depression assessed using PHQ-8 score of 10 as a cut-off showed that the majority of participants 261 (77.2%) manifested depressive symptoms. There was a significant association with age groups, patients suffering from side effects, and negative hepatitis status. However, gender, education, occupation, number of visits per week, time since starting dialysis, work related problems, and having financial problems showed no significant association with the presence of depression as shown in table 2.

Table 1. Sociodemographic characteristics among the study sample

Variables	Category	N (%)
Gender	Female	130 (38.1%)
	Male	211 (61.9%)
Age groups	Adult	244 (71.6%)
	Elderly	97 (28.4%)
Education	Illiterate	136 (39.9%)
	Primary	89 (26.1%)
	Secondary	57 (16.7%)
	University	59 (17.3%)
Occupation	Employed	75 (22.0%)
	Unemployed	266 (78.0%)
Number of visits per week	One	157 (46.0%)
	Two	97 (28.4%)
	Three	87 (25.5%)
Time since starting dialysis	< 6 months	60 (17.5%)
	> 30 months	126 (37.1%)
	7-30 months	155 (45.4%)
Work problem/absence	Yes	122 (35.8%)
	No	219 (64.2%)
Having financial problems	Yes	269 (78.9%)
	No	72 (21.1%)
Having any side effects	Yes	302 (88.6%)
	No	39 (11.4%)
Hepatitis	Yes	55 (16.1%)
	No	286 (83.9%)

Table 2. Association between the presence of major depressive symptoms and sociodemographic data

Variable	Category	PHQ-8 Score N (%)				*P* value
		> 10		≤ 10		
Gender						
	Female	104	(80%)	26	(20%)	0.292
	Male	157	(74.4%)	54	(25.6%)	
Age groups						
	Adults	176	(71.1%)	68	(28.4%)	0.002
	Elderly	85	(87.6%)	12	(12.4%)	
Education						
	Illiterate	108	(79.4%)	28	(20.6%)	0.373
	Primary	64	(71.9%)	25	(28.1%)	
	Secondary	41	(71.9%)	16	(28.1%)	
	University	48	(81.4%)	11	(18.6%)	
Occupation						
	Employed	58	(77.3%)	17	(22.7%)	0.494
	Unemployed	203	(76.3%)	63	(23.7%)	
Number of outpatient/inpatient visits per week						
	One	120	(76.4%)	37	(23.6%)	0.717
	Two	72	(74.2%)	25	(25.8%)	
	Three	69	(79.3%)	18	(20.7%)	
Time since start						
	< 6 months	42	(70%)	18	(30%)	0.369
	7-30 months	119	(76.8%)	36	(23.2%)	
	> 30 months	100	(79.4%)	26	(20.6%)	
Work problems or absence due to caregiving						
	Yes	98	(80.3%)	24	(19.7%)	0.233
	No	163	(74.4%)	56	(25.6%)	
Having financial problems due to caregiving						
	Yes	206	(76.6%)	63	(23.4%)	0.542
	No	55	(76.4%)	17	(23.6%)	
Having any side effects						
	Yes	239	(79.1%)	63	(20.9%)	0.004
	No	22	(56.4%)	17	(43.6%)	
Hepatitis						
	Yes	33	(60%)	22	(40%)	0.003
	No	228	(79.7%)	58	(20.3%)	
Total		261	(77.2%)	80	(22.8%)	

Table 3. Binary logistic regression between depression and the independent variables

Variable	Category	B	S.E.	Wald	P value	Odd ratio (95% C.I.)
Age groups	Adults	Ref.				
	Elderly	1.137	0.354	10.295	0.001	3.117 (1.556-6.243)
Side effects	No	Ref.				
	Yes	1.403	0.381	13.557	0.000	4.069 (1.928-8.589)
Hepatitis	No	Ref.				
	Yes	-1.115	0.341	10.719	0.001	0.328 (0.168-0.639)

The binary logistic regression model was designed using the depression PHQ-8 score cutoff of 10 as a dependent variable while the age groups, presence of side effects and hepatitis as independent variables as summarized in table 3.

4. Discussion

The current study has investigated the prevalence and predictors of depression among Iraqi ESRD patients, and it has shown that 77.2% of the total sample had depressive symptoms. The prevalence of depression was parallel with previous studies. A study [12] showed that 80% of Iraqi ESRD patients experienced depressive symptoms, even though they applied a different scale (Beck's Depression Inventory), one different province (Baghdad), and a lower sample size (n=75). However, a meta-analysis that examined 65 studies with 10235 participants showed that 40% of HD patients suffered from depression [14]. Another meta-analysis claimed that the prevalence range of depression among HD patients was 5% to 58% [15]. In our study, HD patients reported a higher prevalence of depression level close to 50% or more than previously reported literature in many countries.

The peak of depression prevalence occurs throughout the age range of the twenties and thirties while another peak could take place in the fifties and sixties of life [16]. The current study results elucidate that elderly HD patients are more likely to have depressive symptoms in comparison to young patients. To our knowledge, there was no previous study that has specifically elucidated the differences in the presence of depressive symptoms among hemodialysis patients across different age groups. Moreover, meta-analysis [1] and Cochrane Review [6] showed that most studies that recruited the mean age are almost 40 years old and older.

Hemodialysis along with end stage renal disease is associated with numerous side effects from medications, complications or both which have detrimental effects on patient mental health and quality of life [5,17–19]. The current study showed that the respondents who suffer from side effects are more likely to have depressive symptoms. Although the current study was not focused on specific side effects, the potential causes of depression in hemodialysis patients may include the side effects associated with the chronic nature of the ESRD, comorbidities, physical symptoms, lifestyle restrictions, and the psychosocial impact of managing a rigorous treatment regimen [6,20–25]. So, it is challenging to suggest a singular potential cause of depression despite the observed association between reported adverse effects and depressive symptoms.

The hepatitis B virus (HBV) and hepatitis C (HCV) showed a higher prevalence in HD in general [26,27]. Moreover, the estimated prevalence of depression among HCV patients was higher by a range of 1.5-4 times than the general population [28]. Conversely, our study showed an inverse association between hepatitis (B and C) with depressive symptoms in comparison to HD patients without hepatitis. These findings contrast with a study conducted by Goodkin et al [29] which reported a higher risk of depression among HD patients with hepatitis C using the depression scale of the Center for Epidemiologic Studies (*CES-D*) and the sample HD patients with hepatitis C only. Several factors that may potentially contribute to different depression rates were unexplored in the current study, including small number of hepatitis-positive participants 55 (16.1%), hepatitis types (B or C) that were not reported separately, the stage of hepatic disease in such patients, hepatitis treatment received, and the presence of other comorbidities, as well as other distress factors associated with hemodialysis and ESRD which may impact the depressive symptoms prevalence.

There are several limitations of the current study that should be considered. It is a cross-sectional study thus no causal relationships could be concluded. Although the data had been collected from 4 major hospitals, they are restricted to only specific provinces. Focusing on specific regions could be a challenge to generalize the findings to the broader Iraqi HD patients and other provinces may have higher or lower rates of depression. Moreover, while PHQ-8 is a reliable and widely used practice [30,31], being a self-reported measure may lead to social desirability bias or recall bias due to subjective responses without real clinical interviews. Some sociodemographic data was general such as side effects that could be suffered from hemodialysis procedures or medication usage and hepatitis types were not reported.

5. Conclusions

The higher prevalence of depression among Iraqi HD patients reported in the current study exceeds the rate outlined in the previous studies in several different countries and communities. The coexisting side effects and being elderly HD patients seem to cause higher deterioration in mental health. Interestingly, depression shows lower levels in hepatitis-positive HD patients. These findings highlight the need for interventions addressing the management of side effects in HD patients and age-specific mental health support. Moreover, further studies including experimental studies need to determine the potential causes of depression in HD patients with complex interplay factors included.

Abbreviations

HD, hemodialysis; ESRD, end-stage renal disease; PHQ-8, Patient Health Questionnaire-8; Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DMS-V); HBV, hepatitis B virus; HCV, hepatitis C; *CES-D*, Center for Epidemiologic Studies.

Ethical statement

The protocol of the study was approved by the research ethics committee at AlSafwa University College under decision number A/197 issued on June 18, 2023. All participants answered yes to a written informed consent before being included in the study.

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