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Prevalence of Depression and Associated Factors Among Patients at the Dialysis Center of Al-Thawra General Hospital in Ibb Governorate, Yemen: A Cross-Sectional Study

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Abstract

Background

Depression is a prevalent psychiatric comorbidity among patients undergoing haemodialysis (HD), significantly impairing quality of life and increasing morbidity and mortality.

Objective

This study aimed to determine the prevalence of depression and its associated factors among patients at the dialysis centre of Al-Thawra General Hospital in Ibb Governorate, Yemen.

Methods

This cross-sectional study was conducted between August 2025 and March 2026 and included 264 patients recruited from the Dialysis Centre at Al-Thawra General Hospital in Ibb Governorate via convenience sampling. Depression was assessed using the nine-item Patient Health Questionnaire (PHQ-9), and data were analysed using SPSS version 27.0.

Results

The overall prevalence of depression (PHQ-9 score ≥ 10) was 59.1%. Severity distribution revealed moderate depression in 40.9%, mild in 22.7%, and moderately severe in 13.3%. Significant associations were observed with female sex ($P < 0.001$), marital status ($P = 0.001$), education ($P < 0.001$), employment status ($P < 0.001$), smoking status ($P < 0.001$), family history of renal failure ($P < 0.001$), hypertension ($P = 0.020$), and diabetes mellitus ($P = 0.001$). Logistic regression identified female sex (aOR = 0.416), uneducated status (aOR = 7.526), secondary education (aOR = 5.979), and family history of renal failure (aOR = 2.560) as significant predictors.

Conclusion

These findings underscore the necessity of routine psychological screening and the integration of psychiatric personnel into haemodialysis care to enable early detection and intervention, thereby optimising patient outcomes and quality of life.

Introduction

End-stage renal disease (ESRD) represents a significant global health challenge that imposes a profound physical and psychological burden on affected individuals. Hemodialysis (HD) is a life-sustaining

treatment that is rigorous and demanding, requiring strict adherence to a lifelong schedule. The chronic nature of the illness and the physical and social burdens of treatment significantly increase patients' susceptibility to mental health disorders, with depression being the most common psychological comorbidity [1–3].

Untreated depression in HD patients is a critical clinical issue with severe consequences. Studies have consistently demonstrated its association with reduced quality of life, poor treatment adherence, increased hospitalisations, and higher rates of morbidity and mortality [4–6]. The prevalence of depression in this population varies widely across regions, reflecting diverse cultural and socioeconomic influences. For instance, rates range from 22.5% in Brazil [4] to over 70% in Palestine [7] and China [5]. High rates have been consistently reported in the Middle East, including 55% in Egypt [8], 43.6% in Saudi Arabia [9], and a striking 63% in Hodeida, Yemen [1]. These figures highlight the urgency of localized research to understand the specific dynamics of different populations.

A wide array of sociodemographic and clinical factors contributes to depression in HD patients. Female sex is a consistent and strong predictor, with females often having a significantly higher prevalence of depression than males [1, 10]. This disparity may be linked to different coping mechanisms and social burdens [11–12]. Socioeconomic factors, such as unemployment and lack of medical insurance, are also strongly associated with depression, leading to financial strain and loss of self-worth [1, 8]. Furthermore, lower educational attainment is linked to higher depression scores, which may reflect challenges in managing complex chronic illnesses [9, 13].

From a clinical perspective, the presence of comorbidities, such as hypertension and diabetes mellitus, is a significant predictor of depression [14–15]. While some studies suggest that a longer duration of dialysis is associated with increased depression [8, 13], others have found no significant association [16–17]. The type of vascular access, such as the use of a catheter, has also been identified as a contributing factor to depression due to lifestyle limitations [18–19].

Despite the growing body of research, there is a significant lack of data from resource-limited and conflict-affected regions, particularly in Yemen. The ongoing conflict has created unique and severe challenges, with psychosocial stressors, including economic hardship and limited healthcare access, exacerbating mental health issues [1]. Yemen is grappling with a profound humanitarian crisis that has severely affected its healthcare system and left its population vulnerable to health issues. Patients with ESRD who rely on lifelong hemodialysis endure an immense dual burden: the physical and emotional toll of their illness combined with the psychological distress arising from sociopolitical instability, financial hardship, and a fragile healthcare infrastructure. Access to consistent treatment, essential medical supplies, and specialized psychological support is often limited or inconsistent [1]. Given the elevated depression prevalence documented by **Alkubati** et al. [1] in Hodeida, Yemen, juxtaposed with the paucity of empirical evidence from Ibb, the present study sought to ascertain the prevalence and associated factors of depression among hemodialysis patients at Al-Thawra General Hospital in the Ibb Governorate.

Methods

Study Design and Setting

This cross-sectional study was conducted among HD patients at the Dialysis Centre in Ibb Governorate, Yemen, from August 2025 to March 2026. The centre serves as the primary dialysis facility for Ibb Governorate and its surrounding rural districts.

Study Population and Eligibility Criteria

The target population comprised all patients with end-stage renal disease (ESRD) receiving haemodialysis in Ibb Governorate and its surrounding rural districts, totaling 528 individuals. Eligible participants were those aged > 10 years who had been on maintenance haemodialysis for more than three months and provided informed consent. Patients with malignancies, dementia, or diagnosed psychiatric disorders other than depression were excluded from the study.

Sample Size and Sampling Technique

In the absence of prior prevalence data specific to Ibb, the sample size was determined by recruiting 50% of the target population (n = 264), a pragmatic methodological approach consistent with previous Yemeni haemodialysis research [1]. Participants were selected via convenience sampling, whereby all eligible patients attending the centre during the study period were invited to participate. This non-probability sampling technique is widely employed in haemodialysis research, particularly in cross-sectional studies examining depression and psychological outcomes among this population [20–22]. The approach was justified by the practical constraints of conducting research in a resource-limited, conflict-affected setting, where establishing a comprehensive sampling frame and implementing random selection procedures present significant logistical challenges. Furthermore, convenience sampling ensures the inclusion of all patients willing to participate, thereby maximising recruitment and enhancing the feasibility of the study within the available timeframe and resources [23]. Ultimately, 264 patients met the eligibility criteria and consented to enrollment.

Data Collection Tool

Depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9), a widely validated 9-item self-report instrument [1, 24]. Originally derived from the Primary Care Evaluation of Mental Disorders Patient Questionnaire (PRIME-MD PQ), the PHQ-9 ranks among the most frequently employed clinical tools for depression screening in primary care settings [25]. Its items correspond directly to the diagnostic criteria for major depressive disorder outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), thereby rendering it a comprehensive and

psychometrically robust screening measure [1, 24]. The instrument is brief, patient-friendly, and straightforward to administer, score, and interpret.

Respondents were asked to indicate the frequency with which they had been bothered by each of the nine problems over the preceding two weeks. Responses were scored on a 4-point Likert scale ranging from 0 to 3 (0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day), yielding a total score between 0 and 27, with higher scores reflecting greater depressive severity. Symptom severity was categorized as follows: none (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27) [26–27]. For the purposes of this study, a cutoff score of ≥ 10 was employed to identify cases of moderate to severe depression, as this threshold provides an optimal balance between sensitivity and specificity [24, 28].

Tool Reliability and Validity

The Arabic translation of the PHQ-9 has demonstrated satisfactory validity and reliability in haemodialysis patients in Saudi Arabia [25] and among outpatients in Lebanon (Cronbach's α = 0.88) [24]. Sociodemographic and clinical data—including sex, age, educational level, marital status, smoking habits, chronic illness history, family history of renal failure and psychological disorders, and HD-related information—were collected using a pre-designed structured questionnaire. All data were obtained through face-to-face interviews conducted by the researcher immediately following HD sessions, a timing deliberately chosen to minimise the confounding influence of uraemic symptoms, which are least pronounced at this point. This methodological consideration is particularly critical given that numerous depression symptoms—such as anorexia, insomnia, and fatigue—overlap substantially with uraemic manifestations [1, 29].

A pilot study was undertaken with 30 patients to evaluate the feasibility of the study design, the readability of the items, and the overall reliability of the questionnaire. The pilot results indicated that the instrument was easily comprehensible, required approximately 10–15 minutes to complete, and exhibited satisfactory internal consistency, with a Cronbach's alpha coefficient of 0.81.

Data Analysis

Data were analysed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were used to present participants' characteristics and responses. The chi-square test or Fisher's exact test was used to assess associations between categorical variables. All significant factors ($P < 0.20$) in bivariate analysis were further analysed using multivariate binary logistic regression to identify independent predictors of depression. Odds ratios with 95% confidence intervals quantified the strength of associations. Statistical significance was set at $P < 0.05$. Marital status was excluded from the final multivariable model due to complete separation [30], which yields infinite maximum likelihood estimates and precludes reliable parameter inference.

Results

Characteristics of the Study Participants

The study included 264 participants, predominantly male (60.6%, n = 160), with the largest age group being 31–50 years (53.0%, n = 140). Educational attainment was strikingly low, with over one-third being uneducated (35.6%, n = 94), while unemployment (88.3%, n = 233) and lack of medical insurance (93.6%, n = 247) were highly prevalent. Hypertension was the most common comorbidity (85.6%, n = 226), followed by diabetes mellitus (31.8%, n = 84), and the majority had been undergoing haemodialysis for 1–5 years (87.1%, n = 230). Family history of renal failure was reported by only 19.7% (n = 52), and psychological disorders by 6.8% (n = 18). In Table 1.

Table 1
Characteristics of Hemodialysis Patients (n = 264)

Variable	Category	Frequency	Percent
Gender	Male	160	60.6
	Female	104	39.4
Age	< 31 years	49	18.6
	31–50 years	140	53.0
	≥ 51 years	75	28.4
Education Status	Uneducated	94	35.6
	Primary	72	27.3
	Secondary	68	25.8
	Diploma	10	3.8
	Bachelor's	20	7.6
Marital Status	Married	207	78.4
	Single	49	18.6
	Divorced	8	3.0
Medical Insurance	Yes	17	6.4
	No	247	93.6
Smoking	Yes	72	27.3
	No	192	72.7
Living Status	Alone	11	4.2
	With Family	253	95.8
Employment	Employed	31	11.7
	Unemployed	233	88.3
Family History of Renal Failure	Yes	52	19.7
	No	212	80.3
Family History of Psychological Disorders	Yes	18	6.8
	No	246	93.2
Hypertension	Yes	226	85.6
	No	38	14.4

Variable	Category	Frequency	Percent
Diabetes Mellitus	Yes	84	31.8
	No	180	68.2
Angina	Yes	11	4.2
	No	253	95.8
Cerebrovascular accident	Yes	9	3.4
	No	255	96.6
Duration of Dialysis	1–5 years	230	87.1
	6–10 years	8	3.0
	11–16 years	26	9.8

Prevalence and Severity of Depression among Hemodialysis Patients

Overall, depression (PHQ-9 score ≥ 10) was observed in 59.1% (n = 156) of the haemodialysis patients, whereas 40.9% (n = 108) scored below the threshold for depression (Fig. 1). Stratification of depressive severity revealed that moderate depression was the most prevalent category, affecting 40.9% (n = 108), followed by mild depression (22.7%, n = 60), moderately severe depression (13.3%, n = 35), and severe depression (4.9%, n = 13), while 18.2% (n = 48) exhibited no depressive symptoms (Fig. 2).

Factors Associated with Depression

Statistically significant associations were observed for sex, marital status, education, employment, smoking, family history of renal failure, hypertension, and diabetes mellitus ($P < 0.05$ for each). In contrast, age, medical insurance, living status, family history of psychological disorders, angina, cerebrovascular accident, and dialysis duration were not significantly associated with depression ($P > 0.05$). Table 2 presents the detailed bivariate associations.

After adjusting for all covariates, female sex was paradoxically associated with significantly lower odds of depression (aOR = 0.416, 95% CI: 0.208–0.833, P = 0.013). Educational level demonstrated a significant overall effect ($P < 0.001$); specifically, patients with primary education (aOR = 0.124, 95% CI: 0.027–0.575, P = 0.008) and diploma education (aOR = 0.163, 95% CI: 0.036–0.736, P = 0.018) exhibited significantly lower odds of depression relative to uneducated patients. Conversely, secondary and bachelor's education levels did not retain statistical significance. Additionally, the absence of a family history of renal failure emerged as a protective factor (aOR = 0.387, 95% CI: 0.165–0.906, P = 0.029), whereas employment, smoking, hypertension, and diabetes mellitus were not independently associated with depression in the final adjusted model ($P > 0.05$ for all), as summarized in Table 3.

Table 2
Factors Associated with Depression Among HD Patients (n = 264)

Variable	Category	N	PHQ-9 Depression Score n (%264)		Chi-Square	P-value
			≥ 10	< 10		
Gender	Male	160	74 (28.0%)	86 (32.6%)	27.704	**< 0.001**
	Female	104	82 (31.1%)	22 (8.3%)		
Age	< 31Y	49	25 (9.5%)	24 (9.1%)	3.189	0.203
	31–50 Y	140	81 (30.7%)	59 (22.3%)		
	≥ 51	75	50 (18.9%)	25 (9.5%)		
Marital State	Married	207	111 (42.0%)	96 (36.4%)	13.563	**0.001**
	Single	49	37 (14.0%)	12 (4.5%)		
	Divorced	8	8 (3.0%)	0 (0.0%)		
Education	Uneducated	94	33 (12.5%)	61 (23.1%)	48.272	**< 0.001**
	Primary	72	61 (23.1%)	11 (4.2%)		
	Secondary	68	38 (14.4%)	30 (11.4%)		
	Diploma	10	7 (2.7%)	3 (1.1%)		
	Bachelor	20	17 (6.4%)	3 (1.1%)		
Employment	Employment	31	7 (2.7%)	24 (9.1%)	19.369	**< 0.001**
	Unemployment	233	149 (56.4%)	84 (31.8%)		
Medical Insurance	Yes	17	10 (3.8%)	7 (2.7%)	0.001	0.982
	No	247	146 (55.3%)	101 (38.3%)		
Smoking	Yes	72	24 (9.1%)	48 (18.2%)	27.171	**< 0.001**
	No	192	132 (50.0%)	60 (22.7%)		
Living State	Alone	11	6 (2.3%)	5 (1.9%)	0.098	0.754
	With family	253	150 (56.8%)	103 (39.0%)		
Family history of renal failure	Yes	52	14 (5.3%)	38 (14.4%)	27.719	**< 0.001**

	No	212	142 (53.8%)	70 (26.5%)		
Family history of psychology	Yes	18	8 (3.0%)	10 (3.8%)	1.714	0.190
	No	246	148 (56.1%)	98 (37.1%)		
Hypertension	Yes	226	127 (48.1%)	99 (37.5%)	5.448	**0.020**
	No	38	29 (11.0%)	9 (3.4%)		
DM	Yes	84	37 (14.0%)	47 (17.8%)	11.533	**0.001**
	No	180	119 (45.1%)	61 (23.1%)		
Angina	Yes	11	9 (3.4%)	2 (0.8%)	2.453	0.117
	No	253	147 (55.7%)	106 (40.2%)		
Cerebral Vascular Accident	Yes	9	4 (1.5%)	5 (1.9%)	0.827	0.363
	No	255	152 (57.6%)	103 (39.0%)		
Duration of dialysis	1 to 5	230	135 (51.1%)	95 (36.0%)	2.663	0.264
	6 to 10	8	3 (1.1%)	5 (1.9%)		
	11 to 16	26	18 (6.8%)	8 (3.0%)		

Table 3
Factors Associated with Depression (n = 264)

Variable (Reference Category)	B	p-value	AOR	95% CI
Gender (Ref: Male)				
Female	-0.877	**0.013**	0.416	0.208–0.833
Marital Status (Ref: Married)		0.974		
Education (Ref: Uneducated)		**< 0.001**		
Primary	-2.085	**0.008**	0.124	0.027–0.575
Secondary	-0.035	0.965	0.965	0.203–4.601
Diploma	-1.817	**0.018**	0.163	0.036–0.736
Bachelor's	-0.977	0.406	0.377	0.038–3.766
Employment (Ref: Employed)				
Unemployed	-1.072	0.077	0.342	0.104–1.122
Smoking (Ref: Yes)				
No	-0.076	0.852	0.927	0.417–2.060
Family History of Renal Failure (Ref: Yes)				
No	-0.950	**0.029**	0.387	0.165–0.906
Hypertension (Ref: Yes)				
No	-0.204	0.674	0.815	0.315–2.109
Diabetes Mellitus (Ref: Yes)				
No	0.112	0.745	1.119	0.568–2.202
95% CI: 95% Confidence Intervals, **aOR**: Adjusted Odds Ratios				

Discussion

The sociodemographic and clinical characteristics of the 264 haemodialysis patients reflect a population distinctly shaped by Yemen's protracted humanitarian and economic crisis. The male predominance (60.6%) aligns with previous reports from Yemen [1], Palestine [7], and Saudi Arabia [10], though it diverges from studies in Iran and China, where gender distributions are more balanced or female-predominant [6, 14].

The age distribution, with 53.0% of patients aged 31–50 years, indicates a considerably younger haemodialysis cohort than those reported in developed nations and several regional settings, where

most patients are aged > 60 years [4, 13]. This youthful profile is concerning, as it suggests a substantial burden of premature kidney failure, likely attributable to unmanaged chronic conditions and deficient preventive healthcare infrastructure [31].

Economically, the overwhelming unemployment rate (88.3%) and near-complete absence of medical insurance (93.6%) constitute a socioeconomic landscape that is markedly more severe than in neighbouring Gulf states, where stronger welfare systems mitigate such vulnerabilities [9, 32]. This financial precarity constitutes a well-established psychosocial stressor and a potent risk factor for depression among chronically ill populations [33–34]. Educational attainment was notably low, with 35.6% having no formal education, potentially limiting health literacy and adaptive coping capacities [28]. The low prevalence of familial renal failure (19.7%) suggests that acquired, rather than hereditary, factors are the predominant drivers of ESRD in this cohort. Hypertension (85.6%) and diabetes mellitus (31.8%) were the leading comorbidities, consistent with global ESRD aetiology, although the hypertension rate exceeds that reported in Palestine (74.2%) [7], while the diabetes prevalence remains comparable to other regional estimates [10]. The low frequencies of angina (4.2%) and cerebrovascular accidents (3.4%) may be attributable to the relatively young age of the sample. Additionally, 87.1% of patients had been on dialysis for 1–5 years, reflecting either the escalating incidence of ESRD in Yemen or limitations in long-term survival data [31].

The overall prevalence of depression (PHQ-9 ≥ 10) was 59.1%, representing a major yet frequently underrecognised comorbidity. This figure substantially exceeds the global pooled estimate of 27% reported by Palmer et al. [34], underscoring the unique psychosocial toxicity of the Yemeni context.

This elevated prevalence is consistent with findings from other crisis-affected and resource-limited settings, including earlier Yemeni reports from Hodeida between 55.7% and 61.5% [1, 31]. The cross-national consistency across Yemen highlights a national mental health emergency, driven by cumulative conflict, economic collapse, and a fractured healthcare system. Within the Middle East, our estimate is markedly higher than those from more stable Gulf nations, such as Saudi Arabia (36.5–48.1%) [9–10, 32] and Qatar (39.2%) [35]. Conversely, it aligns with rates from other settings with substantial socioeconomic strain, including Palestine (53.4%) [7], Jordan (48.2%) [29], Iran (52.8–54.3%) [14, 17], India (54–57.4%) [13, 19], and Egypt (52%) [15]. In contrast, lower estimates from China (37.6%) [6] may reflect cultural variations in symptom expression or differential access to psychosocial support.

The strikingly high prevalence observed here is plausibly attributable to the synergistic effects of universal financial insecurity (93.6% uninsured, 88.3% unemployed), limited health literacy, and the profound psychological toll of living with a life-sustaining yet burdensome therapy amidst national calamity. Regarding gender, the bivariate association revealed a significantly higher depression prevalence among females (78.8%) than males (46.3%) ($\chi^2 = 27.704$, $P < 0.001$), corroborating extensive regional and international literature [1, 29, 32, 34–35]. This sex disparity likely arises from a confluence of sociocultural burdens and differential coping mechanisms [12], which are particularly pronounced in the Yemeni context.

A notable and context-specific pattern emerged: depression rates were lowest among uneducated patients (35.1%) and substantially higher among those with primary (84.7%) and bachelor's (85.0%) education ($\chi^2 = 48.272$, $P < 0.001$). This paradoxical inverse gradient aligns precisely with the findings of Alkubati et al. [1] in Yemen, suggesting that in an economically devastated environment, educational attainment does not confer the expected psychological resilience but rather precipitates frustration and unmet aspirations when employment opportunities remain inaccessible.

Unemployment was strongly associated with depression ($\chi^2 = 19.369$, $P < 0.001$), consistent with the pervasive financial and social role deprivation theory [7, 36]. Marital status also showed significance ($\chi^2 = 13.563$, $P = 0.001$), with divorced (100%) and single (75.5%) patients exhibiting higher rates than married individuals (53.6%), reinforcing the role of social support [9, 37]. Intriguingly, patients lacking a family history of renal failure had significantly higher depression (67.0%) than those with a positive history (26.9%) ($\chi^2 = 27.719$, $P < 0.001$), implying that unexpected diagnoses confer greater psychological shock and poor preparedness.

Non-smokers demonstrated a higher depression prevalence (68.8%) than smokers (33.3%) ($\chi^2 = 27.171$, $P < 0.001$), a counterintuitive finding that may suggest smoking serves as a maladaptive coping strategy among some patients or that healthier patients are more likely to abstain [8]. Similarly, the absence of hypertension (76.3% vs. 56.2%) and diabetes (66.1% vs. 44.0%) was paradoxically associated with higher depression in bivariate analyses. This finding may reflect that patients diagnosed with these comorbidities earlier in their disease trajectory have had longer periods of psychological adjustment, whereas those with sudden ESRD onset without antecedent chronic disease experience greater distress.

Non-significant associations for age ($\chi^2 = 3.189$, $P = 0.203$), living status ($\chi^2 = 0.098$, $P = 0.754$), and dialysis duration ($\chi^2 = 2.663$, $P = 0.264$) indicate that the depressive burden of ESRD is pervasive across all age groups and that the initial diagnosis and treatment initiation may be more psychologically impactful than the length of time on dialysis [16].

After adjusting for all covariates, female sex was paradoxically associated with significantly lower odds of depression (aOR = 0.416, 95% CI: 0.208–0.833, $P = 0.013$). This represents a critical observation: while females had higher crude rates, the adjusted analysis reveals that the bivariate association is entirely confounded by socioeconomic factors (notably education, employment, and marital status) included in the model. This finding suggests that sex is not an independent risk factor per se; rather, the intersecting social disadvantages disproportionately borne by women fully account for their higher unadjusted prevalence. This nuanced interpretation reframes the literature, emphasizing the primacy of structural determinants over biological sex in this context.

Consistent with the bivariate paradox but now adjusted for confounders, patients with primary (aOR = 0.124, $P = 0.008$) and diploma (aOR = 0.163, $P = 0.018$) education had significantly lower adjusted odds of depression relative to the uneducated reference group. This indicates that, after controlling for other variables, being uneducated emerges as a genuine independent risk factor. The previously observed higher crude prevalence among educated groups was driven by their confounding associations (e.g.,

with sex or financial strain). Once these are accounted for, the protective effect of even basic literacy and numeracy becomes evident, aligning with the broader literature [13, 33].

Absence of a family history was associated with lower adjusted odds of depression (aOR = 0.387, 95% CI: 0.165–0.906, *P* = 0.029), meaning a positive family history is protective. This supports the hypothesis that prior familial exposure to the disease trajectory facilitates psychological preparedness, normalizes the illness experience, and mobilizes family-based coping resources, thereby buffering the psychological impact of diagnosis.

Unemployment, smoking, hypertension, and diabetes mellitus did not retain statistical significance in the final adjusted model. This indicates that their apparent bivariate effects are largely explained by confounding with sex and education. In a sample where unemployment and comorbidities are nearly universal, the psychological burden of ESRD itself may overshadow their additional impacts, diverging from studies where comorbidity burden is a key predictor [4].

Strengths and Limitations

This study provides essential baseline data on depression among Yemeni haemodialysis patients, with strengths including a validated screening tool, adequate sample size, and multivariable analysis. Limitations comprise the cross-sectional design, convenience sampling, single-centre setting, screening-based assessment, and missing data on comorbidities, treatment adherence, and socioeconomic factors.

Conclusion

This study confirms a high depression prevalence among haemodialysis patients in Yemen, with female sex, lower education, and absence of family renal failure history as independent predictors. Routine PHQ-9 screening and mental health professional integration into dialysis care are recommended to enable early intervention. Health literacy programmes, family support, and socioeconomic policy measures are essential adjuncts. Future multicentre prospective studies are needed to validate findings and evaluate intervention effectiveness in this resource-limited setting.

Abbreviations

95% CI
95% Confidence Intervals
aOR
Adjusted Odds Ratios
HD
Haemodialysis
PHQ-9
Nine-Item Patient Health Questionnaire

PRIME-MD PQ
Primary Care Evaluation of Mental Disorders Patient Questionnaire
ESRD
End-stage renal disease
SD
Standard Deviations
P value
Probability value
χ^2
Chi-Square Test

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the principles of the Declaration of **Helsinki** .Ethical approval was obtained from the Institutional Review Board (**IRB**) of the Faculty of Medicine and Health Sciences, Ibb University, on 15 May 2025 (Ref. No. 2025/EC/OBG/0025). All participants received information regarding the study objectives. Verbal informed consent was obtained from all participants before completing the questionnaire. All patients were informed that they could withdraw from the research at any time without consequences.

Clinical trial number

Not applicable.

Consent for publication

Not applicable.

Competing Interests

Not applicable

Conflict of interest

The authors declare that they have no competing interests.

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Author Contribution

Shomais A and Almohamady A conceived the study; Alhelali M, Ali Z, and Al-Falahi G collected the data; Alshargi B, Almanssob W, and Almohamady processed the data; Shomais A, Alshargi B, and Al-Shehari W analyzed and interpreted the data. Al-Falahi G, Almanssob W,B Ahmed, M AborasAnd Alhelali M wrote the first draft manuscript. Shomais A, Al-Shehari W, and Edrees W reviewed and edited the final manuscript. All authors revised and approved the manuscript for submission.

Data Availability

The datasets used and analyzed during this analysis are available from the corresponding author, who will provide any relevant data upon reasonable request.

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Figures

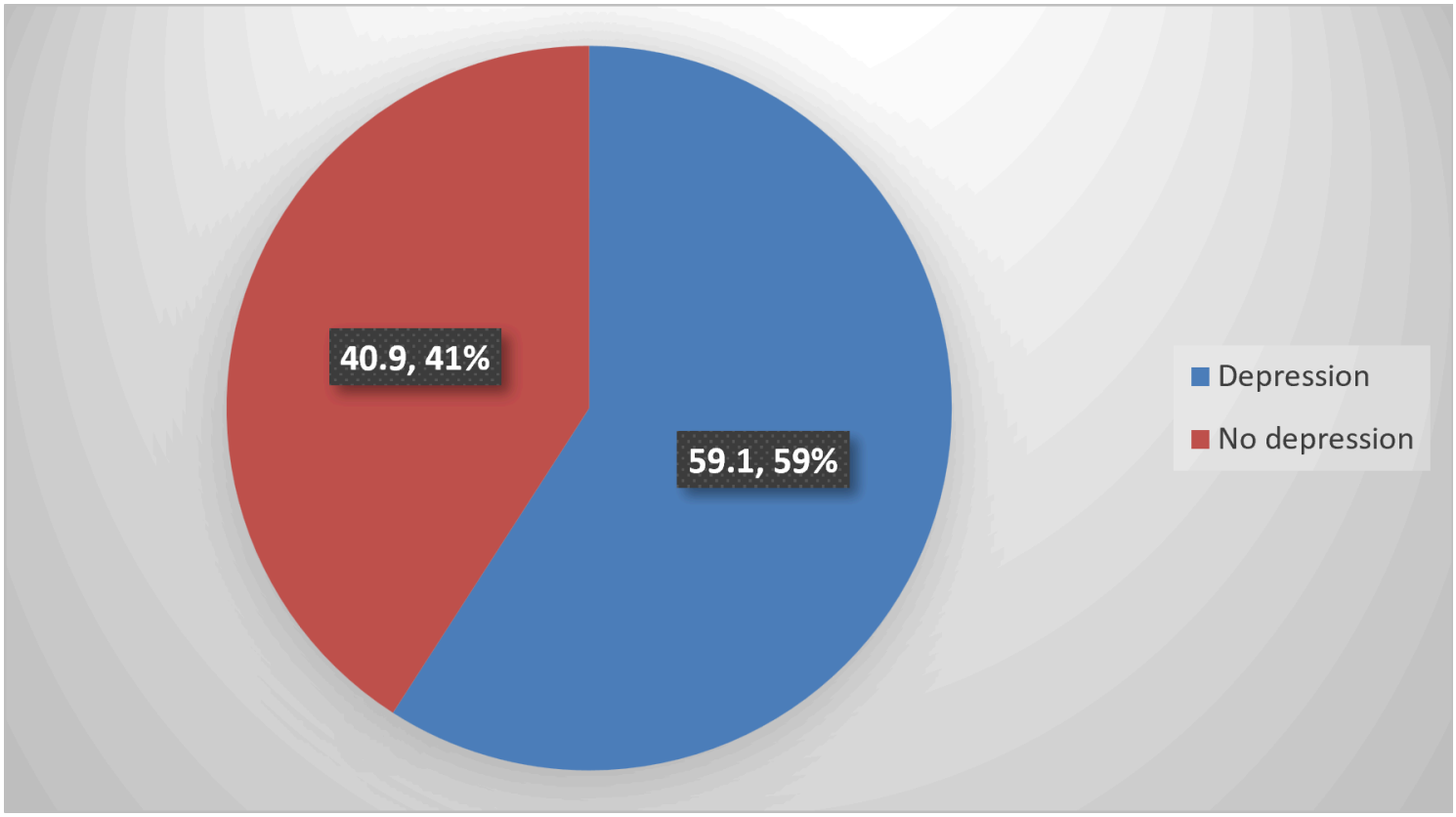


Figure 1

Prevalence of depression among haemodialysis patients

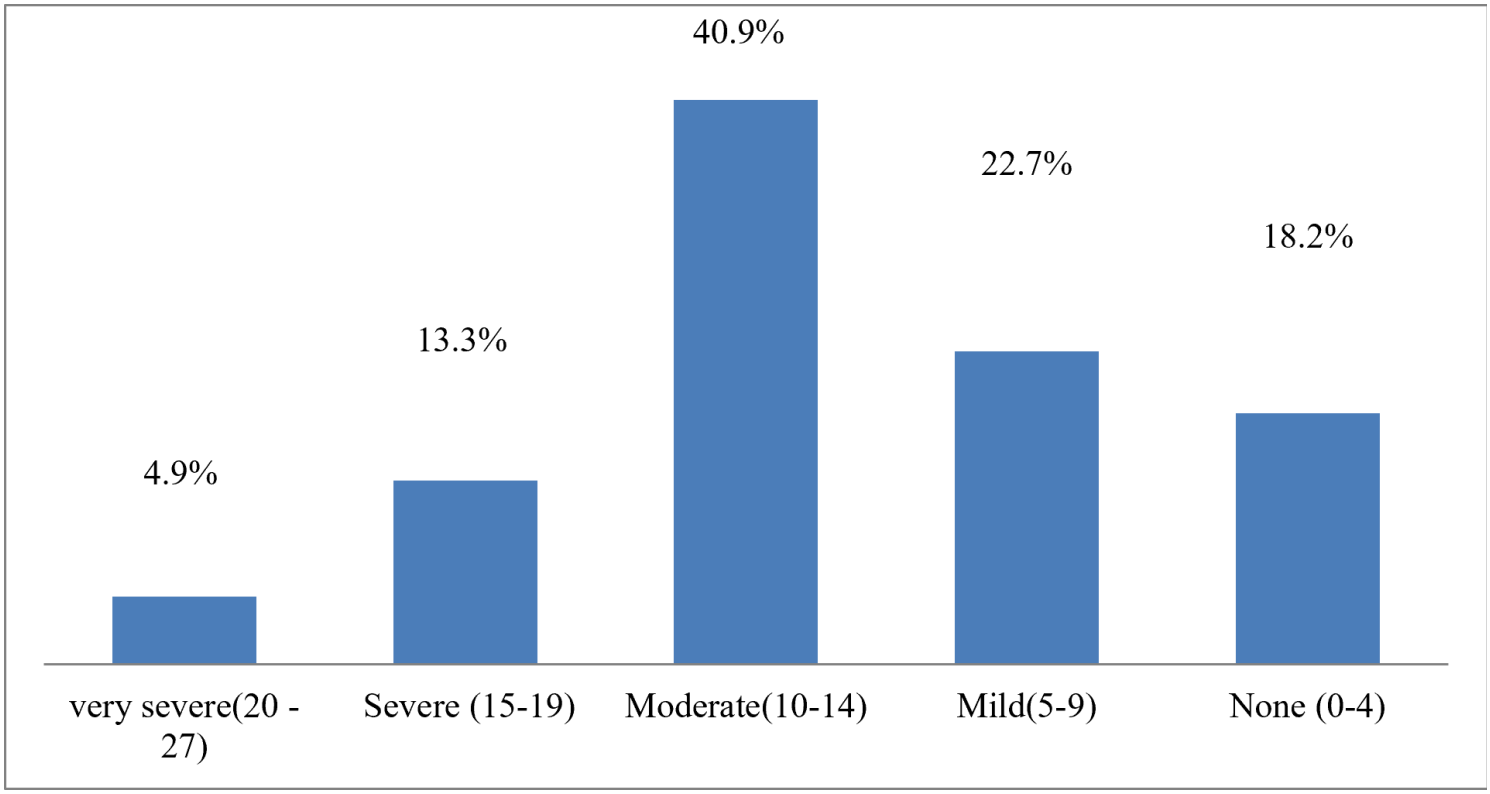


Figure 2

Severity distribution of depressive symptoms among participants based on PHQ-9 scores.