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CLINICAL STUDY

The prevalence of anxiety and depression among end-stage renal disease patients on hemodialysis in Saudi Arabia

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Abstract

Depression commonly overlaps with uremic symptoms, but anxiety is less commonly studied among renal patients. The symptoms of medical illness, along with the psychological and social stresses that often accompany a debilitating chronic disease, are thought to produce deleterious psychological consequences. We sought to determine the prevalence and predictors of anxiety and depression among Saudi dialysis patients in Makkah. A cross-sectional study of anxiety and depression among end-stage renal disease (ESRD) patients in Makkah was conducted in November 2011. The Hospital Anxiety and Depression Scale (HADS) was used to screen for anxiety and depression. Participants' demographic data, possible stressors and past psychiatric history were obtained. All participants were Saudi ESRD patients on maintenance hemodialysis. According to HADS, 57 (21.1%) patients were probable cases of anxiety and 63 (23.3%) were probable cases of depression. Only 32 (11.3%) were diagnosed with depression or anxiety before ESRD onset. Age was a significant predictor of anxiety and depression diagnoses. Major family problems ($p=0.001$) were also a significant predictor of anxiety. Anxiety and depressive symptoms are prevalent among ESRD patients in Makkah, and anxiety can be predicted by family factors. Early detection, management and family support might improve clinical outcomes.

Keywords

Anxiety, depression, end-stage renal disease, hemodialysis, Saudi Arabia

History

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Introduction

Despite the growing worldwide concern regarding quality of life (QOL) and mental well-being among chronically ill patients, little research has investigated these issues in Saudi Arabia.^{1–7} Patients suffering from chronic kidney disease have poor QOL and mental well-being, often suffering from anxiety and depression.^{8–10} It has been reported that depression is the most common psychiatric abnormality among end-stage renal disease (ESRD) patients.^{11–13} In terms of frequency, it is second to hypertension as a comorbid diagnosis among ESRD patients.¹⁴ WHO estimates that, during the early twenty-first century, depression will become the second most common debilitating illness worldwide. It is estimated that depression currently affects more than 350 million people.¹⁵

ESRD is defined as kidney failure severe enough to require maintenance dialysis or kidney transplantation to maintain health or life.¹⁶ There are two maintenance dialysis options

for ESRD: home-based dialysis [home hemodialysis (HD) and peritoneal dialysis (PD)] and hospital-based/in-center HD.¹⁷

Because uremic and depressive symptoms overlap considerably, it is difficult to define depression in ESRD.^{11,13,18} However, clinical depression is defined as a medical condition associated with significant subjective suffering, impairment of social and occupational functioning and lower health-related QOL.¹⁹ Depression in ESRD patients is associated with increased mortality.²⁰ Patients with renal disease are challenged by many stressors, including loss of biochemical and physiologic kidney functions, development of digestive and neurologic disorders, bone disease, anemia, inability to function in the family and maintain one's occupation, decreased mobility, decreased physical and cognitive competence and loss of sexual function. Symptoms of medical illness as well as social and psychological responses to a chronic, debilitating illness might cause or exacerbate depression.^{21,22}

Approximately, 40 million American adults suffer from anxiety disorders.²³ It has been reported that the average anxiety rate among ESRD patients is 38%.²⁴ Anxiety is commonly observed among HD patients.²⁵ However, despite the growing concern regarding depression in this population, screening for anxiety has received little attention.^{10,25}

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In Saudi Arabia, the incidence and prevalence of dialysis patients increased 10–15 times between 1983 and 2005.⁷ Currently, there are over 10,000 patients on HD in Saudi Arabia.⁵ The estimated cost burden of dialysis is over SAR 700 million,⁶ yet there remains a lack of research in this area.⁵

The goal of this study was to screen for prevalence of depression and anxiety among Saudi dialysis patients in Makkah. Furthermore, we investigated the effects of socio-demographic characteristics on the prevalence of depression and anxiety. We proposed that anxiety and depression are prevalent among Saudi dialysis ESRD patients in Makkah.

Subjects and methods

Design and study setting

A questionnaire-based cross-sectional study was conducted in November 2011 to screen for depression and anxiety among ESRD patients on HD in Makkah. Makkah, the capital of Makkah Province in Saudi Arabia, has a population of 2 million.²⁶ Al Noor Specialist Hospital and King Abdulaziz Hospital have the two largest governmental HD centers in Makkah and its environs. Combined, the two centers serve approximately 750 of 950 total ESRD patients in Makkah. They have a nearly equal number of beds for men and women. The main propose of the centers is to provide HD and other health-related services, such as laboratory investigations, dietician advisement, and so forth. They also have separate areas for PD.

Participants

Participants were 286 Saudi patients with ESRD. The purpose and study protocols were explained to participants, after which participants gave verbal informed consent. To be eligible for this study, participants had to be Saudi citizens over 18 years of age who were diagnosed with ESRD and currently on HD treatment. Participants also had to be clinically stable, ambulant, able to understand and answer the questionnaires, able to participate voluntarily and on HD for at least six months. Major visual or hearing impairments and emergency dialysis patients were excluded.

Procedure

Patients were scheduled to come for dialysis on alternating days (e.g., patient A comes on Saturday, Monday and Wednesday, while patient B comes on Sunday, Tuesday and Thursday). On Fridays, the centers only accept emergency cases. There is a morning, afternoon and night shift on each day. Each HD session takes approximately four hours. A convenience sample was obtained by attending three shifts on two consecutive days. Thus, we attended a total of six shifts. All attending patients were interviewed face-to-face by the research team, which included medical students and the authors. All researchers received practical training on using the Hospital Anxiety and Depression Scale (HADS)²⁷ to maintain consistency in questionnaire administration.

Measures

The survey consisted of two parts. The first was designed based on two experts' opinions and decisions made by the authors during a focused group discussion. It includes

demographic characteristics, possible anxiety and depression stressors and past psychiatric history. The second part was the HADS. Two psychiatry experts were consulted during all phases of constructing the questionnaire. The original HADS is used as a self-assessment scale, which has been developed and found to be a reliable instrument for detecting depression and anxiety in ambulatory patient care settings. The HADS is one of the most popular self-report tools for measuring depressive and anxiety symptoms. It consists of 14 items, with seven depression-related items and seven anxiety-related items. Higher scores on each section reflect higher levels of depression or anxiety, respectively. The 14 items are answered on a four-point scale, where 0 represents the absence of the problem and three represents an extreme problem.²⁷ The mean Cronbach's alpha for the HADS anxiety and depression subscales are 0.83 and 0.82, respectively.²⁸ The sensitivity and specificity for both HADS-A and HADS-D—approximately 0.80—were very similar to those achieved by the General Health Questionnaire.²⁸ The questionnaire was professionally translated into Arabic. We then ran a pilot study on eight colleagues, who generally agreed with the Arabic translation, except for a few words, which were subsequently corrected. The Arabic version was then sent to a second professional translator, who back-translated the questionnaire to English to check consistency. The back-translated version was nearly identical to the English original.

Outcomes assessment

We used HADS scores to determine cutoff points for depression and anxiety cases. For each subscale, participants were grouped as normal (0–7 of 21), borderline abnormal (8–10) or abnormal (11–21). This grouping procedure was in line with the original procedure used by Zigmond and Snaith.²⁷

Sample size estimation

Based on previous studies,^{2,8–10,12,13,15,16,18,20,25–41} we assumed the existence of a 20% difference in the prevalence of depression between the general population and ESRD patients on HD. In order to obtain a confidence level (power) of 95% and a confidence limit of 10%, we aimed to study 246 patients (calculated using the QuesGen Systems sample size calculator). Based on the rate of patient flow in the two centers studied, we decided to work for two consecutive days in order to approach 300 patients, as we expected approximately 15% refusal and incomplete data, combined.

Statistical analysis

Statistical analysis was performed using IBM SPSS, version 20.0 (Armonk, NY). Descriptive statistics, including frequencies and percentages for all categorical data, were calculated. Cases with missing data were excluded from the regression procedure using the list wise exclusion procedure. Logistic regression procedures were conducted to determine the variables that predicted the likelihood of having anxiety and depression.

Ethical considerations

The protocol was reviewed and approved by the Committee of Bio-Medical Ethics of the Faculty of Medicine at Umm

Table 1. Distribution of frequency of demographic variables.

	Variables	Frequency (%)
Gender	Male	146 (58.2)
	Female	118 (41.8)
Age	<20 years	10 (3.5)
	20–40 years	78 (27.7)
	>40 years	194 (68.8)
Marital status	Single	47 (16.5)
	Married	212 (74.4)
	Divorced or separated	8 (2.8)
	Widower	18 (6.3)
Number of children	1–5	83 (29.2)
	Less than 5	132 (46.5)
	No children	69 (24.3)
Duration of renal failure	<1 year	30 (10.6)
	1–5 years	125 (44)
	>5 years	129 (45.4)
Work status	Yes	46 (16.3)
	No	160 (56.5)
	Retired	77 (27.7)
Financial problems	Yes	91 (32.2)
	No	192 (67.1)
Place of residence	City	234 (83.9)
	Village	45 (16.1)
Major family problems	Yes	62 (22)
	No	220 (78)
Family support	Yes	222 (79.6)
	No	57 (20.4)
Educational level	Unenlightened	94 (33.2)
	Secondary school or less	157 (54.4)
	Parchment	35 (12.4)
Anxiety or depression before renal failure	Yes	32 (11.3)
	No	251 (88.7)
Visited psychiatric clinic	Yes	24 (8.5)
	No	159 (91.5)
Takes anxiety or depression medication	Yes	20 (7)
	No	264 (93)
Takes other psychiatric medication	Yes	4 (1.4)
	No	277 (98.6)
Has chronic illness	Yes	181 (64)
	No	102 (36)

Al-Qura University in Makkah, Saudi Arabia. The protocol was approved by the two medical centers. Voluntary informed verbal consent was obtained at the time of patient enrolment. The verbal consent procedure was approved by the faculty ethics committee. All data were confidential, as no names or ID numbers were obtained.

Results

Among 286 patients, 58.2% of the participants were men. Of three age groups, the majority of participants were over 40 years of age (Table 1). Only 32 (11.3%) participants were diagnosed with depression or anxiety before the ESRD onset, and 20 (7%) were currently taking depression or anxiety medications (Table 1). Fifty-seven (21.1%) participants scored above the cutoff for probable depression, and 63 (23.3%) scored above the cutoff for probable anxiety (Table 2).

Two participants did not respond to any of the items and were excluded from all analyses. Fourteen other participants did not have recorded anxiety or depression scores. These patients did not differ significantly from patients with anxiety and depression scores in terms of age, gender, marital status,

Table 2. Breakdown of HADS scores for both anxiety and depression subscales (%).

	Normal	Borderline abnormal	Abnormal
Anxiety	60.4	18.5	21.1
Depression	55.2	21.5	23.3

Table 3. Distribution of anxiety scores in accordance to demographic variables.

		Anxiety score		
		Normal	Border line	Abnormal
Age	Variables			
	Less than 20 years	9	1	0
	20–40 years	54	9	12
Marital status	Above 40 years	99	39	44
	Single	34	6	7
	Married	116	43	41
	Divorced or Separated	4	0	3
Work status	Widower	9	1	6
	Yes	27	10	6
	No	94	21	38
	Retired	42	18	12
Financial problems	Yes	47	15	25
	No	116	34	31
Major family problems	Yes	26	16	20
	No	135	34	37
Family support	Yes	131	43	37
	No	28	6	20
Anxiety or depression before ESRD	Yes	13	6	13
	No	150	44	43
Duration of renal failure	Less than 1 year	16	5	8
	1–5 years	65	21	28
	More than five years	82	24	21

work status, presence or absence of financial and family problems, presence or absence of family support, occurrence of anxiety or depression before ESRD or duration of renal failure.

Anxiety scores of demographic variables were listed in Table 3. The logistic regression findings in Table 4 reveal that age significantly predicted the likelihood of being diagnosed with anxiety (OR = 1.87, 95% CI: 1.00–3.51). Patients older than 40 years were more likely to be diagnosed with anxiety than were patients younger than 40 years. In addition, patients with family problems were more likely to be diagnosed with anxiety than were patients without family problems (OR = 2.29, 95% CI: 1.21–4.35).

Depression scores for demographic variables are listed in Table 5. The findings in Table 6 indicate that only age significantly predicted the odds of being diagnosed with depression, OR = 1.92, 95% CI: 1.06–3.50. Patients older than 40 years were more likely to be diagnosed with depression than patients younger than 40.

Discussion

This study sought to determine the prevalence and predictors of anxiety and depression among ESRD patients on maintenance HD. To our knowledge, this is the first study in Saudi Arabia to use HADS to screen HD patients. Age was a

Table 4. Logistic regression results for the anxiety model ($n = 253$).

Variable	OR	95% CI		Wald	df
		Lower	Upper		
Men versus women	1.51	0.85	2.67	2.01*	1
≤40 years versus >40 years	1.87	1	3.51	3.85**	1
Not married versus married	1.28	0.66	2.47	0.52	1
Not working versus working	1.2	0.54	2.66	0.21	1
No problems versus financial problems	1.45	0.82	2.58	1.64	1
No problems versus family problems	2.29	1.21	4.35	6.44	1
No support versus family support	1.18	0.6	2.32	0.24	1
No prior versus prior anxiety/depression	1.68	0.72	3.95	1.44	1
≤5 years renal versus >5 years renal	0.71	0.41	1.23	1.5	1

Notes: CI = confidence interval.

Reference group is the first in each pair. Overall model: $\chi^2(9) = 22.55$ * $p = 0.050$, ** $p = 0.011$.

Table 5. Distribution of depression scores in accordance to demographic variables.

Variables		Depression score		
		Normal %	Border line %	Abnormal %
Gender	Male	84	40	29
	Female	62	18	34
Age	Less than 20 years	7	1	2
	20–40 years	50	17	8
	Above 40 years	90	39	53
Marital status	Single	31	8	5
	Married	108	47	45
	Divorced or separated	3	0	5
	Widower	7	3	8
Number of children	1–5	43	16	20
	More than five	59	33	33
	None	46	9	10
Work status	Yes	27	9	6
	No	90	28	35
	Retired	32	21	21
Financial problems	Yes	44	20	19
	No	104	38	43
Major family problems	Yes	22	10	24
	No	126	48	39
Family support	Yes	123	46	44
	No	24	9	19
Anxiety or depression before ESRD	Yes	13	4	13
	No	136	54	49
Duration of renal failure	Less than one year	16	6	8
	1–5 years	58	32	27
	More than five years	75	20	28

significant predictor of both anxiety and depression, such that older patients were more likely to be diagnosed with both anxiety and depression. Furthermore, patients with family problems were more likely to be diagnosed with anxiety.

There is a lack of reliable data on direct comparisons between HD patients and the general population in the

Table 6. Logistic regression results for the depression model ($n = 255$).

Variable	OR	95% CI		Wald	df
		Lower	Upper		
Men vs. women	1.04	0.61	1.8	0.02*	1
≤40 years versus >40 years	1.92	1.06	3.5	4.6	1
Not married versus married	0.85	0.45	1.58	0.27	1
Not working versus working	0.78	0.36	1.71	0.38	1
No problems versus financial problems	1.03	0.59	1.81	0.01	1
No problems versus family problems	1.7	0.88	3.27	2.53	1
No support versus family support	1.46	0.76	2.81	1.26	1
No prior versus prior anxiety/depression	1.5	0.64	3.53	0.88	1
≤5 years versus >5 years renal	0.7	0.41	1.18	1.83	1

Notes: CI = confidence interval.

Reference group is the first in each pair. Overall model: $\chi^2(9) = 14.82$.* $p = 0.032$.

prevalence of depression.²⁵ However, there is agreement that the prevalence of depression in HD patients is higher than in the general population.²⁵ The prevalence of depression in our data was lower than in other studies, which have reported depression prevalence among ESRD patients ranging from 25.3% to 60.5%²⁵ with different scales used across different populations. We think the difference is due to cultural background and/or social barriers as many patients consider it unacceptable socially to visit a psychiatric clinic. Furthermore, this wide range in prevalences is likely attributable to two reasons, as reported by Bornivelli et al. First, depressive symptoms overlap with uremia symptoms. Second, different methods are used in different studies.¹⁸ In summary, depression is under-recognized in daily practice in HD patients, perhaps because ESRD healthcare providers routinely work with patients who are in a depressed mood due to the nature of their illness. Regular screening should be implemented to identify hidden cases and determine appropriate interventions.¹⁰

The prevalence of anxiety (23.3%) reported in this study was greater than WHO reports (15%) for the general population. It was also higher than the National Co-morbidity Survey (18%).²⁵ A recent study in Singapore administered HADS at community-based dialysis centers and found that depression and anxiety prevalences among HD patients were 28% and 32%, respectively.¹⁰ These findings are consistent with this study, which found that the prevalence of anxiety is higher than depression in HD patients. Different types of anxiety disorders have rarely been studied in HD patients. Wang et al. found prevalence rates to be 26.5% for phobias and 26.6% for panic disorder.²⁵ Investigating different types of anxiety, as well as risk factors, might help in developing interventions. Future studies should also investigate appropriate screening tools for anxiety, as some studies have questioned the effectiveness of HADS in screening for anxiety disorders.¹⁰

Two studies have found that age is associated with depression.^{8,23} Theofilou et al. showed that older patients (>45 years) reported a significantly higher prevalence of

depression,⁸ which is consistent with our results. Older patients also tend to show a higher rate of anxiety among ESRD patients.²³

Depression and anxiety have a noticeable impact on patients' QOL. For instance, the number of comorbid medical conditions is highly correlated with anxiety,²³ which in turn affects QOL. Studies have suggested that anxiety markedly decreases QOL by increasing the burden of ESRD and HD, facilitating poor social interaction and hindering emotional well-being.²³ On the other hand, one study found that divorced and widowed women reported that higher levels of depression most strongly affect patients' QOL.²² It was assumed in this study that major family problems are potential stressors that could indirectly affect QOL through anxiety and depression. Interestingly, in this study, major family problems were a significant predictor of anxiety, but not depression. This issue was discussed in another study, but this study demonstrated the positive effects of a supportive family environment, finding that social and family support was one of the most important factors for improving patients' QOL.⁴¹

In conclusion, anxiety and depressive symptoms are prevalent among ESRD patients in Makkah. To the best of our knowledge, this is the first study to screen HD patients for anxiety and depression in Saudi Arabia. Age was a significant predictor of both anxiety and depression, indicating that care directed toward anxiety and depression should be particularly emphasized in older patients. Although we expected that major family problems would be a significant predictor of anxiety and depression, such an effect was only found for anxiety. Perhaps conducting more focused studies on major family problems among Saudi HD patients will help to clarify these effects. Furthermore, we recommend that research continue to investigate common problems, and improving QOL, in this population. In the context of the study findings, it is important to consider conducting systematic psychiatric consultations. Early detection through an understanding of the predictors and symptoms of anxiety and depression, as well as appropriate cognitive and pharmacological treatment modalities, will potentially improve the QOL of HD patients in Saudi Arabia.

Limitations

These findings can only be applied with the following limitations taken into consideration. First, this study had a convenient sample size which may affect the accuracy of the results. Second, HADS is useful for screening, but it is not a clinical diagnostic tool. Furthermore, many studies have questioned its ability to screen for anxiety. Participants in this study were recruited from public dialysis centers, and although these are the largest dialysis centers in Makkah and represent the majority of HD patients, the results might not be generalizable to patients receiving treatment at private healthcare facilities, patients at charity dialysis centers or high-risk patients who require HD in tertiary centers. Due to the cross-sectional nature of this study, causal and temporal relationships between anxiety and depression in ESRD cannot be confirmed. Finally, as this study was conducted in Al Hajj season—the time of year at which the Islamic pilgrimage to Makkah occurs—several patients had transportation difficulties, and some even missed their HD sessions.

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Declaration of interest

This study was conducted with no financial support or third-party involvement and thus does not present any conflict of interest or any possible bias resulting from such associations.

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