

# Depression and Anxiety in Urban Hemodialysis Patients

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Depression is well established as a prevalent mental health problem for people with ESRD and is associated with morbidity and mortality. However, depression in this population remains difficult to assess and is undertreated. Current estimates suggest a 20 to 30% prevalence of depression that meets diagnostic criteria in this population. The extent of other psychopathology in patients with ESRD is largely unknown. The aim of this study was to expand the research on psychiatric complications of ESRD and examine the prevalence of a broad range of psychopathology in an urban hemodialysis center and their impact on quality of life. With the use of a clinician-administered semistructured interview in this randomly selected sample of 70 predominately black patients, >70% were found to have a psychiatric diagnosis. Twenty-nine percent had a current depressive disorder: 20% had major depression, and 9% had a diagnosis of dysthymia or depression not otherwise specified. Twenty-seven percent had a current major anxiety disorder. A current substance abuse diagnosis was found in 19%, and 10% had a psychotic disorder. The mean Beck Depression Inventory score was  $12.1 \pm 9.8$ . Only 13% reported being in current treatment by a mental health provider, and only 5% reported being prescribed psychiatric medication by their physician. A total of 7.1% had compound depression or depression coexistent with another psychiatric disorder. The construct of depression was also disentangled from the somatic effects of poor medical health by demonstrating a unique relationship between depressive affect and depression diagnosis, independent of health status. This study also suggests the utility of cognitive variables as a meaningful way of understanding the differences between patients who have ESRD with clinical depression or other diagnoses and those who have no psychiatric comorbidity. The findings of both concurrent and isolated anxiety suggest that the prevalence of psychopathology in patients with ESRD might be higher than previously expected, and the disorders may need to be treated independently. In addition, the data suggest that cognitive behavioral therapeutic techniques may be especially advantageous in this population of patients who are treated with many medications.

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Previous studies established depression as the primary mental health problem of patients with ESRD (1-8). There are recent estimates of a 20 to 30% incidence of depressive disorders in hemodialysis populations (3,6-8). Depression is second only to hypertension in frequency as a comorbid diagnosis in patients with ESRD (9), yet it is understudied (4) and seldom identified or treated adequately in hemodialysis patients (5,7,8). Furthermore, depression has been associated with impaired recovery and increased mortality in many diseases (10,11) and specifically in ESRD (12,13). In addition, we and others have shown that depression is associated with diminished perception of quality of life (14,15).

Despite this high rate of depression and the established complications of depression, there is little research on clinical interventions in this problem in patients with chronic kidney disease (16,17). One possible explanation for the lack of

intervention trials is that there is still significant confusion regarding how to recognize and define "depression" in the ESRD population (1,4). There is strong overlap between uremic and depressive symptoms, and it can be difficult to identify psychiatric illness against the backdrop of the medical illness (1-4). For example, negative affect as a result of depression can be difficult to distinguish from the known uremic symptoms of irritability, cognitive dysfunction, and encephalopathy or from drug effects or inadequate dialysis. In addition, comorbid depression, or depression that coexists with another psychiatric or medical illness, may render depression relatively refractory to treatment (1-3,6,18,21). Although recent work has emphasized the place of pharmacotherapy for depression, nondrug therapies have also shown to have a place in its treatment (22-24). Kimmel *et al.* (6) showed that anxiety disorders were prevalent in the Medicare ESRD population, but no study to our knowledge has surveyed patients with ESRD for the presence of multiple psychiatric disorders.

A possible way to differentiate between a psychiatric illness such as depression and medical illness involves delineating differences in thinking styles. Cognitive theory posits that people have cognitive conceptualizations of themselves and the world around them (25). When these core conceptualizations,

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or schemas, are maladaptive, psychopathology is created. Exploring a patient's cognitive schema could be an important tool in differentiating between the unhealthy schema that is associated with depression that stems from a maladaptive view of the world and the psychologically healthy schema of somatic depression that stems from medical illness, such as uremia. Specifically, for there to be meaning in the difference between people who score higher on measures of depressive affect or even a *Diagnostic and Statistical Manual of Mental Disorders* (DSM) diagnosis of depression and those with lower levels of depressive affect, there needs to be a difference in the quality and/or quantity of dysfunctional schema.

Depression may be a salient problem for black patients with ESRD (26), and barriers to therapy may render treatment less available to this population (26,27). The existence of multiple psychiatric comorbid illnesses is an important public health problem in this vulnerable population, in an entitled program with total outlays exceeding \$32.5 billion per year in the United States (5,26).

We therefore wished to study the prevalence of the broad range of comorbid psychiatric illnesses in an inner-city hemodialysis population and to assess the interaction of medical and psychiatric diagnoses in association with patients' perceptions of quality of life. We specifically wished to dissociate the symptoms of depression from those of uremia, using a novel approach based on the identification of depression-specific cognitive schema, and to differentiate between depression and anxiety.

## Materials and Methods

This study was approved by the institutional review board. Participants were randomly selected from the adult hemodialysis patients at a major urban dialysis center in central Brooklyn. All patients in each shift were assigned a number, and then a random list was developed to determine the order in which patients were approached. All selected patients were approached at the dialysis center, and informed consent was obtained. Patients were compensated \$20 for their time upon the successful completion of all measures, which took an estimated 2 to 2.5 h. With a desired  $\alpha$  of 0.05, an anticipated effect size of 0.15 (medium), and a desired power of 0.80, our estimated *a priori* sample size was 58 for the hierarchical regression and 17 patients for each of the four cells of our ANOVA. A sample size of 70 was selected to guarantee appropriate power for these analyses, and recruitment continued until 70 participants had completed the assessment. In total, 85 patients, of the possible 123 in the dialysis center, were approached with 73 agreeing to participate; 70 of these 73 completed the assessment. One of the randomly selected patients was unable to complete the informed consent because of her impaired consciousness, so she was not eligible for inclusion in the study. No data are available on the other 11 people who refused to participate. Two of the three who did not complete the assessment had been hospitalized. One stated that her husband wished that she not participate, so she withdrew. Interviews were audiotaped and then independently reviewed for diagnostic accuracy with an overall good level of agreement between raters ( $r = 0.94$ ).

### Measures

**The Structured Clinical Interview for DSM-IV.** The Structured Clinical Interview for DSM-IV (SCID) (28) is a semistructured interview for making the major Axis I DSM-IV diagnoses. Using a decision tree

approach, the SCID guides the clinician in testing diagnostic hypotheses as the interview is conducted. The output of the SCID is a record of the presence or absence of each of the disorders being considered, for current episode (past month). It has variable but acceptable reliability and validity and is accepted as the "gold standard" for deriving psychiatric diagnoses in research studies. It has been previously used in ESRD populations (8,29,30).

**Beck Depression Inventory.** The Beck Depression Inventory (BDI) (31) is a 21-item self-report instrument with high scores (range 0 to 63) reflecting the presence and the severity of depressed mood. It is a reliable and well-validated measure of depressive symptoms in both clinical and nonclinical samples (32). The BDI has been used extensively in ESRD populations (7,12,13,33,34). Kimmel's team has demonstrated its use in a black hemodialysis patient population (12,13,26). The standard cutoff for depression is a score of 10 or greater in the general population (32); however, in patients with ESRD, a score of 15 or greater has been suggested (35).

**Kidney Disease Quality of Life Short Form.** The Kidney Disease Quality of Life Short Form (KDQOL-SF) (36) assesses the quality of life of patients with kidney disease. This is accomplished with 43 disease-specific items, 36 generic (SF-36) items, and an overall health-ranking item. Items of the KDQOL-SF are arranged in these subscales: Kidney disease-specific items (symptom/problem list, effects of kidney disease, burden of kidney disease, work status, cognitive function, quality of social interaction, sexual function, sleep, social support, dialysis staff encouragement, patient satisfaction, and overall health rating), generic items (physical functioning, general health, pain, role-physical, emotional well-being, role-emotional, social function, energy/fatigue), and items regarding background information. The KDQOL has been used widely in ESRD populations (15,37,38).

**Young's Schema Questionnaire-Short Form (39).** The Young's Schema Questionnaire (YSQ) is a 75-item self-report inventory that was designed to measure 15 core beliefs or schemas organized into five domains. It is a relatively new instrument. Shah and Waller (40) published preliminary norms for a depressed group, and it has been used in depressed populations (41) as well as with people with an abuse history (42). Schmidt *et al.* (43) showed that its primary scales possess adequate test-retest reliability and internal consistency, with the majority of the proposed scales being replicated by factor analysis. The YSQ has also been found to possess convergent and discriminant validity with respect to measures of psychologic distress, self-esteem, cognitive vulnerability for depression, and personality disorder symptoms (43). A higher score reflects a more maladaptive, unhealthy core belief. The five domains with their subscales are displayed in the appendix.

### Statistical Analyses

All data were analyzed using the computer-based statistical software package SPSS (version 13.0; SPSS, Chicago, IL). Descriptive statistics were calculated for the sample population, and the group differences were compared for continuous variables with an ANOVA, using Tukey least significant difference (LSD) for *post hoc* comparisons. Pearson correlations were derived, and tests of significance were set at 0.05. Patients were divided by type of psychopathology, and their quality of life, depressive affect, and cognitive schema were compared. For the ordinal comparisons, a cross-tabs with  $\chi^2$  was used. For exploration of the effects of self-reported health status and depression on quality of life, a factorial ANOVA was undertaken, in which high and low scorers, determined by median split on the SF-36, and those with and without a depression diagnosis were compared on overall quality of life. Finally, for identification of the unique variance in depression diagnosis as a result of depressive affect once the common variance

with health status had been controlled, a hierarchical logistic regression was used. The SF-36 was entered into the model first and then BDI score to examine the unique effect of depression once the shared effects of health status were controlled.

## Results

Women composed 53% of the sample, and 50% of the people had been born in the United States (Table 1). The average age was  $53.2 \pm 15.0$  yr. Eighty-nine percent identified themselves as black or Afro-Caribbean, 3% as Hispanic, 1% as white, and 7% as other. The average amount of education was  $12.7 \pm 3.7$  yr. The sample was medically ill, averaging  $1.9 \pm 3.3$  hospitalizations within the past year. The average duration for which patients were treated with dialysis was  $61.0 \pm 63.6$  mo. Only 14% of the sample was working.

### Psychopathology

In the total sample of 70 patients with ESRD, 71.4% had a current DSM-IV Axis I diagnosis based on the SCID-I (Figure 1). Twenty-nine percent had a current depressive disorder: 20% had major depression, and 9% had a diagnosis of dysthymia or depression not otherwise specified. No patients had a diagnosis of bipolar disorder. Twenty-seven percent had a current anxiety disorder (panic with or without agoraphobia, posttraumatic stress disorder, obsessive-compulsive disorder, social phobia, or generalized anxiety disorder). A current substance abuse diagnosis was found in 19%, and 10% had a current psychotic disorder. The group had a mean BDI score of  $12.1 \pm 9.8$ . Thirteen percent of the sample reported being in current treatment by a mental health provider, and an additional 5% reported being prescribed psychiatric medication by their physician. There were no differences between SCID groups regarding employment or place of birth. In a one-way ANOVA, there were no differences in the rates of psychopathology by age, length of time treated for ESRD, years of education, or number of medical hospitalizations in the past year.

### Differences among Psychiatric Diagnostic Groups

Patients were divided into psychopathology groups on the basis of their SCID diagnoses to understand the interplay be-

Percent of sample with SCID Diagnoses

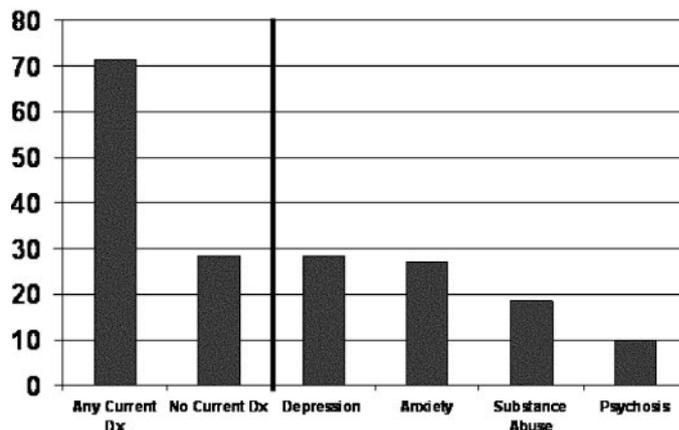


Figure 1. Psychiatric diagnostic category.

tween psychiatric diagnosis and quality of life, depressive affect, and cognitive schema. There was significant overlap (60%) between psychotic diagnoses and substance abuse diagnoses, so these diagnostic groups were combined. Of the 70 patients, only seven had diagnoses from more than one diagnostic group. Two patients had both an anxiety and a depressive disorder; two patients had an anxiety and a substance/psychotic disorder; and three patients had an anxiety, a depression, and a substance/psychotic diagnosis. These patients were excluded from this analysis. Overall, there were significant differences in an ANOVA between psychopathology diagnoses and the BDI scores ( $F_{3,59} = 14.4$ ,  $P < 0.001$ ; Table 2). The depressed group had significantly higher mean BDI scores ( $21.9 \pm 10.1$ ) than the no psychopathology group ( $6.0 \pm 4.3$ ; Tukey HSD  $P < 0.01$ ), the anxiety group ( $10.4 \pm 8.3$ ; Tukey HSD  $P < 0.01$ ), and the other psychopathology group ( $10.1 \pm 6.8$ ; Tukey HSD  $P < 0.01$ ). There were also significant differences on the KDQOL ( $F_{3,59} = 16.9$ ,  $P < 0.001$ ), with the depressed group having significantly lower total quality of life than the no psychopathology group ( $51.1 \pm 13.2$  versus  $75.4 \pm 7.5$ ; Tukey HSD  $P < 0.001$ ), the anxiety group ( $65.6 \pm 13.1$ ; Tukey HSD  $P < 0.001$ ), and the other psychopathology group ( $67.8 \pm 5.6$ ; Tukey HSD  $P < 0.001$ ). The anxiety group demonstrated a lower perception of quality of life (KDQOL) than the no psychopathology group ( $65.6 \pm 13.1$  versus  $75.4 \pm 7.5$ ; Tukey HSD  $P < 0.001$ ). Age, gender, and length of time on dialysis were examined as possible covariates but did not significantly effect these relationships ( $P > 0.05$ ).

There were significant differences across psychopathology groups on the YSQ domains of disconnection and rejection ( $F_{3,59} = 6.8$ ,  $P < 0.001$ ) and impaired autonomy ( $F_{3,59} = 9.8$ ,  $P < 0.001$ ), with the depressed group showing higher values compared with the no psychopathology group (Tukey HSD  $P < 0.001$ ) on both of these domains (Table 2). There were also differences on the other directedness YSQ domain ( $F_{3,59} = 5.3$ ,  $P < 0.001$ ), with people with psychotic or substance abuse diagnoses showing higher values when compared with the no psychopathology group (Tukey HSD  $P < 0.001$ ).

Table 1. Demographic information

Variable	Mean $\pm$ SD or %
Age	$53.3 \pm 15.0$
Female gender	52.9
Length of time on dialysis (mo)	$61.0 \pm 62.6$
Education (yr)	$12.7 \pm 2.7$
No. of hospitalizations in past year	$1.9 \pm 2.6$
Born in the United States	50
Ethnicity (self-report)	
black/Afro-Caribbean	88.6
Hispanic	2.9
white	1.4
other	7.0
History of mental health treatment	12.9

Table 2. Comparison of variables by psychopathology group<sup>a</sup>

Variable	No Psychopathology	Depression	Anxiety	Other Pathology
Age (yr)	56.5 ± 14.5	54.6 ± 16.0	45.1 ± 16.3	55.1 ± 13.2
Time on dialysis (mo)	62.9 ± 71.2	69.9 ± 65.4	58.9 ± 63.4	52.9 ± 58.0
BDI	6.0 ± 4.3 <sup>b</sup>	21.9 ± 10.1 <sup>c,d,e</sup>	10.4 ± 8.3 <sup>b</sup>	10.1 ± 6.8 <sup>b</sup>
Quality of Life (KDQOL)	75.4 ± 7.5 <sup>b,d</sup>	51.1 ± 13.2 <sup>c,d,e</sup>	65.6 ± 13.1 <sup>b,c</sup>	67.8 ± 5.6 <sup>b</sup>
Health Status (SF-36)	58.0 ± 15.0 <sup>b</sup>	39.7 ± 17.8 <sup>c</sup>	49.8 ± 17.4	47.4 ± 13.8
Disconnection and rejection (YSQ)	1.4 ± 0.5 <sup>b</sup>	2.6 ± 1.2 <sup>c,d</sup>	1.5 ± 0.6 <sup>b</sup>	2.2 ± 1.2
Impaired autonomy (YSQ)	1.4 ± 0.3 <sup>b</sup>	2.3 ± 0.7 <sup>c,d</sup>	1.3 ± 0.3 <sup>b</sup>	1.7 ± 1.0
Other-directedness (YSQ)	1.6 ± 0.6 <sup>e</sup>	2.2 ± 0.9	1.8 ± 0.6	2.6 ± 0.8 <sup>c</sup>
Over vigilance (YSQ)	2.2 ± 1.0	2.9 ± 0.9	2.5 ± 0.9	2.6 ± 1.0
Impaired limits (YSQ)	2.2 ± 1.0	2.6 ± 1.0	2.3 ± 0.7	3.0 ± 0.8

<sup>a</sup>Data are means ± SD. BDI, Beck Depression Inventory; KDQOL, Kidney Disease Quality of Life; YSQ, Young's Schema Questionnaire.

<sup>b</sup>Significantly ( $P < 0.05$ ) different from the depression group.

<sup>c</sup>Significantly ( $P < 0.05$ ) different from the no psychopathology group.

<sup>d</sup>Significantly ( $P < 0.05$ ) different from the anxiety group.

<sup>e</sup>Significantly ( $P < 0.05$ ) different from the other pathology group.

### Quality of Life

The mean score for all patients on the KDQOL-SF was 65.8 ± 13.5, whereas the mean score on the SF-36 was 50.1 ± 70.3. It is interesting that there were no significant relationships between either perception of quality of life or self-reported health status and number of hospitalizations in the past year or length of time on dialysis (NS in all cases). For exploration of the effects of self-reported health status and depression on quality of life, a factorial ANOVA was undertaken. This analysis compared high and low scorers on the SF-36 with those with and without a depression diagnosis on KDQOL values. Both poor health status ( $F_{1,69} = 14.7, P < 0.001$ ) and a positive depression diagnosis ( $F_{1,69} = 37.3, P < 0.001$ ) were significantly associated with perception of lower quality of life. It is interesting that there was no interaction effect ( $F_{1,69} = .93, NS$ ), indicating that both health status and depression diagnosis make unique contributions to the variance within quality-of-life scores.

To highlight further the existence of depression independent of health status, we performed a hierarchical regression (entering SF-36 first and then BDI score) to predict SCID depression diagnosis. This method allowed for isolation of the unique variance in depression diagnosis as a result of depressive affect, once the common variance with health status had been controlled. The BDI retained its significance in predicting depression diagnosis (Nagelkerke  $R^2 = 0.515, P < 0.001$ ), even when the shared variance with the SF-36 was held constant. The BDI step of the model correctly classified 82.6% of SCID depression cases correctly, indicating the presence of a unique construct of depression independent of health status.

### Discussion

This study sought to explore the range and the extent of psychopathology in urban patients who had ESRD and were treated with hemodialysis. Information on 70 randomly selected inner-city patients from the Hemodialysis Center was

gathered. Overall, the population had a high rate of DSM-IV diagnoses (74%), as determined by the clinician-administered SCID. This is the first known report on the full spectrum of psychiatric disorders determined systematically in a hemodialysis population. Rates of depression were comparable to other studies in ESRD and other medically ill populations (1–3). We found that the rate of major depression (20%) and dysthymia (9%) in the current study were in good agreement with other ESRD studies. Watnick *et al.* (30) found SCID rates of depression of 26%, Hedayati *et al.* (8) reported a SCID depression prevalence of 27%, and Kimmel *et al.* (44) reported depression at 25% using a stringent cutoff of the BDI. The rate of anxiety disorders (27%) was somewhat higher than the expected rate (18%) on the basis of the National Comorbidity Survey (45). The rates of substance abuse disorders and psychotic disorders were higher than community averages, but that was anticipated because of the relationship between the cause of kidney disease and substance abuse (6,46,47) and the known prevalence of psychiatric disorders in patients who have ESRD and are treated with hemodialysis (6,48).

More than 80% of patients with a psychotic disorder reported receiving mental health treatment, but only 12% of patients with a diagnosis of anxiety or depression were currently receiving treatment. This highlights how underrecognized depression and anxiety are and perhaps suggests a tolerance of depression and anxiety by physicians and staff, accepting them as part of the ESRD experience.

The rate of comorbid depression and anxiety (7% for depression and a major anxiety disorder) was lower than expected. It is possible that the excess depression demonstrated in ESRD populations is causally linked, either biochemically or experimentally, to ESRD, because there has been some research suggesting an causative link through inflammatory processes (3,49,50) and a psychodynamic literature (3,51) linking depres-

sion and dialysis. These pathways are specific for depression and do not include anxiety and therefore perhaps explain the relatively minor overlap between the diagnoses.

Because of the strong overlap between uremic and depressive symptoms, it has been difficult to isolate the unique role that depression plays in ESRD. This study sought to explore the utility of the construct of depression by examining its relationship to quality of life and self-reported health status. In accordance with previous research, a strong negative relationship between quality of life and depression scores was demonstrated (1,2,4,33). The factorial ANOVA highlighted the independent contribution that a depression diagnosis has on quality of life for patients with both high and low health status. The hierarchical regression indicated that depressive affect accounts for depression diagnosis, independent of health status, suggesting that depression exists in ESRD populations independent of uremia. Both of these analyses support the conclusion that the construct of depression is meaningful in ESRD populations.

This study also investigated the utility of using cognitive variables as another tool to understand effectively the meaningfulness of the construct of depression in this complex medically ill population. In this sample, the YSQ, specifically the disconnection and rejection domain and the impaired autonomy domain, effectively distinguished between those who had the diagnosis of depression and those who did not, granting validity to the notion of psychiatric depression in this patient population. In fact, patients with an anxiety disorder showed no elevations in their cognitive schema, lending validity to the YSQ as a sensitive measure of depressogenic schema. The elevation in the disconnection and rejection domain suggests that the depressed individuals have higher expectation that their needs for security, safety, acceptance, and respect will not be met in a predictable manner. In addition, the elevation in the impaired autonomy domain suggests that depressed individuals have increased expectations about themselves and the en-

vironment that interfere with their perceived ability to separate, survive, function independently, or perform successfully. These findings are in accordance with the primarily psychodynamic literature that discusses these themes of "aloneness" and "ineffectiveness" as hallmarks of the depressogenic changes that are associated with ESRD treatment (51).

Methodologic limitations of this study include a lack of a community comparison group and the reliance on self-report measures of physical health without corroboration from health biomarkers. Despite these limitations, there were also methodologic strengths in that it used random selection within each dialysis shift and both self-report and clinician report measures of psychopathology. In addition, these data were collected from a population that was overenriched for black patients. This is an important subpopulation in the United States, composing 13% of the total population and 32% of patients in the US Renal Data System (52). Although the data that were derived for this study may not be generalizable across the United States, these findings are largely comparable to units across the urban East Coast and Southeast of the United States, in which the overwhelming majority of patients are black (53). Our data need to be replicated in larger, multicenter studies that will yield populations that are more similar to the US Renal Data System.

It is interesting to note the psychological state of the patients without any psychiatric illness, because their overall depression (BDI) scores place them in the normal range and their overall quality-of-life scores placed them significantly higher than patients with an anxiety or depression diagnosis. It seems that despite all of the medical and psychologic challenges of living on dialysis, people without a comorbid psychiatric condition, particularly depression, can enjoy a much greater quality of life. These findings have strong implications for the need for treatment of depression in patients with ESRD, because now there is indication that treatment might not only decrease depression but also improve quality of life (5). The study provides

#### Appendix 1. YSQ domains, description, and included subscales

Domain	Description	Subscales
Disconnection and rejection	Expectation that one's needs for security, safety, stability, nurturance, empathy, sharing of feelings, acceptance, and respect will not be met in a predictable manner.	Abandonment, mistrust/abuse, emotional deprivation, social isolation, defectiveness/shame
Impaired autonomy	Expectations about oneself and the environment that interfere with one's perceived ability to separate, survive, function independently, or perform successfully.	Functional dependence/incompetence, vulnerability to harm, enmeshment, failure to achieve
Other-directedness	An excessive focus on the desires, feelings, and responses of others, at the expense of one's own needs, to gain love and approval, maintain one's sense of connection, or avoid retaliation.	Subjugation, self-sacrifice
Over vigilance and inhibition	Excessive emphasis on suppressing one's spontaneous feelings, impulses, and choices or on meeting rigid, internalized rules and expectations about performance and ethical behavior, often at the expense of happiness, self-expression, relaxation, close relationships, or health.	Emotional inhibition, unrelenting standards
Impaired limits	Deficiency in internal limits, responsibility to others, or long-term goal orientation. Leads to difficulty respecting the rights of others, cooperating with others, making commitments, or setting and meeting realistic personal goals.	Entitlement, insufficient self-control

preliminary evidence that anxiety exists independent of depression in this patient population, and further investigation is warranted to determine whether it is best treated with the depression or independently. In addition, this study contributes to the emerging intervention literature (33,54–56), suggesting more reason to suspect that interventions that are aimed at challenging distorted cognitive beliefs, perhaps using cognitive behavioral therapeutic techniques (54), will be particularly useful in this patient population, which is subject to treatment with so many medications.

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## Disclosures

None.

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Depression and anxiety are common in ESRD patients on hemodialysis and perhaps their frequency has been underestimated in the past. These disorders must be addressed to improve the quality of life of patients undergoing renal replacement therapy. Experts in the field uniformly recommend exercise as a modality of improving the quality of life because these types of programs often improve anxiety and depression as the patient gains confidence and stamina. In this month's *JASN*, Cheema *et al.* (pages 1594–1601) show the benefits on muscle quantity and quality of a high-resistance exercise program. They did not examine quality of life; however, one could reasonably expect that benefits of such conditioning would carry over into psychiatric comorbidities.