# Fatigue in African American Women on Hemodialysis

CNE Continuing Nursing Education

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***The purpose of this study was to examine factors associated with fatigue in African American women with end stage renal disease. Twenty-seven of 36 women in the sample were fatigued. Correlations were found with mood disorder and fatigue ($p < .001$), social support and uremic malnutrition ($p = .003$), and anemia and fatigue ($p = .012$) and mood disorder ($p = .039$). Anemia, uremic malnutrition, mood disorder, and social support explained 38% of variance in fatigue scores ($F = 4.768$ [4, 31]; $p = .004$). Future studies testing interventions that mitigate fatigue are warranted.***

**Goal**

To increase the knowledge of nephrology nurses about factors that affect fatigue in African American women requiring hemodialysis.

**Objectives**

1. Describe the factors affecting fatigue as used in a study of African American women requiring hemodialysis.
2. Summarize the physical, psychological, and situational factors that affect symptoms of fatigue in those requiring hemodialysis.
3. Relate the results of a study on the effects of fatigue on African American women requiring hemodialysis.

Chronic kidney disease affects approximately 7 million people in the United States (Coresh et al., 2005), and many of these progress to end stage renal disease (ESRD) which requires transplant or some form of dialysis to sustain life with the majority receiving hemodialysis. African Americans are burdened more by ESRD than any other racial group in America and account for approximately 32% of patients diagnosed with ESRD (United States Renal Data System [USRDS], 2007).

Patients on hemodialysis experience many side effects due both to the disease process and the treatment regimen. Fatigue is one of the most common side effects and has been shown to be a common stressor for those on hemodialysis (Curtin, Bultman, Thomas-Hawkins, Walters, & Schatell, 2002; Lok, 1996; McCann & Boore, 2000; Sklar, Riesenberg, Silber, Ahmed, & Ali, 1996). The fatigue experienced by individuals with ESRD has been described as common and incapacitating (Evans, 1999). Increased effort is required for those with fatigue to carry out cognitive and physical activities, and fatigue also affects role performance and functional status (McCann & Boore, 2000). Fatigue has been related to depression, anxiety, and significant problems with work and other activities (McCann & Boore, 2000; Sklar et al., 1996). Thus, fatigue experienced by women with ESRD has the potential to alter roles, relationships, and negatively affect quality of life (DeNour, 1982; White & Grenyer, 1999). The majority of the studies on fatigue in ESRD relate to the prevalence of fatigue. Outcomes associated with this unpleasant symptom include mental and physical function, role performance, depression, and anxiety (Curtin et al., 2002; Lok, 1996; McCann & Boore, 2000; Sklar et al., 1996). Most studies have not explored factors contributing to fatigue. Studies examining the correlates of fatigue are imperative for nurses who desire to develop interventions to improve the quality of life of African American women with ESRD. Therefore, the purpose of this study was to examine

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fatigue and factors contributing to fatigue in African American women on hemodialysis as a basis for developing interventions to decrease fatigue and improve quality of life.

## Conceptual Framework

The theory of unpleasant symptoms served as the guiding framework for the study (Lenz, Pugh, Milligan, Gift, & Suppe, 1997). The symptom the individual experiences, the factors affecting the symptom, and the consequence of the symptom are the three major components of the theory. This study focused on factors affecting fatigue.

Factors influencing the unpleasant symptom of fatigue in patients on hemodialysis are physiologic, psychological, and situational (Lenz et al., 1997). The physiologic factors examined in this study were related to the pathology of ESRD and included uremic malnutrition and anemia. Mood disorder was the psychological variable chosen for study. Social support was the situational variable studied.

## Physiologic Variables: Anemia and Uremic Malnutrition

### Anemia

Those affected with ESRD have many physiologic changes related to their disease and treatment. Anemia is one of the most debilitating consequences of ESRD, with manifestations ranging from compromised quality of life and increased hospitalizations to increased mortality (Hong, Ebben, Ma, & Collins, 1999; Kammerer, Ratican, Elzein, & Mapes, 2002; Pickett, Theberge, Brown, Schweitzer, & Nissenson, 1999). Anemia in patients with ESRD is a result of dialysis and inadequate erythropoietin production. Iron is vital in erythropoiesis, and because blood is lost in dialysis and iron is restricted in the diet, iron stores are depleted as well. McCann and Boore (2000) and Sklar et al. (1996) examined the direct relationship of hemoglobin and hematocrit levels to fatigue, but no significant associations were found in either study. The National Kidney Foundation recommends a target range of hemoglobin of 11-12.5 grams per deciliter with a gender specific and menopausal approach to diagnosis and treatment (National Kidney Foundation, 2002). Patients in this range are reported to have improved cognitive function, quality of life, and exercise capacity (Hong et al., 1999; Kammerer et al., 2002; Pickett et al., 1999). Studies of patients with ESRD (Hong et al., 1999; Kammerer et al., 2002), however, have not taken into account differences in hemoglobin levels based on gender or explained what indicator was used for anemia.

### Uremic Malnutrition

Patients on dialysis also have problems with malnutrition. Factors such as decreased dietary protein, inadequate dialysis dose, decreased caloric intake, nutrient loss during dialysis, and symptoms such as anorexia and nausea contribute to the condition known as uremic malnutrition (Caglar, Hakim, & Ikizler, 2002). Uremic malnutrition is a unique form of protein-calorie malnutrition leading to decreased tissue function and loss of body mass (Caglar et al., 2002; Pupim & Ikizler, 2004). It is reported to be present in 20%-50% of patients on dialysis (Caglar et al., 2002) and is associated with poor clinical outcomes in ESRD (Churchill et al., 1992; Pupim, Evanson, Hakim, & Ikizler, 2003; Pupim & Ikizler, 2004), including increased inflammation, infection, cardiac disease, hospitalization, and mortality.

Churchill et al. (1992) examined survival and morbidity in 496 people on hemodialysis for a year and a half, approximately 42% of whom were women. Since albumin correlated well with other measures of malnutrition, serum albumin was used as the nutritional marker. The probability of hospitalization for any cause was greater for those with a serum albumin of 30 grams per liter or less. Hospitalization due to circulatory disease and infections, including pneumonia, was also more likely in those with lower albumin levels. There was also a higher death rate among those with a serum albumin of 30 grams per liter or less than among those with higher albumin levels (13.8% vs. 7.8%). However, this study did not explore how malnutrition is related to the fatigue experienced by those on hemodialysis.

Sklar et al. (1996) examined the relationship of nutritional status to fatigue in patients on hemodialysis using chart reviews to obtain recent albumin levels. Albumin level was not associated with fatigue. McCann and Boore (2000) also investigated the role of nutrition in fatigue, again, using albumin. Consistent with Sklar et al., no significant associations were found between nutrition and fatigue. Both studies, however, had small samples and nutrition in both studies was determined by examining the patient's albumin level. The use of albumin in prior studies may have resulted in inaccurate findings. While albumin synthesis decreases as a result of inadequate dietary protein, serum levels of albumin are often unaffected because of albumin's long half-life of 20 days. Serum albumin is also affected by hydration and renal function. Pupim and Ikizler (2004) thus noted that albumin is not an ideal marker, especially when looking for rapid changes in nutritional status. Prealbumin is reported to be an accurate indicator of nutritional status in patients with renal disease and has been used both clinically and in research settings (Beck & Rosenthal, 2002; Pupim & Ikizler, 2004). Prealbumin is not affected by hydration, making it a more accurate measure for examining nutrition. Therefore, studies examining prealbumin levels and fatigue are needed.

## Psychological Variable: Mood Disorders

Mood disorders, such as anxiety and depression, have been prevalent in samples of patients with ESRD for over 15 years (Davis, Krung, Dean, & Hong, 1990; Dobrof, Dolinko, Lichtiger, Uribarri, & Ebstein, 2001;

Elal & Krespi, 1999; McCann & Boore, 2000; Sklar et al., 1996; Tyrrell, Paturel, Cadec, Capezzali, & Poussin, 2005). In fact, depression rates have been reported to be higher in those with ESRD than in samples with other chronic diseases (Davis et al., 1990). Anxiety and depression have been shown to exist in ESRD samples including African American women. For example, Dobrof et al. (2001) found both anxiety and depression in their sample, which included 57% females and 44% African Americans. Anxiety and depression were also examined in a study of fatigue in persons with renal failure who required maintenance hemodialysis (McCann & Boore, 2000). Both anxiety and depression were significantly related to fatigue ($p < .05$). Sklar et al. (1996) examined postdialysis fatigue (PDF) in relation to depression, measured by the Beck Depression Inventory Scale. The PDF group had higher scores on Beck's Depression Scale (11.6 +/- 8.0) than the non-PDF group (7.8 +/- 6.3, $p = .02$). This was consistent with McCann's and Boore's (2000) findings. However, both studies used predominantly Caucasian samples, preventing generalization to African American women. Thus, little is known about the effects of mood disorders on fatigue in African American women on hemodialysis.

## Situational Variable: Social Support

Social support can be generally defined as the presence or availability of people whom one can rely and who facilitate a feeling of being cared about, loved, and valued (Vaglio et al., 2004). Social support has been shown to have positive effects on outcomes for patients with ESRD (Boyer, Friend, Chlouverakis, & Kaloyanides, 1990; Burton, Kline, Lindsay, & Heidenheim, 1988; Christensen, Weibe, Smith, & Turner, 1994; Elal & Krespi, 1999). Using The Duke-UNC Functional Social Support Questionnaire to measure social support, Sklar et al. (1996), found a trend toward poor social support among those with fatigue. A retrospective study ($N = 100$) that explored resiliency factors and health related outcomes in a diverse ESRD sample (Dobrof et al., 2001) (57% female and 44% African American) found that support from family and friends was listed by 69% of the sample and good family relationships were identified by 48% as the primary factors in their resiliency (Dobrof et al., 2001).

Social support has been described as a buffer against depression in ESRD (Burton et al., 1988; Christensen et al., 1994; Elal & Krespi, 1999; Furr, 1998), and it may indirectly affect fatigue. Burton et al. (1988) found that when patients perceived satisfactory social support, they experienced less anxiety and depression and were more likely to participate in social and community activities. Elal and Krespi (1999) examined the buffer effect of social support on depression in 200 patients on hemodialysis, 62% male and 38% female. The Beck Depression Inventory was used to measure depression and the Social Support Inventory was used to measure support. Clinical depression was noted in 42% and moderate depression in 33% of the sample. Social support was negatively related to moderate and clinical depression. The researchers concluded that social support is necessary for psychological well being in patients with ESRD. Because African American women were not represented in this study, little is known about social support and psychological factors in African American women.

Social support in patients with ESRD has also been examined in relation to medical compliance. Boyer et al. (1990) used serum phosphorus and potassium levels as indicators of medication and diet compliance and found that in their sample of 60 patients on dialysis, social support was associated with lower levels of potassium and phosphorous, indicating greater dietary and medication compliance. When family and medical staff were perceived as unsupportive, both potassium and phosphorus levels were higher. This study demonstrated the influence of social support on compliance, which in turn may affect patient symptoms and thus, well-being.

McCann's and Boore's (2000) study examined the associations of marital status, employment, and length of time on dialysis with fatigue in ESRD. None of these factors were associated with fatigue. Turner-Musa (1999) investigated the effects of family structure on 476 African Americans with ESRD. Female patients who lived in a household with a spouse and others had higher mortality than those living alone or with their spouse. The estimated risk ratio was 2.17 ($p < .001$), almost two times higher than for patients who lived alone or with a spouse. However, this study did not provide specific information about social support, just family composition and marital status.

Research is needed on how perceived social support is related to symptoms in African American women with ESRD. Depression and anxiety have been associated with fatigue in ESRD, but the studies did not have adequate, if any, African American representation (McCann & Boore, 2000; Sklar et al., 1996). Examining mood disorder, social support, and fatigue in African American women with ESRD on hemodialysis is important to develop interventions to decrease fatigue and improve quality of life.

This study examined correlates of fatigue in African American women on hemodialysis. The research questions were: (a) What is the proportion of fatigue in African American women with ESRD on hemodialysis?; and (b) Are there relationships between the physiological factors of anemia and nutritional status, the psychological factor of mood disorder, the situational factor of social support, and fatigue in African American women with ESRD on hemodialysis?

## Research Design

### Methodology

This cross-sectional study used a descriptive correlation design to examine the relationship of physio-

logical, psychological, and situational factors to fatigue.

## Setting and Sample

The study was conducted in two State Division of Facilities Services-approved dialysis centers located in an urban area in the southeastern United States. The centers provide hemodialysis to patients from the county in which they are located and other nearby counties. The majority of clients are African American (72%) or Caucasian (25%). Inclusion criteria used were: (a) self-identified African American woman, (b) ability to speak English, (c) diagnosis of ESRD on the medical record, (d) treated with hemodialysis for at least 1 year, as validated on the medical record, and (e) age 21 to 65, as validated on the medical record. Approval for the study was obtained from The University of North Carolina at Greensboro Institutional Review Board. Informed consent was obtained from all participants.

## Data Collection

After informed consent was obtained, each participant was given an identification number and a folder for their data. The folder contained two copies of the informed consent, the demographic and physiologic data sheet, the Fatigue Visual Analog Scale (VAS), the ENRICHD Social Support Instrument (ESSI), and the Hospital Anxiety and Depression questionnaire (HADS). The Principal Investigator (PI) gave instructions on using the Fatigue VAS and a description of the two anchors. The participant was asked to place a mark on the VAS indicating fatigue level experienced over the last week. After completion of the Fatigue VAS, the participant was given instructions on the ESSI and asked to respond to each of the questions. Finally, the participant was given directions on the HADS and asked to answer the 14 questions. Because of the physical constraints of some participants, the PI read instructions to all eligible participants. This process took an estimated 20-30 minutes to complete. After completion of the written instruments, the PI collected demographic and physiologic data from the medical record and recorded these on a demographic and physiologic data sheet.

## Instruments

**Fatigue VAS.** Fatigue, the dependent variable in this study, was measured using the Fatigue VAS, a 100-millimeter line that is anchored by two horizontal lines. One end of the vertical line represents no tiredness or fatigue and the other represents complete exhaustion. The area between these points represents levels of fatigue ranging from 0 (lowest anchor), no fatigue, to 100 (highest anchor), complete exhaustion. Line measurement translates into a numerical fatigue score with higher scores representing more fatigue. Each participant was asked to place a horizontal mark indicating the fatigue experienced in the last week or to denote no fatigue. A line crossing the vertical line between the two anchors indicated fatigue. The amount of fatigue was calculated by measuring in millimeters from the bottom anchor to the point at which the participant's line crossed the VAS. Visual Analog Scales have shown to be reliable and valid in studies exploring various symptoms (Bijur, Latimer, & Gallagher, 2003; Chan, 2004). Wolfe (2004) compared the performance of the Fatigue VAS to Belza's Multidimensional Assessment Fatigue Scale (MAF), the vitality scale from the Medical Outcomes Study Short Form 36 (SF-36), and the Brief Fatigue Inventory (BFI). The four fatigue scales were well correlated with each other, with coefficients between .79 and .86 (Wolfe). The Fatigue VAS demonstrated correlations of .80 with the total MAF, .76 with the BFI, and .71 with the SF-36 (Wolfe). In addition, the Fatigue VAS takes a minimal amount of time to complete.

**Physiological measures.** Anemia and uremic malnutrition, the physiological factors, were determined by using the absolute value from the patient's medical record and coded as a yes or no based on established parameters. The most recent lab values were used. Anemia was defined as a hemoglobin level of 12.5 grams per deciliter or less in self-identified postmenopausal women and 11 grams per deciliter or less in self-identified premenopausal and perimenopausal women (National Kidney Foundation, 2002).

Uremic malnutrition can be observed in visceral protein concentrations reflected by serum prealbumin and albumin. When available, the participant's prealbumin level was examined to detect malnutrition in this study. Prealbumin is reported to be an accurate indicator of nutritional status in patients with chronic disease (Beck & Rosenthal, 2002). A prealbumin of 29 milligram per deciliter or less was considered indicative of uremic malnutrition (Pupin & Ikizler, 2004). If prealbumin was not recorded, the participant's most recently recorded albumin was used. Albumin is a well-studied serum protein whose synthesis rate decreases as a result of inadequate dietary protein intake (Pupim & Ikizler, 2004). The K/DOQI guidelines (NKF, 2002) denote that a value "slightly less" than 4.0 grams per deciliter is the principle marker for malnutrition in patients with ESRD. Therefore, the researchers used a conservative level of less than 3.5 grams per deciliter to define the presence of uremic malnutrition.

**Hospital Anxiety and Depression Scale.** The psychological factor of mood disorder was measured using Zigmond and Snaith's Hospital Anxiety and Depression Scale (Snaith, 2003). This tool was developed as a simple and reliable way to provide information on the presence of a mood disorder in patients in nonpsychiatric settings, and it has demonstrated validity outside of the hospital environment. The questionnaire consists of 14 items, 7 reflecting anxiety and 7 reflecting depression. Each item has a possible response of 0-3. A total score 11 or higher on either the anxiety or depression subscale indicates the probable presence of the

mood disorder, and a score of 8 to 10 is considered suggestive of anxiety or depression (Snaith, 2003). Internal consistencies on both subscales are reported as Cronbach alpha = .89 (Savard, Leberge, Gauthier, Ivers, & Bergeron, 1998). Test retest reliability was .72 ($p < .001$) for each subscale, with a correlation of .74 ($p < .001$) for the total scale (Savard et al., 1998). The HADS takes 2 to 5 minutes to complete (Snaith, 2003).

**ENRICHD Social Support Instrument.** The situational factor social support was measured using the ENRICHD Social Support Instrument (ESSI), a short 7-item rating scale that assesses the emotional, instrumental, informational, and appraisal attributes of social support (Mitchell et al., 2003). Six items are scored from 1 (none of the time) to 5 (all of the time). Item 7 relates to living with a significant other and is scored 4 for "yes" and 2 for "no" (Mitchell et al.). The score on the ESSI is tallied by summing the scores on the items, with higher scores indicating stronger support. This scale takes approximately 5 to 10 minutes to complete. The ESSI was developed to measure social support in cardiac patients and was administered with the established social functioning subscale of the Medical Outcomes Study SF-36 health status survey. A modest correlation was found between the ESSI and the Medical Outcomes Study Social Functioning sub-scale ($n = .19$, $p = .002$) (Vaglio et al., 2004). Cronbach's alpha was .88, demonstrating the tool's internal consistency (Vaglio et al., 2004).

**Demographic and physiologic data sheet.** The demographic and physiologic data sheet was designed by the PI in consultation with other experts to collect data from the medical record. The patient's hemoglobin, prealbumin, albumin, dry weight, height, age, blood pressure, and length of time on dialysis were recorded. Additionally, each woman identified herself as either premenopausal, perimenopausal, or postmenopausal and this information was recorded on this data sheet.

**Table 1**
**Overweight and Obesity Classification by BMI**

| | Obesity Class | BMI (kg/m²) | *n* (%) |
|---|---|---|---|
| Underweight | | Less than 18.5 | 1 (3%) |
| Normal | | 18.5 – 24.9 | 11 (31%) |
| Overweight | | 25.0 - 29.9 | 7 (20%) |
| Obesity | I | 30.0 – 34.9 | 10 (28%) |
| Obesity | II | 35.0 – 39.9 | 3 (8%) |
| Obesity | III | 40 or greater | 4 (11%) |

## Results

African American women on hemodialysis during the study period were approached by the charge nurse to determine interest in participating in this study. Forty-one (41) African American women agreed to hear more about the study. Each of these women were then approached by an investigator to ascertain their interest in participating. Five women chose not to participate for various reasons, including not feeling well ($n = 2$), not interested ($n = 2$), or problems during dialysis ($n = 1$). Thirty-six African American women participated in the study. Their ages ranged from 27 to 65 ($M = 52$, $SD = 10.89$) with 64% between 51 and 65. The majority (83%) had children, were unemployed (83%), and single (81%). The average years on hemodialysis ranged from 1 to 22 years ($M = 6.42$, $SD = 5.59$) with 56% of the sample having been on hemodialysis 6 years or less.

Participants' mean arterial blood pressure ranged from 55 to 137 ($M = 98.9$, $SD = 19.2$). The women's dry weight ranged from 70 to 263 pounds ($M = 169$, $SD = 43.8$) with 50% weighing more than 174 pounds. Body mass index ranged from 12.6 to 70.4 ($M = 29.8$, $SD = 9.92$). According to the National Heart, Lung, and Blood Institute (2005), the majority (67%) were overweight or obese (see Table 1).

Only 22% of the women had uremic malnutrition, and 75% ($n = 6$) of those women were classified as overweight or obese (National Heart, Lung, and Blood Institute, 2005). Based on albumin levels and prealbumin levels to define uremic malnutrition, the majority (78%) of the women did not have uremic malnutrition. However, when examining only those women who had a prealbumin level on their medical record ($n = 13$), the majority did have uremic malnutrition ($n = 8$, 62%). Using a hemoglobin cut point of 12 grams per deciliter or less as anemic, 58.3% of the women were anemic. However, when classifying according to menopausal status, the majority ($n = 20$, 80%) of postmenopausal women had anemia followed by premenopausal ($n = 3$, 12%) and perimenopausal ($n = 2$, 8%). The majority ($n = 30$, 83%) did not have a mood disorder. Scores indicating abnormal mood on the HADS were 8 or higher. Thirty six percent (36%) of the women had anxiety and 25% depression. Scores on the ESSI ranged from 16 to 34 ($M = 25.9$, $SD = 5.2$) (see Table 2).

**Research Question #1.** Descriptive statistics were used to determine the proportion of African American women with ESRD on hemodialysis who experienced fatigue. The majority (75%) were fatigued. Scores on the Fatigue VAS ranged from 0 to 100 ($M = 44.6$, $SD = 33.1$).

**Research Question #2.** All variables were examined to ensure that the assumptions for multiple regression were met. Two variables were dichotomous and were dummy coded as 0 (no) or 1 (yes). Only two variables were continuous. These

**Table 2**
**Descriptive Statistics for Selected Variables**
**(*N* = 36)**

| Variables | Mean | *SD* | Range | Possible Range |
|---|---|---|---|---|
| Fatigue | 44.6 | 33.1 | 0 – 100 | 0 - 100 |
| **Uremic Malnutrition** | | | | |
| Albumin | 4.16 | 0.33 | 3.5 – 4.6 | |
| Pre-Albumin | 28.84 | 8.83 | 17.0 – 47.0 | |
| Hemoglobin | 11.6 | 1.3 | 8.3 – 13.8 | |
| **Mood Disorder** | | | | 0 - 21 |
| Anxiety | 7 | 3.26 | 1 – 15 | |
| Depression | 5.4 | 3.52 | 1 – 13 | |
| Social Support | 25.9 | 5.2 | 16 – 34 | 8-34 |
| Age | 52 | 10.89 | 27 – 65 | 21-65 |
| Body Mass Index | 29.8 | 9.92 | 12.6 – 70.4 | |

**Table 3**
**Multiple Regression Analysis of Influencing Factors on Fatigue**
**(*N* = 36)**

| | Standardized Regression Coefficient | Standard Error | *t* | *p* |
|---|---|---|---|---|
| Anemia | .203 | 10.848 | 1.324 | .195 |
| Uremic Malnutrition | -.039 | 12.652 | -.242 | .810 |
| Mood Disorder | .466 | 13.088 | 3.125 | .004* |
| Social Support | -.242 | 1.005 | -1.527 | .137 |

**Note:** $R^2 = 0.381$; $p \leq 0.05$*; $F = 4.768$

variables, the ESSI and fatigue scores, were normally distributed. Residuals were also examined for linearity, normality, and homoscedasticity. All residuals plots met the assumptions for multiple regression.

When all the independent variables were entered into the regression model, the model significantly ($p$ .05) explained 38% of the variance in the fatigue score ($F = 4.768$ (4, 31), $p =$ .004). The only significant variable was mood disorder ($p = .004$) (see Table 3).

A significant moderate positive correlation was found between mood disorder and fatigue ($r = .528$, $p$ .001). A moderate negative correlation ($r =$ - .448, $p = .003$) was found between social support and uremic malnutrition. Weak correlations were noted between anemia and fatigue ($r = .374$; $p = .012$) and between anemia and mood disorder ($r = .297$; $p = .039$) (see Table 4).

To examine the contributions of other variables to fatigue, a hierarchical regression was performed. Mood disorder was entered into the first block (Model 1) and social support, anemia, and uremic malnutrition were entered into the second block (Model 2). Model 1 explained 27.8% of the variance in fatigue ($F = 13.119$ (1, 34), $p = .001$) and Model 2 explained 38% of the variance in fatigue ($F = 4.768$ (4, 31), $p = .004$).

To examine the contributions of anxiety and depression to fatigue, a multiple regression analysis was conducted. Thirty six percent of the variance in fatigue was explained by these variables ($F = 9.436$ (2,33), $p =$ .001). Both anxiety ($p = .036$) and depression ($p = .054$) significantly contributed to fatigue (see Tables 5 and 6).

## Discussion

The high proportion of African American women with ESRD who experienced fatigue while on hemodialysis is an important finding. This is consistent with other studies that have noted fatigue to be a common symptom of patients on hemodialysis (Curtin et al., 2002; Lok, 1996; McCann & Boore, 2000; Sklar et al., 1996).

Although fatigue is a symptom of anemia (Penninx et al., 2004; Smith, 2000), previous studies exploring the relationship of anemia to fatigue did not define the parameters used to determine anemic status (McCann & Boore, 2000; Sklar et al., 1996). Interestingly, these studies also reported no correlation between lab values and fatigue. The current study used the most recently recommended parameters for anemia from the National Kidney Foundation at the time of the study (NKF, 2002) and found a significant, although weak, correlation between anemia and fatigue. Clearly, it is important to use recommended guidelines to assess hemoglobin levels, particularly in relation to menopausal status.

Uremic malnutrition is reported to be present in 20%-50% of patients on hemodialysis and is associated with hospital admissions due to circulatory disease and infections, including pneumonia (Churchill et al., 1992). This study found that 22% of the women had uremic malnutrition. Most of those with uremic malnutrition were classified as overweight to obese (National Heart, Lung, and Blood Institute, 2005). This is important because it demonstrates that obesity and malnutrition can coexist. Nurses must rely on objective data such as prealbumin and albumin to determine a patient's nutritional sta-

**Table 4**
**Intercorrelations Between the Variables (*N* = 36)**

| Variables | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Fatigue | | .374* | .084 | .528** | -.257 |
| 2. Anemia | | | .210 | .297* | -.171 |
| 3. Uremic Malnutrition | | | | -.060 | -.448** |
| 4. Mood Disorder | | | | | .005 |
| 5. Social Support | | | | | |

**Note:** * = $p < .05$ and ** = $p < .01$

**Table 5**
**Multiple Regression Analysis of Mood Disorders**

| | Standardized Regression Coefficient | Standard Error | *t* | *p* |
|---|---|---|---|---|
| Anxiety | .359 | 1.673 | 2.183 | .036 |
| Depression | .329 | 1.547 | 1.996 | .054 |

**Note:** $R^2 = 0.364$; $F = 9.436$

**Table 6**
**Intercorrelations Between the Variables of Anxiety and Depression**

| Variables | 1 | 2 | 3 |
|---|---|---|---|
| 1. Fatigue | | .536* | .521* |
| 2. Anxiety | | | .537* |
| 3. Depression | | | |

**Note:** * = $p < .05$

tus, not body mass index.

Other studies have used albumin as a marker for uremic malnutrition (McCann & Boore, 2000; Sklar et al., 1996), but they did not observe a relationship between albumin and fatigue. This study used either albumin or prealbumin but like other studies, found no relationship with albumin or prealbumin to fatigue. The majority of participants in the study, however, did not have a recorded prealbumin and therefore albumin was used. This may have skewed the findings since only 13 African American women had a recorded prealbumin. The majority of these women with prealbumin levels met the parameters for uremic malnutrition. Thus, further study using prealbumin levels is recommended.

This study found a moderate negative correlation between social support and uremic malnutrition. Boyer et al. (1990) noted that when family and medical staff were perceived as unsupportive, potassium was high, indicating a decrease in dietary compliance. Therefore, support from the patient's social environment, including staff and family, may influence dietary habits. Assessment of social support is needed, and dietary resources such as assistance with meals, meal supplements, and education should be increased for those with lower social support. Because of the influence of social support on uremic malnutrition and the influence of uremic malnutrition on mortality and morbidity, further research examining social support is essential.

As in most of the studies to date (Davis et al., 1990; Dobrof, et al., 2001; Elal & Krespi, 1999; McCann & Boore, 2000; Sklar et al., 1996), mood disorder was present in this sample. Further, mood disorder and fatigue were significantly correlated. McCann and Boore (2000) also used the HADS to measure mood disorder. They found depression more prevalent than anxiety and only depression was correlated with fatigue. Interestingly, in the current study, anxiety was more prevalent than depression, and correlations were found between both anxiety and depression with fatigue. These differing results may be related to race and gender. McCann and Boore (2000) did not report race and they included both males and females. The current study focused on African American women. Further studies exploring the presence of anxiety and the effect of anxiety on fatigue in African American women with ESRD are needed. Because interventions for anxiety and depression may differ, mood disorders should be distinguished and treatments designed accordingly.

## Conclusion

The theory of unpleasant symptoms places importance on three antecedents to an unpleasant symptom – physiological factors, psychological factors, and situational factors. In this study, when all three factors were combined, they explained 38% of the fatigue score, and only psychological factors (anxiety and depression) were significant. For the symptom of fatigue, the results of this study strongly support the psychological impact on fatigue. When analyzed separately, the psychological factors were again strongly correlated with fatigue, physiological factors were moderately correlated, and situational factors were not significantly correlat-

ed. Further studies need to be conducted that examine other types of physiological and situational factors influencing fatigue.

## Limitations

While the findings of this study are intriguing, there are limitations to this study. This study used a cross-sectional design with a convenience sample. Therefore, the results only represent data noted at one point in time and cannot be generalized. Because the study was conducted in one geographical region, the results may not represent African American women from other regions. Finally, only four independent variables were used for this study. Thus, these results may not represent the complex relationship of influencing factors to fatigue in African American women with ESRD. Further studies are warranted to investigate other influencing factors of fatigue in African American women on dialysis.

## Implications for Nephrology Nurses

One of the most important implications for nephrology nurses is the high prevalence of fatigue in African American women on hemodialysis. Understanding fatigue and the antecedents to fatigue will help nephrology nurses focus their assessments to address fatigue and the factors that may be modified to decrease fatigue. Monitoring laboratory values will also assist with the identification of anemia and uremic malnutrition which may be contributing to fatigue. Documenting signs and symptoms of anxiety and depression, not just depression, will aid in identifying mood disorders associated with fatigue in African American women. Further, determining levels of social support may help explain poor nutritional outcomes. Nephrology nurses are in unique positions to assess fatigue and coordinate interdisciplinary teams to develop individualized plans of care for this specific population.

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# ANSWER/EVALUATION FORM

## Fatigue in African American Women on Hemodialysis

*Amy G. Williams, MSN, RN, Patricia B. Crane, PhD, RN, FAHA, and Daria Kring, MSN, RN, BC*

**1.5 Contact Hours**
**Expires: December 20, 2009**
**ANNA Member: $15**
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### Posttest Instructions

- Select the best answer and circle the appropriate letter on the answer grid below.
- Complete the evaluation.
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1. What would be different in your practice if you applied what you have learned from this activity?

_____

_____

_____

_____

_____

_____

_____

**GOAL** To increase the knowledge of nephrology nurses about factors that affect fatigue in African American women requiring hemodialysis.

**New Posttest Format**

Please note that this continuing education activity does not contain multiple-choice questions. We have introduced a new type of posttest that substitutes the multiple-choice questions with an open-ended question. Simply answer the open-ended question(s) directly above the evaluation portion of the Answer/Evaluation Form and return the form, with payment, to the National Office as usual.

| Evaluation | Strongly disagree | | | | Strongly agree |
|---|---|---|---|---|---|
| 2. By completing this offering, I was able to meet the stated objectives | | | | | |
| a. Describe the factors affecting fatigue as used in a study of African American women requiring hemodialysis. | 1 | 2 | 3 | 4 | 5 |
| b. Summarize the physical, psychological, and situational factors that affect symptoms of fatigue in those requiring hemodialysis. | 1 | 2 | 3 | 4 | 5 |
| c. Relate the results of a study on the effects of fatigue on African American women requiring hemodialysis. | 1 | 2 | 3 | 4 | 5 |
| 3. The content was current and relevant. | 1 | 2 | 3 | 4 | 5 |
| 4. This was an effective method to learn this content. | 1 | 2 | 3 | 4 | 5 |

5. Time required to complete reading assignment: _____ minutes.

I verify that I have completed this activity _____
(Signature)