



Chronic Kidney Disease, Anxiety and Depression among American Blacks; Does Ethnicity Matter?

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Abstract

Introduction: Chronic kidney disease (CKD) is known to be associated with deterioration of mental health. However, it is clear that this link is over and beyond the effects of socio-economic factors and other medical conditions. This study had two aims: 1) to compare the association between CKD and general anxiety disorder (GAD) among the two major ethnic groups of American Blacks (e.g. African Americans and Caribbean Blacks), and 2) to compare the association between CKD and major depressive episode (MDE) between African Americans and Caribbean Blacks.

Methods: We analyzed data from African Americans and Caribbean Blacks who participated in the National Survey of American Life (NSAL). Self-reported physician diagnosis of CKD was the independent variable. Outcomes were 12- month GAD and MDE measured by the World Mental Health Composite International Diagnostic Interview (CIDI), a fully structured diagnostic interview. Ethnic-specific logistic regressions were used to determine the associations between CKD and 12- month GAD and MDE, after controlling for the effects of age, sex, educational level, and 13 other medical conditions.

Results: Although CKD was positively associated with GAD and MDE in bivariate analysis, this association did not remain statistically significant in the multivariate analysis which controlled for socio-economic factors and other medical conditions. The study suggested that the main confounders for the association between CKD, GAD, and MDE vary based on ethnicity. For instance, the chronic medical condition that may play the role of confounder for the association between CKD and 12-month GAD among African Americans and Caribbean Blacks might be hypertension and heart disease, respectively.

Conclusion: Possible confounders of the associations between CKD and GAD and MDE among American Blacks vary by ethnicity. Further research is needed to determine the links between different types of CKD and poor mental health among American Blacks. Consideration of ethnicity might be important in evaluation and treatment of mental health problems among Black patients with CKD.

Keywords: Anxiety, Depression, Chronic Kidney Disease, American Blacks, Ethnic Groups

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1. Introduction

Although Blacks might be more physically ill [1-3], they report a better mental health compared to Whites [4]. More specifically, research has consistently documented lower rates of general anxiety disorder (GAD), and major depression disorder (MDD) among Blacks [4]. Jackson et al. have called this phenomena a paradox that has contradictory physical and mental health disparities between Blacks and Whites. Jackson and colleagues argue that this paradox contradicts the presumed relationships among negative life conditions and stressors on the one hand and poor physical and mental health on the other [5]. Research surrounding this paradox is essential to understanding mechanisms for Black and White health disparities.

Patients with chronic kidney disease (CKD) experience low levels of psychological well-being [6]. Anxiety and depression are also common among patients who undergo chronic hemodialysis [7-9]. Anxiety and depression are associated with higher morbidity in multiple domains of well-being of the CKD patients [10-13]. Poor mental health is associated

with higher morbidity and mortality among patients with CKD [14-16].

Although there is some evidence suggesting that psychological well-being may be lower and anxiety and depression may be more prevalent among patients with CKD [17], few studies have been conducted to test if the association between CKD and mental problems are independent of socio-economic and other medical conditions. This is particularly important because there is evidence suggesting that socio-economic and chronic medical conditions may confound these associations [18].

Race and ethnicity shape patterns and predictors of chronic medical and psychiatric conditions [19-22]. This is possibly due to the unique profile of risk and protective factors among each racial and ethnic group. Race and ethnicity should be considered as contextual factors that shape exposure and susceptibility to a wide range of risk and protective factors [23-27]. However, very little is known about the differences in the patterns of comorbidities between physical and mental

illness across racial and ethnic groups. It is plausible to assume that physical illnesses may have differential mental health correlates (causes or consequences) among different social groups, explaining a part of health disparities among ethnic minority groups.

To extend available literature regarding the ethnic differences in association between physical and mental health, the current study was conducted to determine the associations between CKD and GAD and major depressive episode (MDE) among African Americans and Caribbean Blacks.

2. Methods

For this cross sectional study, we used data from the National Survey of American Life (NSAL), 2001 to 2003. All procedures for this study were approved by the Institute Review Board at the University of Michigan.

2.1. Participants

The NSAL used a nationally representative probability sample of Black and White populations, 18 years and older in the US. Features of sample design, procedures, and interviewer training and supervision have been described elsewhere [28-30].

2.2. Interview

Data was collected through face to face (86%) or telephone (14%) interviews. Interviews typically lasted an average of 2 hours and 20 minutes. All interviews were conducted in English. The final response rate was 72.3%.

2.3. Measures

Each participant was asked to report the presence of CKD, diagnosed by a physician. They were also asked about 13 other medical conditions including arthritis / rheumatism,

peptic ulcers, cancer, hypertension, diabetes, chronic liver disease, stroke, asthma, other chronic lung diseases, atherosclerosis, sickle cell disease, heart disease, and glaucoma. Socio-economic characteristics such as age, sex, and educational level were also collected.

2.4. Outcomes

Twelve months GAD and MDE were measured using a modified version of the World Mental Health Composite International Diagnostic Interview (CIDI), a fully structured diagnostic interview. The CIDI evaluates a wide range of DSM-IV mental disorders, and has been used reliably on the World Mental Health project [31].

2.5. Statistical Analysis

Because the NSAL used a multistage sample design involving clustering and stratification, specialized statistical techniques were used to account for the complex design. Weights were applied to provide a nationally representative sample, based on strata, clusters, and non-response. Sub-population analyses for surveys were also applied.

Stata version 12 was used for data analysis. First, bivariate association between CKD and outcomes were tested, using weight adjusted chi square tests. For multivariable analysis, ethnicity-specific logistic regressions were fitted considering 12 month GAD and MDE as outcomes (4 regressions were fitted to data). CKD and other chronic conditions were entered as dichotomous variables to these models, while the effects of socio-economic characteristics were controlled. Adjusted Odds Ratios (OR) and 95% Confidence Intervals (CI) were reported. P-values less than 0.05 were considered statistically significant.

Table 1. Socio-economic characteristics of the African Americans and Caribbean Blacks*

Socio-economic Characteristics	Ethnicity	
	African American n(%)	Caribbean Black n(%)
Gender		
Male	1271 (44.03)	643 (50.87)
Female	2299 (55.97)	978 (49.13)
Marital Status		
Married	960 (32.91)	559 (37.56)
Partner	260 (8.74)	131 (12.58)
Separated	286 (7.16)	128 (5.37)
Divorced	524 (11.75)	178 (9.29)
Widowed	353 (7.90)	78 (4.29)
Never married	1170 (31.55)	542 (30.92)
Region		
Northeast	411 (15.69)	1135 (55.69)
Midwest	595 (18.81)	12 (4.05)
South	2330 (56.24)	456 (29.11)
West	234 (9.25)	18 (11.14)
	Mean (SD1)	Mean (SD)
Education	12.43 (2.23)	12.93 (1.00)
Age	42.33 (14.50)	40.28 (5.78)
Income	36846 (33236)	47017 (15242)

* Weights have been considered.

1- SD= standard deviation

3. Results

Socio-economic characteristics of ethnic groups of Blacks are presented in Table 1. CKD was positively associated with 12 month GAD and MDE in bivariate analysis ($P < 0.05$ for both comparisons). In multivariable analysis, however, these associations did not remain as statistically significant.

3.1. General anxiety disorder during the last 12 months

Among African Americans, CKD conditions did not remain as associated with 12 month GAD. Among Caribbean Blacks, atherosclerosis ($OR = 8.621$), and heart disease ($OR = 4.926$) were associated with 12 month GAD, while hypertension ($OR = 0.138$) was associated with lower odds of GAD (Table 2).

Table 2. Association between 12-month major depressive episode and chronic kidney disease among Caribbean Blacks *

	OR ¹	95% CI ²		SE ³	T	P
Women	0.8	0.3	1.9	0.347	-0.6	0.563
Educational Level	0.9	0.6	1.6	0.235	-0.2	0.840
Age	0.9	0.9	0.9	0.014	-3.4	0.003
Chronic Kidney Disease	0.1	0.01	3.5	0.166	-1.4	0.190

* Variables which were entered to the logistic regression included age, gender, education level and 13 other chronic conditions.

1- OR= Adjusted Odds Ratio

2- 95% CI= 95% Confidence Interval

3- SE = Standard Error

Table 3. Association between 12-month major depressive episode and chronic kidney disease among African Americans *

	OR ¹	95% CI ²		SE ³	T	P
Women	1.7	1.2	2.4	0.278	3.30	0.0
Educational Level	0.9	0.8	1.1	0.084	-0.96	0.3
Age	0.9	0.9	1.0	0.007	-5.37	0.0
Chronic Kidney Disease	1.5	0.7	3.0	0.516	1.19	0.2

** Variables which were entered to the logistic regression included age, gender, education level and 13 other chronic conditions.

1- OR= Adjusted Odds Ratio

2- 95% CI= 95% Confidence Interval

3- SE = Standard Error

Table 4. Association between 12 month general anxiety disorder among Whites, African Americans and Caribbean Blacks *

	OR 1	95% CI 2		SE 3	t	P
Women	0.9	0.3	2.9	0.513	-0.2	0.878
Educational Level	0.9	0.5	1.6	0.257	-0.3	0.762
Age	0.9	0.9	1.03	0.03	-1.0	0.333
Chronic Kidney Disease **	-	-	-	-	-	-

* Variables which were entered to the logistic regression included age, gender, education level and 13 other chronic conditions.

** Omitted from regression because of the low number

1- OR= Adjusted Odds Ratio

2- 95% CI= 95% Confidence Interval

3- SE = Standard Error

Table 5. Association between 12-month general anxiety disorder among African Americans *

	OR 1	95% CI 2		SE 3	T	P
Women	2.0	1.1	3.8	0.638	2.26	<0.001
Educational Level	1.1	0.8	1.4	0.133	0.36	0.700
Age	0.9	0.9	0.9	0.008	-2.49	<0.001
Chronic Kidney Disease	1.6	0.7	3.8	0.675	1.14	0.300

* Variables which were entered to the logistic regression included age, gender, education level and 13 other chronic conditions.

1- OR= Adjusted Odds Ratio

2- 95% CI= 95% Confidence Interval

3- SE = Standard Error

Table 6. Association between 12-month general anxiety disorder among Whites *

	OR 1	95% CI 2		SE 3	t	P
Women	3.6	1.2	10.9	1.877	2.52	0.024
Educational Level	1.1	0.7	1.7	0.218	0.64	0.53
Age	0.9	0.9	1.0	0.01	-0.46	0.652
Chronic Kidney Disease	1.4	0.5	3.3	0.582	0.72	0.483

* Variables which were entered to the logistic regression included age, gender, education level and the 14 chronic conditions.

1- OR= Adjusted Odds Ratio

2- 95% CI= 95% Confidence Interval

3- SE = Standard Error

3.2. Major depressive episode during the last 12 month

Among African Americans, hypertension (OR=2.041) but not CKD remained significant as a predictor of 12 month MDE. Among Caribbean Blacks, heart disease (OR=18.174) but not CKD remained as associated with higher odds of 12 month MDE (Table 3).

4. Discussion

Although in the bivariate analysis, CKD was positively associated with 12-month GAD and MDE, these associations did not remain statistically significant in the multivariate analysis that controlled for socioeconomic status and other chronic medical conditions. The main medical condition that plays the role of confounder for the association between CKD and 12-month MDE might be hypertension for African Americans and heart disease for Caribbean Blacks.

The association between chronic somatic conditions and anxiety and depression has been previously supported by the literature. Chronic diseases decrease psychological wellbeing [32]. About 20% of Medicare beneficiaries in 2003 reported depression or another mental illness [33]. Decades ago, Abram argued that "attention to the medical aspects of illness only will no longer suffice" [34]. He highlighted emotional and psychological reactions of people with chronic illnesses including those under long-term renal dialysis [35].

Based on our study, in the absence of socio-economic status and other chronic medical conditions, there were positive associations between CKD and 12-month GAD and 12-month MDE. Ferraro and Farmer studied the effects of different types of diseases on perceived health, showing that there are only certain medical conditions that may be independently linked to well-being. The study suggested that only arthritis, diabetes, and hypertension were associated with a decline in perceived health, while other chronic medical conditions did not have any additive effects [36]. Another study showed that CKD and coronary artery disease but not other medical conditions were associated with high depressive symptoms, and rheumatoid arthritis and hepatitis but not CKD were associated with high levels of anxiety [17]. These studies, however, are different in setting, samples, and measures.

Ferraro and Farmer also showed that the effect of a chronic medical condition differs based on race and ethnicity. In their study, the effect of heart failure on disability was stronger for Blacks than for Whites [36]. In a number of studies, Assari has also shown that the links between obesity, diabetes, drinking, comorbid medical conditions, and depression and anxiety are specific to the social context in which the individuals lives in, and race, ethnicity, gender, social class, and country are within the most fundamental contextual factors that shape the complex interplay between risk factors, protective factors, and outcomes [23-27]. It is possible that delay of diagnosis and treatment of medical diseases among racial and ethnic minority groups may explain some of these differences [43-45]. As a result, there may be social

groups in whom chronic diseases may have more disabling effects [36].

There are studies suggesting that being labeled as having a chronic medical illness may have different results in anxiety and psychological distress among racial and ethnic groups [46]. So, race and ethnic -specific labeling effects may be responsible for some of the inconsistencies in the links between medical diseases and mental health problems across race and ethnic groups. This is particularly important, as the psychological effect of labeling seems to be distinct from those of the disease itself [46]. Even in the absence of symptoms, awareness about the presence of an illness results in functional limitation [47].

Based on the Theory of Illness Cognition, the psychological impact of a disease is closely linked to the individual's cognitive and emotional response to awareness about presence of the disease [48]. In addition, patients from different ethnicities who have been diagnosed may differently adopt sick roles [49]. Based on the Illness Beliefs Theory, we can expect some racial and ethnic differences in the psychological effects of disease and their labeling. For instance, compared to Whites, Blacks more frequently believe that hypertension is a more serious health concern [50], however, they may less frequently believe that lifestyle change lowers blood pressure [51]. Highly perceived seriousness and lowly perceived control over the condition may lead to high levels of anxiety among Blacks with a medical condition such as hypertension [52].

Race and ethnicity may influence the levels of insight, motivation, and perceived need for treatment of a chronic medical condition. Patients of different ethnicities may also differ in their beliefs about how an illness threatens body integrity and function. Ethnic groups may also differ in use of defense mechanisms such as regression, displacement, introjections, or denial, in the process of coping with an illness. The level of preoccupation with an illness and also adherence and compliance of the patients may also depend on race and ethnicity.

Based on the Transactional Model of Stress and Health, ability to cope with stress buffers the effect of stressors on outcome [53]. In our case, CKD and other medical conditions are the stressor, while GAD and MDE are the potential mental health consequences.

People of one ethnic group may appraise having a chronic medical disease as more of a threat to their life. Ethnicity may also influence use of problem-focused and emotion-focused coping strategies when faced with stressful situations [54,55]. Ethnicity may also influence distribution of available social support that functions as a buffer against the effects of stressors [56].

Race, ethnicity, and culture influence perception and expression of illnesses. Ethnic groups differ in life values that may alter responses to suffering from a chronic condition, however, few empirical studies have been done in this regard. In many cultures, it is believed that a wise man is able to remain

indifferent to both joy and suffering. Thus, cultures may praise the ability to withstand pain. Thus, a single disease may produce a wide range of responses across ethnic groups [57].

Empirical research on ethnic differences in the health attitudes and practices associated with each chronic medical condition is very limited. Meaning and expression of symptoms may be under influence of values and norms that are specific to ethnic background. We already know ethnicity and culture influence how the symptoms are being experienced and expressed [57]. Ethnicity also shapes the protective effect of religious coping in the presence of a chronic medical condition [24, 27].

Research has accumulated data on the influence of social and cultural elements in illness perceptions and in the etiology of certain physical and emotional diseases. Attitudes toward illness and medicine may vary across various population groups. However, much remains to be explored regarding ethnic differences in emotional and mental health reactions to medical illnesses [57].

There is a need for further studies on the role of race and ethnicity on shaping the links between physical and mental health conditions. Our result is against the belief that mental health effects of chronic diseases [58-61] are independent of the type of disease. There is a need for studies that measure the role of both number and type of chronic conditions [62]. Our study was limited from several aspects. For instance, we measured chronic conditions using self-reported data, as we questioned whether or not a physician had ever told participants that they had CKD and other chronic conditions. However, we do not have data on the validity of the self-reports of the CKD and other medical conditions among different racial groups [63]. In addition to possible differences in validity of self-reported chronic conditions between different racial and ethnic groups [64], people from different race and ethnic origins may have different levels of access to health care, and as a result may have different levels of awareness about their health problems, such as CKD. The sample size for the two ethnic groups did not match. The cross-sectional design also prevents us from establishing any causal link between study variables. The study also did not measure medications, other therapeutic interventions. Another possible limitation of this study was the possible differential validity of the diagnosis of GAD and MDE between African Americans and Caribbean Blacks [4, 65]. For all these reasons, the results should be interpreted more conservatively. Despite the limitations listed above, our study had numerous strengths. Our study is one of very few studies that has investigated the moderating effects of race / ethnicity on the links between chronic medical diseases and anxiety and depression disorders. The results presented here may help us to better understand racial disparities in mental health by showing different pathways from chronic conditions and mental health for Blacks and Whites [23-27, 37-40]. The current

study also shows that some medical conditions may contribute by a larger extent than others to racial disparities in mental health [66-68].

5. Conclusion

To conclude, based on our study, the associations of CKD with GAD and MDE among Blacks are not independent of socio-economics and other chronic medical conditions. Possible confounders, however, vary by ethnicity.

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Authors' Contributions

Assari was involved in the study design, data analysis, result interpretation, drafting, and revision of the manuscript.

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