Strengthening Chronic Kidney Disease Knowledge

Among Students Attending a Historically Black University

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Chronic kidney disease (CKD) affects African Americans in a disproportionately high manner and progresses more rapidly than in other races. Lack of knowledge of CKD risk factors and progression may contribute to this disparity. The purpose of this non-random cross-sectional study was to determine the level of CKD knowledge among students attending a historically black college and university (HBCU). Men and women enrolled in healthcare administration, health education, social work, and public health courses were asked to participate in the study. The Chronic Kidney Disease Knowledge in College Students Questionnaire was utilized. A total of 270 participants from a single HBCU were included. The results demonstrate that CKD knowledge was low in this population, particularly among the younger college students. This study provides a foundation for CKD community education, and will be helpful to nephrology social workers in CKD settings and kidney organizations for specifically targeting and educating at-risk individuals.

INTRODUCTION

Chronic kidney disease (CKD) affects more than 26 million people in the United States at varying levels of severity, with most being undiagnosed (Centers for Disease Control and Prevention (CDC), 2015). According to the CDC, CKD is the ninth leading cause of death in the U.S. (CDC, 2015). There has been a drastic increase in the number of CKD patients who eventually develop end-stage renal disease (ESRD). ESRD is projected to increase in prevalence by 50% over the next decade (Collins, Gilbertson, Snyder, Chen, & Foley, 2010). Hence, CKD is a major public health problem with widespread socio-economic impact. Among the general Medicare population, the cost to treat CKD represents 20.1% of Medicare spending at $50.4 billion. Additionally, the ESRD population adds 7% to (Medicare spending United States Renal Data System (USRDS, 2015).

A key issue with this disease is that it disproportionately affects racial and ethnic minorities (Muntner, et al., 2012). The ESRD incidence rate is three times higher in African Americans, compared to Caucasians (USRDS, 2015). Indeed, although African Americans make up only 13% of the U.S. population (U.S. Census Bureau, 2015), 35% of ESRD patients on dialysis are from this community (USRDS, 2015). Moreover, dialysis patients have higher mortality rates compared to the general population. However, African American and Caucasian dialysis patients younger than 45 years-old have similar mortality rates (USRDS, 2015).

Diabetes and hypertension are among the main risk factors contributing towards development of CKD and progression to ESRD. Approximately 11% of all African Americans age 20 or older have diabetes, with one-third of the cases being undiagnosed (National Medical Association (NMA), n.d.). In 2013, Mississippi had the third highest prevalence of diabetes in the United States, affecting approximately 12.9% of the adult population (Mississippi State Department of Health (MSDH), 2015a).

Similarly, hypertension is more common in African Americans. This population is more likely to develop hypertension at an earlier age, and it is more likely to be severe and inadequately controlled (MSDH, 2015b; Moulton, 2009). Mississippi has the second highest prevalence of hypertension in the nation, affecting more than 700,000 adults (MSDH, 2015b; Trust for America's Health & Robert Wood Johnson Foundation, 2015).

While the rates of ESRD due to hypertension have decreased for Caucasians younger than 40, it has actually increased among African Americans (NMA, n.d.). However, despite this rather alarming trend, this community lacks basic understanding of CKD and the risk factors contributing to the disease process (Plantinga, Tuot, & Powe, 2010). Interestingly, while many individuals are aware of diabetes and hypertension as health problems, they fail to correlate diabetes and hypertension to CKD, or view CKD as a health problem (Chow, et al., 2012; Plantinga, Tuot, & Powe, 2010). This suggests that there are substantial shortcomings in CKD knowledge in the African American community. Thus, the primary aim of this study was to perform a pilot in which we assessed CKD knowledge of college students enrolled in health courses at a historically black college and university (HBCU).

Healthcare professionals have an important role in promoting CKD awareness. Many of the study participants had the potential to perform leadership roles within CKD facilities as social workers and administrators. With proper knowledge, they could play an important role in the health education of individuals and groups to eliminate the CKD health

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disparity. The goal of this study was to help discover the population who would most likely benefit from CKD education, and have a positive impact in health awareness within the African American community. Its intended audience is nephrology social workers who work in CKD settings. Social workers are key in educating and promoting awareness for individuals and communities at risk for CKD. They are integral in advocating for and educating vulnerable populations, and have the potential to significantly expand CKD knowledge in the African American community through culturally competent practices.

METHODS

Study Design

The study followed a descriptive cross-sectional design with a quantitative approach to assess CKD knowledge of students at a HBCU. Descriptive research was the most direct option for assessing the knowledge of students to further assist with the development of interventions for the target population.

Study Participants and Data Collection

The surveys were administered at a HBCU located in Mississippi, after obtaining permission from the university's Institutional Review Board (IRB). A non-random convenience sample of undergraduate and graduate students pursuing bachelors, masters, and doctoral degrees, and enrolled in healthcare administration, health education, social work, and public health courses were recruited to participate. Study participants who agreed to complete the survey included both males and females, 18 years or older. We chose this particular population because the courses they were studying focused on preventive health, and prepared students to address the health challenges of individuals, groups, and communities. Various professors for the identified courses at the university were contacted for permission to enter their class for approximately 15–20 minutes to administer the survey. Prior to administering the survey, a script was read that explained the intent of the research. Informed consent was obtained before the survey was administered. The surveys and copies of the informed consent forms, which included the purpose of the study, were provided to the participants. The sample size was 270 students. Participants completed the survey during class, and returned them immediately after completion. Non-participants were asked to remain quiet during the survey administration. Study participation was voluntary, and participants were informed that they could withdraw at any stage while completing the survey. All surveys were anonymous and the data kept confidential.

Study Questionnaire

The survey included 7 questions designed to assess CKD knowledge. Five of the 7 questions were obtained, with permission, from a Singapore CKD knowledge survey designed by Wai Leng Chow et al. (2012). Their study assessed CKD knowledge in 1520 patients from 3 Singaporean primary care centers (Chow et al., 2012). The CKD knowledge questions adapted from the survey were tested for face validity and content saturation. Survey questions were based on the physiology, etiology, presentation, progression, complication, identification, and anatomy of CKD. Responses to the questions were scored 0–7, depending on the number of correct answers. All questions were weighed equally (0 points if not correct; 1 point if correct).

Statistical Analysis

Participants were divided by the following characteristics for purposes of analysis: gender, race (African American vs. Non-African American), age, and academic classification. Descriptive statistics were used to analyze each item of the survey to include demographic information. Pearson's chi-square ($\chi 2$) analysis was used to measure the difference in the dispersion of the data. An alpha level of .05 was established for determining significance.

RESULTS

Sample Characteristics

The demographic characteristics of the participants are presented in **Table 1.** This study included a total of 270 men and women enrolled in a health-related course during the 2014 summer and fall semesters. The study sample was comprised of more female (82.6%) than male students, and more African American (89.3%) than any other race. The average age of the participants was 26.52 (SD = 8.121), median age was 24, and range was 18–56. The age categories for the study were defined according to the National Center of Education Statistics (NCES, 2014). Of the participants' age, a majority were 20-21 (22.2%), with the following age groups in descending order: 22-24 (20%), 25-29 (18.1%), 35 and older (14.8%), 18-19 (11.4%), and 30-34 (10.8%). The majority of the participants were classified as juniors (31.5%), followed by graduate students (28.9%), and seniors (21.1%), while freshmen and sophomores each represented the lowest participation at 8.9% each.

Table 1. Demographic Characteristics

Variable	*N = 270*	
Gender *n* (%)		
	Male	46 (17.0%)
	Female	223 (82.6%)
Race *n* (%)		
	African American	241 (89.3%)
	Non-African American	25 (9.4%)
Age *n* (%)		
	18–19	30 (11.4%)
	20–21	60 (22.2%)
	22–24	54 (20.0%)
	25–29	49 (18.1%)
	30–34	29 (10.8%)
	35 and older	40 (14.8%)
Classification *n* (%)		
	Freshman	24 (8.9%)
	Sophomore	24 (8.9%)
	Junior	85 (31.5%)
	Senior	57 (21.1%)
	Graduate	78 (28.9%)

Note: Due to missing data, counts do not total 270.

In **Table 2**, the survey question addressing knowledge about what can cause kidney disease (Question 2), and what type of test should be performed to detect kidney disease (Question 6), showed higher correct responses at 85.5% and 84.4%, respectively. Approximately, 83.3% correctly responded to the question identifying the function of a kidney in a human body (Question 1). A majority of the participants (67.4%) correctly answered how many healthy kidney(s) a person needs to lead a normal life (Question 7). The question regarding the complications of kidney disease (Question 5) was correctly answered by 41.5% of the participants. Among all questions, those identifying the statement that was incorrect about kidney disease (Question 4), and the symptoms of early kidney disease that might progress to kidney failure (Question 3) were found to be low among the participants at 35.2% and 4.1%, respectively. As for overall knowledge, 67% of the participants answered 4 or more knowledge questions correctly.

CKD Knowledge Questions

Table 3 shows the association between CKD knowledge and age. There was a statistically significant relationship between the participants who knew the function of a kidney in a human body (physiology) and age (p = .032). The age group of the participants with the highest correct responses for physiology were 25–29 (91.8%), and 35 and older (90.0%). The age group with the least number of correct responses was 18–19 (70%). Ninety-five percent (95.0%) of participants 35 and older responded correctly to what can cause kidney disease (etiology), but there was no significant relationship (p = .648). The least correct etiology responses were in the 18–19 and 20–21-year age ranges (80%). Also of note in **Table 3** is the fact that most participants had no knowledge of the symptoms of early kidney disease that might progress to kidney failure (presentation). The highest percentage of participants who responded correctly were in the 25–29-year age range, however those results did not reach statistical significance (p = .122). Results indicated the most significant relationship when examining the progression of kidney disease (p = <.001). The lowest correct responses for identifying the statement that was incorrect about kidney disease (progression) were demonstrated in the 18–19 age range (6.1%). Participants 30–34 had the highest correct response (65.5%). Overall, the lowest knowledge of identifying the complications of kidney disease (complication) was demonstrated in younger participants aged 18–19 (33.3%), 20–21 (36.7%), and 25–29 (36.7%). Participants in 22–24-year age range had the highest correct responses (53.7%), however there was no significant relationship (p = .076) **(Table 3)**.

A significant relationship was seen in the identification of kidney disease (p = .044). Approximately 97.5% of participants in the age category of 35 years and older correctly responded to the type of test that should be performed to detect kidney disease (identification), the lowest percentage of correct responses were in the age category of 18–19 (76.7%). The highest percentage of correct responses identifying the number of healthy kidney(s) a person needs to lead a normal life (anatomy) was seen in participants in the 35 years and older age range (80%), and in the age category of 25–29 years (73.5%). Participants in the age category of 22–24 and 20–21 had the lowest percentage of correct responses at 61.1% and 63.3%, respectively, but did not reach significance (p = .691) **(Table 3)**.

Table 2. Participants' Response to Chronic Kidney Disease Knowledge Questions

		Correct (%)	*Incorrect (%)*	*Don't Know (%)*
1.	What is the function of a kidney in a human body? (Physiology)	225 (83.3)	32 (12.3)	11 (4.1)
2.	What can cause kidney disease (Etiology)	230 (85.5)	22 (8.1)	16 (5.9)
3.	What are the symptoms of early kidney disease that might progress to kidney failure (Presentation)	11 (4.1)	228 (84.5)	29 (10.7)
4.	Which of the following statements about kidney disease is INCORRECT (Progression)	95 (35.2)	106 (39.3)	69 (25.6)
5.	What are the complications of kidney disease? (Complication)	112 (41.5)	107 (39.7)	51 (18.9)
6.	What type of test should be performed to detect kidney disease? (Identification)	228 (84.4)	30 (11.1)	11 (4.1)
7.	How many healthy kidney(s) does a person need to lead a normal life (Anatomy)	182 (67.4)	82 (30.4)	5 (1.9)

Note: Due to missing data, counts do not total 270.

Table 3. Participants Response to Knowledge Question by Age Category

	CORRECT RESPONSE BY AGE						
Question Type	18-19 *n* (%)	20-21 *n* (%)	22-24 *n* (%)	25-29 *n* (%)	30-34 *n* (%)	35 and older *n* (%)	*P*
Physiology	21 (70.0)	47 (79.7)	45 (83.3)	45 (91.8)	24 (82.8)	36 (90.0)	.032
Etiology	24 (80.0)	48 (80.0)	45 (84.9)	42 (85.7)	24 (85.7)	38 (95.0)	.648
Presentation	1 (3.3)	1 (1.7)	3 (5.6)	3 (6.1)	1 (3.6)	2 (5.1)	.122
Progression	2 (6.1)	17 (28.3)	16 (29.6)	21 (42.9)	19 (65.5)	18 (45.0)	<.001
Complication	10 (33.3)	22 (36.7)	29 (53.7)	18 (36.7)	14 (48.3)	16 (40.0)	.076
Identification	23 (76.7)	48 (80.0)	43 (81.1)	45 (91.8)	23 (79.3)	39 (97.5)	.044
Anatomy	20 (66.7)	38 (63.3)	33 (61.1)	36 (73.5)	19 (65.5)	32 (80.0)	.691

Note: Full questions are displayed in Table 2. Values and frequency (percent) for categorical variables; Chi-Square tests for variables to obtain p*-value.*

STUDY STRENGTHS

To the best of our knowledge this is the first study to specifically address the extent of CKD knowledge in African American college students. It assists in identifying the knowledge gap in a population that is disproportionately affected by CKD, based on race, geographic location, and risk factors such as diabetes and hypertension. It aims to provide a foundation for future research studies specifically targeting at-risk populations. It also provides information regarding areas of low knowledge in the target population and will be beneficial when designing and implementing future educational interventions and social work practice.

STUDY LIMITATIONS

This study had several limitations. First, all variables were self-reported and may have resulted in some participants providing the answer they thought the researcher wanted, thus not being reliable. Second is the use of a cross-sectional design. The information was gathered from the participants at a single point in time. Third, the sample population was from one HBCU, and the findings cannot be generalized to other HBCUs. Fourth, study participants were enrolled in health-related courses and may have had more knowledge regarding CKD. Fifth, the study used a convenience sample and the findings cannot be generalized. Lastly, this was a pilot study and therefore the sample size may be underpowered to draw firm conclusions.

DISCUSSION

Findings of this study demonstrate the relative lack of awareness regarding CKD in the study population. Although the survey was conducted among college students who were studying preventive health-related subjects and may have more knowledge than the general population, there was an overall lack of knowledge in CKD presentation, progression, and complications. An age difference in CKD knowledge was seen in participants identifying the cause of kidney disease and the type of test that should be performed to detect kidney disease; specifically, we found that younger, undergraduate students (18–21-year-olds) had the lowest knowledge compared to the older participants (35 and older). This signifies a discrepancy in educating young adults about the risks associated with kidney disease.

Each year millions of people are diagnosed with a chronic disease, and unfortunately millions more die from the illness (World Health Organization (WHO), 2014). The first step in increasing awareness about CKD is through education. In order to understand the impact of CKD and take preventive measures, there must be knowledge of the disease. Family members of CKD patients have a high prevalence of CKD and its risk factors, therefore, it is recommended to screen the family members of CKD patients in an effort to prevent kidney disease (Kazancioglue, 2013). The results of this study can assist clinic-based nephrology social workers with providing patient education about the increased risk of CKD

to pass on to their family members, with a focus on younger adults, and begin conversations about early screenings and detection.

Community-based social work interventions with this population should focus on educating young adults about their increased risk of CKD, based on having diabetes, hypertension, and a family member with the illness. Educational initiatives should explore the possibility of risk factor screening for young adults in order to learn their glucose and blood pressure levels so early measures can be taken to prevent these risk factors. Social workers must promote organizations such as the National Kidney Foundation and other organizations that offer free community kidney health screenings and educational materials to increase awareness of CKD. The National Kidney Disease Educational Program (NKDEP) (2016) offers health guides and educational toolkits that promote family and community CKD conversations and screenings. Nephrology social workers are advocates and can educate patients to become "kidney champions" and utilize these free resources to engage family members. We must actively empower patients and the communities to participate in local screenings to become aware of their risk for CKD. Nephrology social workers in CKD settings, as well as macro-level workplaces, such as kidney organizations and ESRD Networks can reference this study to target interventions for individuals at greatest risk for ESRD.

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