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Journal of Health Disparities Research and Practice

Volume 14 | Issue 3 Article 8

2021

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Abstract

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Keywords

Food Insecurity; Race; African American Males; Health Outcomes; Health Disparities

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Journal of Health Disparities Research and Practice
Volume 14, Issue 3, Fall 2021, pp. 133-150
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ABSTRACT

Although prevalence of food insecurity has declined over the last 5 years, food insecurity for African Americans and single individuals is increasing. The purpose of this paper is to examine the male-specific associations between food insecurity and cardiovascular-related health outcomes. We examine the relationship between single, African American male adults and food security, kidney disease risk, diabetes, and related comorbidities using the NHANES dataset (2013-2014). We build multivariate logistic regression models to estimate the association between gender, race, and food insecurity using stratified data from the 2013-2014 National Health and Nutrition Examination Survey.

Keywords: Food Insecurity; Race; African American Males; Health Outcomes; Health Disparities

INTRODUCTION

Food insecurity is a measure that conceptualizes a household-level economic and social condition of limited or uncertain access to adequate food (Coleman-Jensen, Gregory, & Singh, 2017). Existing studies on food insecurity largely limit analyses to marginalized populations such as women with children, families with children, and aging populations. However, the intersectionality of gender, race/ethnicity, and the experience of food insecurity is complex and involves factors such as poverty, unemployment, incarceration, and those who are differently abled (Odoms-Young & Bruce, 2018).

Current Population Survey (CPS) 2017 data suggest a trend of more non-married adults living alone compared to 2007, going from 39% to 43% nationally (Fry, 2017). Moreover, 61% of adults under 35 are living alone (Fry, 2017). Recent data reports a similarity in prevalence of

food insecure men and women living alone, 13.4% and 13.9% respectively (Coleman-Jensen, Gregory, & Rabbitt, 2018). According to the United States Department of Agriculture (USDA), African American households have a food insecurity rate (21.2%) that is nearly double the national average (Coleman-Jensen, Gregory, & Rabbitt, 2018). Few studies distinctively examine food insecurity and associated determinants (i.e. men's diet, obesity, hypertension, heart disease, kidney disease) among non-institutionalized, single, African American male adults. This study will examine the relationship between single, African American male adults and food security, kidney disease risk, diabetes, and related comorbidities using 2013-2014 data from the National Health and Nutrition Examination Survey (NHANES).

African American Men's Diet and Connection to Food Behaviors

Some of the existing data on African American male diets have been a result of conveniently sampled populations (i.e. college students or children) (Garbers, 2018), therefore limiting extant literature on adult males and those living among other family members. It is important to note that African American family structures and familial roles may differ from those of normative European Americans (Browne and Battle, 2018). Although many African American families are matriarchal in structure, African American men are often respected partners, fathers, and have essential roles in the family (Jones, 2018; McAdoo, 2007).

Eating behaviors and diets of men are influenced by gatekeepers such as women, wives, or partners (Allen et al., 2012). The aforementioned variables such as poverty, employment status, and those relating to structural inequality coupled with complex responsibilities from work, family, community, social commitments, and one's environment influence African American male dietary choices and health outcomes (Griffith et al., 2015; Savoca et al. 2011). African American men frequently report skipping meals such as breakfast or lunch as a result of time constraints and work schedules (Griffith et al., 2013). African American men have been identified as participating in food preparation (Haynes, 2000), although they rely heavily on spouses or partners for "home-cooked" dinners (Griffith et al., 2013).

Race, Health, and Food Insecurity

The relationship between obesity, race, and gender is multifaceted and confounded by socioeconomic status. African Americans are more likely to reside in obesogenic environments that offer increased access to higher calorie dense foods, unsafe environments for physical activity, and high stress environments (Rose, 2020; Thorpe et al., 2015). This often yields negative diet behavior choices. The amalgamation of these factors and dietary behaviors contribute to chronic diseases such as obesity, diabetes, cardiovascular diseases, and kidney disease.

Data from the Behavioral Risk Factor Surveillance System 2015-2017 suggest that African Americans have the highest prevalence of self-reported obesity (38.4%) when compared to Hispanics (32.6%) and non-Hispanic Whites (28.6%) (CDC, 2020). Multiple studies illustrate racial differences among men based on age and income (Griffith et al., 2011; Ogden et al., 2017). Researchers have observed an inverse relationship between obesity and socioeconomic indicators like income and education for most gender and racial/ethnic groups (Ogden et al., 2017). However, as income and educational attainment increase, obesity *increases* in Black male adults (Ogden et al., 2017). Studies using national datasets find increased odds of obesity for married Black men (Griffith et al., 2011).

Researchers have found a mix of results linking food insecurity, race, and health. Vaccaro and Huffman (2017) report higher waist circumference for food insecure individuals aged 55 and older, as well as increased rates of diabetes and hypertension. While exploring differences by gender, they found that Mexican American, Black American, and Asian American men with food insecurity had higher odds of diabetes when compared to non-Hispanic Whites (Vaccaro & Huffman, 2017). On the other hand, while Hernandez and colleagues noted that food insecurity was higher for overweight/obese White and Hispanic women, it was not associated with being overweight/obese for Black women, White men, Black men, or Hispanic men (2017). Additionally, no associations were found between food insecurity, diabetes and African American men in a study that stratified race/ethnicity and sex/gender (Strings et al., 2016). The most recent National Health and Nutrition Examination Survey (NHANES) cycle contained data showing the prevalence of food insecurity was highest in obese adults overall, but found that food insecurity was most prevalent among African American adults with normal weight (Myers et al., 2020). Overall, though, there is a paucity of literature on food insecurity and health outcomes that focuses on Black men. Limitations of prior studies exploring race and food insecurity often include low sample sizes (Irving, 2014).

In a study examining gender-specific associations between food insecurity, obesity, and insulin resistance, Liu and associates (2015) suggest food insecurity and insulin resistance vary by gender. The authors attribute a gender difference in coping methods to divergent relationships between food insecurity, overweight and obesity, and insulin resistance outcomes. Insulin resistance and marginal food insecurity were significant in overweight or obese men; whereas very low food security was found significant in normal weight men (Liu et al., 2015).

Hypertension and Food Insecurity

Extant literature reports a positive relationship between food insecurity and hypertension (Irving, 2014), often among low-income individuals (Seligman, 2010; Crews et al., 2014). Data from the Centers for Disease Control and Prevention suggest adult males 60 and under have higher prevalence of hypertension in comparison to women, and African Americans have a higher prevalence of hypertension when compared to Whites, Asians, and Hispanics (CDC, 2017). An executive report on African American men and blood pressure used data from three time spans dating from 1988-2006; these data illustrate higher percentages of African American men with hypertension when compared to White or Mexican American men in every time span and African American women in 2 out of 3 time spans (CDC, 2010). Thus, longitudinal data demonstrates that African American men have suffered from higher proportions of elevated blood pressure when compared to other racial and minority groups.

Victor and associates (2018) studied an intervention group of mainly single Black males with hypertension in barbershop settings. These settings allotted for a supportive and culturally comfortable environment to engage Black men. Findings within this study recommended health care promotion in culturally appropriate settings by trusted individuals (such as barbers) to improve blood pressure outcomes and utilization of blood pressure medication.

Some researchers have compared historical and genetic expression of hypertension in African Americans and Africans. Findings suggest disparities in hypertension amongst African Americans and Whites due to genetics; yet when hypertension in African Americans are compared to West Africans, African Americans experience the illness at double the rate (Williams, Priest, & Anderson, 2016). This evidence, along with other etiological ideologies,

enjoin us to consider social factors, racial disparities, cultural and environmental factors (Williams et al., 2016), and response differences to antihypertensive medications (Williams et al. 2010) to better understand race, gender, and other disparities related to hypertension in the United States.

Irving and colleagues (2014) explored food insecurity and self-reported hypertension in the Hispanic, Black, and White populations. The study reports African Americans (both male and females) report higher prevalence of self-reported hypertension and that overall, food security is positively associated with self-reported hypertension (Irving 2014).

Comorbidity of Diabetes

Cardiovascular disease is one of the leading causes of death and impairment in the United States; it is also a common risk factor and comorbidity of diabetes and obesity (Mozaffarian, 2016). The understanding of the intersection of race, socioeconomic status, social environment, food insecurity and how these factors influence cardiovascular disease needs further investigation (Williams et al., 2016). Social consequences of race and ethnicity including oppression, racism, exploitation, and social inequality have been theorized to contribute to negative health outcomes such as poor cardiovascular health (Calvin, 2003). Death rates from heart disease are higher at every level of education for African American men when compared to White men (Jemal et al., 2008; Williams et al., 2016).

Kidney Disease and Food Insecurity

Hypertension and cardiovascular disease are often associated with kidney function. Lower income, race, geographic disparities, and modifiable environmental influences have also been linked to greater odds of development of chronic kidney disease (Suarez et al., 2016). Authors also note the connection between diet and food environment as a contributor to poor kidney function and kidney disease, as well as comorbid health outcomes such as obesity and diabetes (Suarez et al., 2016; Banerjee et al., 2017). Similarly, individuals who are food insecure are more likely to develop end-stage renal disease when compared to those who are considered food secure (Banerjee et al., 2017). In a nationally representative study examining the effects of food insecurity on chronic kidney disease in lower-income Americans, analysis suggested a significant association between food insecurity and hypertension (Crews et al., 2014).

African American Men and Food Insecurity

Poverty, unemployment, race, and the limited and often restricted opportunities for educational access and employment are all predictors of food insecurity for African American males (Odoms-Young & Bruce, 2018). Moreover, Odoms-Young and Bruce (2018) report that a major factor of food insecurity is the concentration of the social and economic disadvantages experienced by people of color. Studies that dissect food security by race and sex and the associations between food insecurity and diabetes, found that 46% of African American males reported either experiencing low food security or very low food security (Strings et al., 2016).

Single African American men often lack the economic opportunities, access, and economic power that are experienced by the majority (Glassman, 2020). As food insecurity is associated with poor physical and mental health outcomes, poverty, and environmental injustice, implications for studying the intersectionality of race and gender are important for the health and nutrition of African American males. More information is needed to guide interventions that meet the needs of African American males and African American families.

Reducing food insecurity is an important focal point to reducing health disparities for populations such as Black males. The purpose of this study is to examine the associations between food security, obesity, diabetes, and kidney disease for single, adult African American men. We hypothesize that the relationship between gender, obesity, and food insecurity will vary by marital status. We also predicted that there will be a positive association between African American single men and food insecurity.

METHODS

Data from this study were drawn from a cross-sectional survey, the National Health and Nutrition Examination Survey (NHANES) 2013-2014. The sample population within the NHANES data is a nationally representative sample of non-institutionalized US civilians. This collection of data assesses the nutritional and health status of adults and children within the United States. The survey employs interviews and physical examinations by trained medical personnel and staff. This dataset includes demographics, socioeconomic status, individual health, dietary-related survey questions, and medical and physiological measurements (CDC/National Center for Health Statistics, 2017).

We employed publicly available data from the 2013-2014 NHANES. NHANES participants are interviewed in their homes before completing a physical examination in a mobile center to collect clinical data (CDC/National Center for Health Statistics, 2017). The overall total number of participants in this study was 5,363, including adult males and females. The sample for this project only included adults (age 18 and older) who identified their race/ethnicity, food security status, and key health indicators. NHANES oversamples African Americans for more reliable statistics. A subsample of 451 African American men provided data relevant to this study.

Measures

Body Mass Index (BMI): Height (feet and inches) and weight were collected during the surveys and used to calculate BMI. BMI was categorized as normal weight (BMI= 18.5-24.9), overweight (BMI= 25-29.9), Mild Obesity (BMI= 30-34.9), Moderate Obesity (BMI= 35-39.9), and Morbid Obesity (BMI > 40). These standards are outlined by the Centers for Disease Control and Prevention (CDC, 2015).

Food Insecurity: The 10-item USDA Food Security Scale for households was used to assess adult food security categorization. If participants affirmatively responded to three or more items, this suggested that the participants experience food insecurity; affirmative responses to two or fewer items suggests food security (Coleman-Jensen et al., 2016).

Diabetes: Diabetes risk as a health outcome was measured by participants answering affirmatively to the question, “Do you feel you could be at risk for diabetes/prediabetes?”

Heart Disease: As hypertension is often a risk factor and comorbidity of heart disease, our study uses hypertension as a proxy to investigating cardiovascular health and heart disease, similar to Fuchs & Welton (2020). Participants were identified as having heart disease if they affirmatively responded to the question, “Ever told you had high blood pressure?”

Kidney Disease: Kidney Disease was based on the participant’s responses to if they have ever been told they had weak/failing kidneys. This study uses this measure as a proxy to investigating kidney disease risk.

Race: Race was based on self-reported responses to the interview questions. Race was categorized as non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, Hispanic, Mexican Americans, and other.

Covariates: Demographic variables were included as covariates in all models to control for factors that may contribute to food insecurity as well as poor health outcomes. Variables include: marital status, age, education, employment (employed, unemployed), and household income.

Analytic Plan

All statistical analyses were performed using SPSS version 24 statistical software. Each of our dependent variables are binary (yes/no) questions. Therefore, in order to perform a multivariate analysis, we used binary logistic regression.

Research Question: What are the relationships between African American single male adults, food security, diabetes and cardiovascular health outcomes?

We recoded marital status as a dichotomous variable combining those who were married with those who were living with a partner. The other categories (widowed, divorced, separated, and never married) were combined into the "Single" category.

We recoded food security into a dichotomous variable of either full food security or food insecure (combining marginal food security, low food security, and very low food security).
Body Mass Index (BMI) data were categorized into Normal (Lowest through 24.99), Overweight (25 through 29.99), Mild Obesity (30 through 34.99), Moderate Obesity (35 through 39.99), and Morbid Obesity (40 and higher).

RESULTS

Table 1 includes frequencies for nominal and ordinal variables in our model. Non-Hispanic Whites are the largest racial/ethnic group in the dataset (44.2%), followed by Non-Hispanic Blacks (20.8%). Mexican Americans are the third largest group, making up approximately 12.2% of all respondents. The vast majority (71.4%) of respondents report being food secure, with about 29% reporting food insecurity. More respondents are married or living with a partner (58.5%) than single (41.5%). About 26% of respondents are college graduates and another 31% have some college (including those with an associate's degree). In terms of BMI, most respondents are either Underweight/Normal weight (33%) or Overweight (34%). Nineteen percent classify as mildly obese, while 8% are moderately obese, and 5.6% are morbidly obese.

Table 1: Frequencies

		Frequency	Percentage
Race/Ethnicity	Non-Hispanic White	2,373	44.2%
	Non-Hispanic Black	1,115	20.8%
	Mexican American	652	12.2%
	Other Hispanic	446	8.3%
	Other Race	777	14.5%
Food Security	Food Insecure	1,535	28.6%
	Food Secure	3,828	71.4%
Marital Status	Single	2,223	41.5%
	Married	3,140	58.5%
EDUC	Less than HS Diploma	1,085	20.2%
	HS Grad	1,224	22.8%
	Some College	1,676	31.3%
	College Grad or above	1,378	25.7%
GENDER	Male	2,577	48.1%
	Female	2,786	51.9%
Household Income	Poor (Less than $20,000)	1,101	20.5%
	Lower working ($20,000 up to $44,999)	1,737	32.4%
	Middle Income ($45,000 up to $74,999)	1,006	18.8%
	Upper Middle to Wealthy (Above $75,000)	1,519	28.3%

BMI	Underweight or Normal	1,778	33.2%
	Overweight	1,825	34.0%
	Mild Obesity	1,031	19.2%
	Moderate Obesity	426	7.9%
	Morbid Obesity	303	5.6%

We ran three logistic regressions to examine the impact of race and food insecurity on health outcomes. Table 2 shows the logistic regression predicting the likelihood of having high blood pressure. Race, food insecurity, educational attainment, age, and BMI are all significant predictors of the likelihood of having high blood pressure. Food insecure individuals are more likely to have high blood pressure than food secure individuals. Blacks are more likely than Whites to have high blood pressure, while Mexican Americans are less likely than Whites to have high blood pressure. Age is positively associated with high blood pressure, meaning that as individuals age they are at an increased likelihood of having high blood pressure. Being overweight or obese also significantly increases the likelihood of having high blood pressure. Some other demographic variables, including household income and gender, were statistically unrelated to high blood pressure. Overall, this model accounts for 33% of the variation in identifying who is likely to have high blood pressure.

Table 2: Logistic Regression Predicting High Blood Pressure (Full Sample)

	B	S.E.	Exp(B)
Ethnicity: NH Black***	0.339	0.087	1.404
Ethnicity: Mexican American***	-0.424	0.113	0.654
Ethnicity: Other Hispanic*	-0.284	0.127	0.753
Ethnicity: (Asian/Native/other)	-0.004	0.107	0.996
Food Insecure*	0.190	0.081	1.210
Marital Status: Single	0.032	0.073	1.032
EDUC: High School Graduate	0.086	0.101	1.090
EDUC: Some College*	0.198	0.098	1.219
EDUC: College Grad	-0.189	0.112	0.827
GENDER: Female	0.028	0.067	1.028
HH Income: Low Income	0.201	0.115	1.223
HH Income: Lower Working	0.117	0.097	1.124
HH Income: Middle Class	0.064	0.103	1.066
Age in years***	0.064	0.002	1.066
BMI: Overweight***	0.618	0.085	1.855
BMI: Mild Obesity***	1.152	0.097	3.165
BMI: Moderate Obesity***	1.472	0.130	4.357
BMI: Morbid Obesity***	1.736	0.147	5.672
Constant	-4.695	0.189	0.009
N=5363; Nagelkerke R^2=.333			

DV: High Blood Pressure. +Comparison Group: nhWhite; Food Secure, Married, LT High School; Male; BMI: Normal Weight.

The logistic regression predicting diabetes risk is shown in Table 3. Similar to the model shown in Table 2, food security, race/ethnicity, and BMI are each significant predictors of health status. However, there are important differences in the area of race. Unlike the model predicting high blood pressure, Mexican Americans feel like they are more likely to be at risk for diabetes, and Blacks are not significantly different from Whites. In addition, the combined Asian/ Native/ Other group is more likely to report being at risk for diabetes than Whites. Another difference from the high blood pressure model is that gender and income are statistically significant. Low-income individuals are significantly less likely to feel like they are at risk for diabetes than higher income individuals. Once again, BMI has the largest overall impact on health status.

Table 3: Logistic Regression Predicting Diabetes Risk (Full Sample)

	B	S.E.	Exp(B)
Ethnicity: NH Black	0.059	0.093	1.061
Ethnicity: Mexican American***	0.477	0.111	1.612
Ethnicity: Other Hispanic	0.082	0.129	1.086
Ethnicity: (Asian/Native/other)**	0.313	0.104	1.367
Food Insecure**	0.240	0.082	1.271
Marital Status: Single	0.066	0.073	1.068
EDUC: High School Graduate	0.094	0.110	1.099
EDUC: Some College**	0.281	0.104	1.324
EDUC: College Grad*	0.241	0.118	1.272
GENDER: Female***	0.268	0.069	1.307
HH Income: Low Income**	-0.387	0.118	0.679
HH Income: Lower Working	-0.074	0.097	0.928
HH Income: Middle Class	0.074	0.102	1.077
Age in years	-0.003	0.002	0.997
BMI: Overweight***	0.553	0.087	1.738
BMI: Mild Obesity***	0.967	0.098	2.630
BMI: Moderate Obesity***	1.416	0.130	4.119
BMI: Morbid Obesity***	2.009	0.158	7.454
Constant	-1.814	0.175	0.163
N=4670; Nagelkerke R^2=.108			

DV: Diabetes Risk. +Comparison Group: nhWhite; Food Secure, Married, LT High School; Male; BMI: Normal Weight.

The logistic regression predicting kidney disease risk is shown in Table 4. Once again, food insecurity is a significant contributor to health, as food insecure individuals are much more likely to report having kidney disease risk than food secure individuals. In this model, household income is also a significant contributor; individuals with low-income, and even middle income, are more likely to have kidney disease risk than people in high income households. Morbid obesity is also a strong predictor of kidney disease risk. There are no significant differences in kidney disease risk by race/ethnicity.

Overall, our key finding is that food insecurity contributes to an increased likelihood of experiencing kidney disease risk, high blood pressure, and diabetes risk. African Americans are significantly more likely to experience high blood pressure, controlling for age, BMI, education, income, and marital status. However, African Americans are not statistically more likely to be at risk for diabetes or kidney disease. Being overweight is a very strong predictor of high blood pressure and being at risk for diabetes, which is consistent with prior literature.

Table 4: Logistic Regression Predicting Kidney Disease (Full Sample)

	B	S.E.	Exp(B)
Ethnicity: NH Black	0.082	0.206	1.086
Ethnicity: Mexican American	0.059	0.270	1.061
Ethnicity: Other Hispanic	-0.061	0.324	0.941
Ethnicity: (Asian/Native/other)	0.086	0.283	1.090
Food Insecure**	0.555	0.185	1.742
Marital Status: Single	0.133	0.174	1.142
EDUC: High School Graduate	0.201	0.231	1.223
EDUC: Some College	0.159	0.230	1.173
EDUC: College Grad+	0.054	0.280	1.056
GENDER: Female	-0.171	0.165	0.843
HH Income: Low Income*	0.686	0.319	1.987
HH Income: Lower Working**	0.759	0.288	2.137
HH Income: Middle Class**	0.877	0.296	2.404
Age in years***	0.038	0.005	1.039
BMI: Overweight	0.189	0.208	1.209
BMI: Mild Obesity	0.122	0.245	1.130
BMI: Moderate Obesity	0.328	0.314	1.389
BMI: Morbid Obesity**	0.920	0.300	2.509
Constant	-6.636	0.489	0.001
N=5360; Nagelkerke R^2=.077			

DV: High Blood Pressure. +Comparison Group: nhWhite; Food Secure, Married, LT High School; Male; HH Income: Upper Income; BMI: Normal Weight.

In Table 5-7, we present the binary logistic regression with a sample of only Black men, excluding the race/ethnicity and gender variables from the model. We separately ran models predicting the likelihood of experiencing kidney disease risk, high blood pressure, and being at risk for diabetes for Black males. In each of those models, the biggest risk factor is obesity. Age is also a statistically significant predictor of health status. The older you are and the higher your BMI, the more likely you are to have high blood pressure, diabetes, and kidney disease risk. Marital status, food security, and income were not statistically related to health outcomes. However, education did have an impact on one type of health status; Black males with a college education are more likely to report being at risk for diabetes.

Table 5: Black Men Only: Logistic Regression Predicting Diabetes Risk.

	B	S.E.	Exp(B)
Food Insecure	0.041	0.256	1.041
Marital Status: Single	0.270	0.247	1.310
EDUC: High School Graduate*	0.634	0.328	1.885
EDUC: Some College	0.573	0.335	1.773
EDUC: College Grad**	1.055	0.398	2.871
HH Income: Low Income	-0.138	0.391	0.871
HH Income: Lower Working	-0.189	0.340	0.828
HH Income: Middle Class	0.258	0.344	1.294
Age in years	0.007	0.007	1.007
BMI: Overweight	0.426	0.284	1.532
BMI: Mild Obesity*	0.879	0.315	2.407
BMI: Moderate Obesity	0.765	0.441	2.148
BMI: Morbid Obesity***	1.738	0.547	5.687
Constant	-2.444	0.589	0.087
N=451; Nagelkerke R^2=.094			

DV: Diabetes Risk. +Comparison Group: Food Secure, Married, LT High School; HH Income: Upper Income; BMI: Normal Weight.

Table 6: Black Men Only Logistic Regression Predicting High Blood Pressure

	B	S.E.
Food Insecure	0.319	0.236
Marital Status: Single	0.091	0.227
EDUC		
EDUC: High School Graduate	0.225	0.275
EDUC: Some College	0.049	0.287
EDUC: College Grad	0.312	0.358
HH Income Categorical Simple		
HH Income: Low Income	-0.043	0.370
HH Income: Lower Working	0.146	0.322
HH Income: Middle Class	0.100	0.332
Age in years at screening* **	**0.074**	**0.007**
BMI NIH Classifications		
BMI: Overweight	0.296	0.260
BMI: Mild Obesity*	**0.626**	**0.295**
BMI: Moderate Obesity*	**0.944**	**0.400**
BMI: Morbid Obesity**	**1.437**	**0.474**
Constant	-4.778	0.588
N=551 Nagelkerke R^2=0.342		

DV: High Blood Pressure. +Comparison Group: Food Secure, Married, LT High School; HH Income: Upper Income; BMI: Normal Weight.

Table 7: Black Men only logistic regression predicting kidney disease

	B	S.E.
Food Insecure	0.380	0.504
Marital Status: Single	0.189	0.471
EDUC		
EDUC: High School Graduate	-0.535	0.611
EDUC: Some College	0.110	0.577
EDUC: College Grad	0.266	0.693
HH Income Categorical Simple		
HH Income: Low Income	-0.979	0.906
HH Income: Lower Working	0.045	0.677
HH Income: Middle Class	0.280	0.653
Age in years at screening* **	**0.060**	**0.016**
BMI NIH Classifications		
BMI: Overweight	0.326	0.552
BMI: Mild Obesity	-0.674	0.851
BMI: Moderate Obesity*	**1.440**	**0.651**
BMI: Morbid Obesity	0.647	0.889
Constant	-6.744	1.339
N=551; Nagelkerke R^2=0.180		

DV: Kidney Disease Risk. +Comparison Group: Food Secure, Married, LT High School; HH Income: Upper Income; BMI: Normal Weight.

DISCUSSION

The goal of this study was to explore the associations between food insecurity and cardiovascular health outcomes, with a particular emphasis on single, adult African American men. Overall, with the use of 2013-2014 NHANES data, our findings both align with and counter existing research (Crews et al., 2014; Mendy et al., 2018; Menke et al., 2015). Some of the prior literature has not established a link between food insecurity and negative health outcomes. However, there is a gap in the literature focusing on African American males. In this section, we offer our findings within the context of previous research, current trends in minority health, and directions for future research.

Our research provides insight into age and obesity as significant predictors of health outcomes regardless of food security status. In our sample, 29% of men self-reported food insecurity, and approximately 33% met a category for a diagnosis of obesity. In comparison, other studies suggest that women have significantly higher levels of food insecurity, despite contributing to the majority of food production (Hanson et al., 2007; Mendy et al., 2018). Given these gender differences, the majority of research on food insecurity focuses on women (Ivers & Cullen, 2011). Yet, as our findings suggest, the effects of food insecurity among men cannot be ignored, especially when considered through the lens of cardiovascular-related health disparities. Similar to previous findings (Calif & Vargas, 2009; Mendy et al., 2018; Seligman & Schillinger, 2010), our results suggest that several factors, including food insecurity, are predictive of high blood pressure across racial/ethnic categories. Given the increasing prevalence of underdiagnosed hypertension among African Americans in general, and African American men in particular (Peters et al., 2006), identifying food insecure individuals and connecting them to

medical professionals that can monitor blood pressure might be beneficial in reducing hypertensive-related morbidity and mortality. Further, since BMI maintains a significantly positive relationship with high blood pressure in this study and others (Mendy et al., 2018), identifying men who are both obese and food insecure might be a dual alert for the need to recognize complex issues with hypertension.

Similar to hypertension, food insecurity was significantly associated with diabetes in this study. As Gucciardi and colleagues (2014) note, food insecurity is a risk factor for developing diabetes, and individuals that are both food insecure and diabetic generally have a more difficult time managing their diagnosis. Food insecurity can lead to increased diabetes-related health risks. For instance, previous research examining the intersection of diabetes and food insecurity notes that food insecurity is positively associated with poor self-management among diabetics (Seligman et al., 2010). The finding that African Americans were not at higher risk of diabetes was surprising since previous literature has generally found the opposite. Although our findings did not suggest a racial difference in relation to a diagnosis of diabetes, a much larger body of research consistently recognizes the threat of diabetes in the African American community (Harris et al., 1998; Lynch et al., 2014; Menke et al., 2015). Reports that African American men are 20% to 50% more likely than White men to develop diabetes (Harris et al, 1998) highlight the importance of prioritizing a response to food insecurity for minority men. Similarly, the finding that low-income individuals were significantly less likely to be at risk for diabetes than higher income individuals came as a surprise and could be related to access to regular health care and checkups, which could lead to more frequent diagnoses. This could be a result of the diabetes variable being a measurement of self-reported perceived risk.

While chronic kidney disease occurs in both men and women, the illness is associated with poorer health outcomes and higher rates of mortality for men (Carrero et al., 2018). Our findings, similar to others (e.g. Crews et al., 2014), identify a strong association between chronic kidney disease and food insecurity. Further, although we do not find any racial differences, household income is a significant indicator for chronic kidney disease. While these findings have been supported by others in relation to lower incomes (Crews et al., 2014; Martins et al., 2006), our findings remain unique in identifying even those within moderate income categories as being at a higher risk for kidney disease in comparison to individuals with higher incomes. Given this finding, and the limited amount of research on moderate income individuals and measures of food insecurity, it would be worth exclusively examining nutrition patterns and health outcomes for middle-class Americans, in general, and African Americans, specifically.

When examining the 2013-2014 NHANES data for Black men, several noteworthy findings merit discussion. Foremost, despite the association of food security with hypertension, diabetes, and kidney disease risk, when measured solely against race, we find no connection between these variables and being a Black man. This would suggest that adopting a healthy lifestyle, even in the midst of food insecurity, would help Black men to stave off morbidities that disproportionately affect the Black community. We do find that BMI and age are significantly related to high blood pressure, chronic kidney disease, and diabetes risk in Black men. Research generally suggests that these three conditions contribute to one another, particularly if one or more are not properly managed (Levey et al., 2010). Our finding in relation to age is one of value. Black men have the lowest life expectancy of any other racial or gender category, and this limits what is known about the health of Black men in older adulthood, due to lower sample

sizes. There is an existing need to focus more on (1) within-group differences in Black men and (2) Black men during their older adult years.

Limitations

We evaluated some measures of health outcomes that were both self-reported (self-perceived) and clinical diagnoses of health risk. The measure for diabetes reflected a self-perceived health outcome measuring if they felt at risk for diabetes. Thus, one may assume that as education increases, the ability to perceive personal health status and understanding of one's risk would increase. While existing data illustrate a racial disparity between Whites and African Americans (diabetes rates are 9.4% and 13.3% respectively), this paper does not suggest a statistically significant difference between Whites and African Americans (Center for Disease Control and Prevention, 2020). However, the measurement of food security in African American communities might require more nuanced approaches. Moreover, as we conceptualize food insecurity as a household measure, if nearly one third of the African American male population are ignored by this measure as a result of chronic institutionalization, differing family structures, or food sharing practices, the utilization of household measurement strategies might limit the understanding we have of this particular population. Some single individuals may participate in food sharing with family members or a partner living in a different household. Others may be difficult to measure using the quantitative USDA Food Security Questionnaire; a qualitative study may reveal more depth to this social problem.

CONCLUSION

Our research findings suggest that associations between food insecurity and cardiovascular health outcomes vary by age and race. There are notable health disparities that need to be addressed by policymakers to allow for the inclusion of interventions specific to the needs of African American males and allot for additional, accessible, and affordable resources to improve health outcomes. Understanding the relationships between food insecurity and health-related outcomes offer several implications.

Given the significant correlation between food insecurity and health outcomes such as hypertension and diabetes, professionals engaging men with multiple morbidities should inquire about access and intake of healthy and adequate nutrition. Yet, these professionals should also remain aware that men may be more likely to underreport food insecurity, due to factors such as shame, pride, and a limited understanding of healthy eating habits (Broussard, 2019). Future research would benefit from capturing food insecurity among men with measures that do not involve self-report. While this approach may generally be more time-consuming and tedious than survey research, tracking food insecurity with measures limiting response bias could be important in understanding the connections between eating habits and health for men.

At the core of addressing food insecurity, and the subsequent health outcomes associated with the phenomenon, is education. Existing studies note that many individuals experiencing food insecurity are unaware of the negative consequences associated with their nutritional intake (Seligman et al., 2010; Savoca et al., 2011). With that, practitioners and policymakers must be more intentional about reaching underserved populations, particularly minority groups, to discuss the importance of recognizing food insecurity and acknowledging a need for help. In a similar vein, professionals must also remain reflective and consider the potential role of sociocultural factors (e.g., race, social support, relationship status) in food insecurity. Addressing macro-level

issues such as income disparities and food deserts could potentially be significant in alleviating the disproportionate racial and gender effects of food insecurity.

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