Factors influencing Healthy Eating Habits among Low-Income African Americans in Tennessee

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ABSTRACT

Introduction: Poor nutrition and diet are significant contributors to the development of chronic illnesses such as cancer and diabetes, particularly among individuals of lower socioeconomic status (SES).This study examined demographic and lifestyle factors that influenced decisions to engage in healthy eating behaviors among low-income African Americans in three urban Tennessee cities.

Methods: As part of the Meharry Community Networks Program (CNP) needs assessment, a 123-item community survey was administered to assess demographic characteristics and eating behaviors among low-income African Americans. The total sample size was 1116. The primary outcome of interest was the healthy eating habits score which was calculated from a 13-item questionnaire that was part of the community survey.

Results: Several statistically significant differences were observed between the mean healthy eating habits scores by sociodemographic variables such as marital status, age, education, and geographic location ($P < 0.05$). Additionally, significant differences were observed by strategies used for maintaining weight including reducing fat and carbohydrate intake and exercising ($P < 0.05$). There were also significant differences observed by obstacles to eating low fat foods including family habits and food preparation time ($P < 0.05$).

Discussion: Educational interventions aimed at weight-loss and improving healthy eating should incorporate information about obstacles and predictors to healthy eating.

Keywords: Healthy Eating Habit Score; Poor Nutrition and Diet; Chronic Diseases; Low Income; African American

INTRODUCTION

Poor nutrition and diet are significant contributors to the development of chronic illnesses such as cancer and diabetes, particularly among individuals of lower socioeconomic status (SES) (Cockerham, Hamby, & Oates, 2017; Harrington, et al., 2011; World Health Organization [WHO], 2003). Many of the leading causes of death in the United States are related to chronic diseases, many of which are diet-related (Bauer, Briss, Goodman, & Bowman, 2014; Kochanek, Murphy, Xu, & Tejada-Vera, 2017; National Center for Health Statistics [NCHS], 2016). These high rates of mortality and morbidity are compounded by the high cost associated with treatment of chronic illnesses (American Diabetes Association [ADA], 2013; Gerteis, et al., 2014).

Maintaining a healthy weight is impacted by a person's eating habits and dietary choices (Bauer, et al., 2014; Bhaskaran, et al., 2014; National Heart, Blood, and Lung Institute [NHBLI], 2013). Specifically, diets high in fat have been shown to directly contribute to the development of chronic diseases such as cardiovascular disease, diabetes, obesity, and cancer (Freedman, 2003; Mauro, et al., 2017; O'Neill, et al., 2016). These conditions are of even greater concern among minority populations, especially African-Americans, who bear a disproportionate burden for many chronic diseases compared to other racial and ethnic groups (Centers for Disease Control and Prevention [CDCP], 2015; NCHS, 2016). The disproportionate morbidity rates are amplified among African Americans with low-income and partially explained by higher rates of food insecurity and related factors that impact the ability to eat a healthy diet (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010; Coleman-Jensen, Rabbitt, Gregory, & Singh, 2017; Darmon, 2008; Fiscella, Franks, Gold, & Clancy 2008). In 2016, African Americans/non-Hispanic blacks experienced food insecurity at rates higher than any other race or ethnicity surveyed (Coleman-Jensen, et al., 2017).

Food insecurity, defined by the U.S. Department of Agriculture as the limited or uncertain ability to acquire enough food for an active and healthy lifestyle, has been shown to decrease the quality of diet through a complex and multifactorial process that includes dynamic interaction at the individual, interpersonal, and environmental levels (Coleman-Jensen, et al., 2017; McGowan, et al., 2016; Mestral, Stringhini, & Marques-Vidal, 2016; Rehm, Monsivais, & Drewnowski, 2015; Skuland, 2015). While having a lower income is associated with a greater likelihood of eating an unhealthy diet, income level is not the sole cause of eating an unhealthy diet (Cockerham, et al., 2017; Harrington, et al., 2011; McGowan, et al., 2016). Psychological factors such as poor mood and high stress levels have also been shown to play a role in eating an unhealthy diet (Gardner, Wansink, Kim, & Park, 2014; Groesz, et al., 2012; Jacka, Kremer, Leslie, & Williams, 2010; Privitera, King-Shepard, Cuifolo, & Doraiswamy, 2016). Other personal factors include smoking status, increased alcohol consumption, and time constraints, all of which exhibit negative correlations with eating a healthy diet (Ma, Betts, & Hampl, 2016; Mestral, et al., 2016; Munt, Partridge, & Allman-Farinelli, 2017; Padrão, Lunet, Santos, & Barros, 2007). Externally, local social norms and customs play a significant role in dietary choices. The eating habits of those around an individual can ultimately influence that individual's personal dietary choices (Higgs & Thomas, 2016; Mollen, Holland, Ruiter, & Rimal, 2017; Rehm, et al., 2015; Trapp, et al., 2015). Additionally, the cost and availability of healthy foods can be influenced by the neighborhood or even city an individual lives in, as access may be different or limited between geographic areas within the same region (Drewnowski, Aggarwal, Cook, Stewart, & Moudon, 2016; Trapp, et al., 2015). Because food insecurity has been shown to impact races/ethnicities differently,

understanding how these various factors interact with socioeconomic and demographic variables may provide insight towards developing healthy eating interventions tailored to different food insecure populations, specifically low-income African Americans (Allen, Kuczmarski, Evans, Zonderman, & Waldstein, 2016).

The current study examines socio-demographic factors that influence decisions to engage in healthy eating behaviors in three different Tennessee metropolitan areas. In addition, this study examines the differences in obstacles to eating low fat foods and strategies to keep from gaining weight. The impetus for this investigation is that while research has documented factors that influence healthy eating behaviors, more information is needed to understand influences and obstacles to healthy eating among low-income African Americans and how these influences and obstacles may differ between cities within the same geographic region. This information in turn can be used to improve dietary behaviors.

METHODS

The National Cancer Institute funded 25 Community Networks Programs (CNP) to focus on reducing cancer disparities in diverse, high-risk populations located throughout the United States. One of the projects funded was the Meharry Medical College Community Health Centers-Community Networks Program (Meharry CNP), which focused on reducing and in time eliminating cancer health disparities among African Americans. As part of the Meharry CNP needs assessment, a 123-item community survey was developed to assess demographic characteristics (age, race, income, education, marital status, employment status), health insurance coverage, health care access and utilization, health behaviors (smoking history, alcohol use), and screening practices (including obstacles to screening) for various cancers. The survey was modeled after the CDC's Behavioral Risk Factor Surveillance System (BRFSS) and contained many identically worded questions, including those about cancer.

Population studied. The survey was administered to African Americans at three community health centers in Nashville (n = 336), Chattanooga (n = 390), and Memphis (n = 390) in a paper-and-pencil format. To maximize recruitment of African Americans, communities within zip codes with a majority African American presence (> 50%) were targeted. To target a zip code, population characteristics including race, age, and gender information for all zip codes in these cities were obtained from the U.S. Census Bureau. The total sample size was 1116.

Participants were recruited for the survey at community events and businesses (i.e. community centers, health fairs, barbershops). The staff were trained in recruiting eligible participants, obtaining written informed consent, and administering the survey. The eligibility criteria included being African American, 18 years and older, English speaking, and a resident of Nashville, Chattanooga or Memphis for the past 6 months. This survey protocol was approved by the Meharry Medical College and Erlanger Health Systems Institutional Review Boards (IRBs).

Data coding and analysis. The primary outcome of interest was the healthy eating habits score. This score was calculated from a 13-item questionnaire that was part of the baseline survey. These pertained to eating categories of overeating, unplanned snacking, emotional eating, consuming foods high in fat, and use of low-fat or fat-free products. Each item was given a score of "0" or "1" based upon whether the response indicated attempts at healthy eating. For example, the item "I eat when I am upset" was given a score of 1 if the participants choose "Disagree" or "Strongly Disagree" for this item. A total healthy eating habits score was derived by summing the scores on the 13-item scale. The minimum possible score was zero and the maximum score was 13. Higher

healthy eating habits score indicates better healthy eating habits. The internal consistency of this 13-item healthy eating habits scale was adequate (Cronbach's alpha = 0.72).

Weight status and smoking status were two variables that were calculated. Weight status was categorized using body mass index (BMI) calculated as self-reported weight in kilograms divided by the square of self-reported height in meters. The three standard BMI categories used included normal weight ($18.5 \leq BMI \leq 24.9$), overweight ($25 \leq BMI \leq 29.9$), and obese ($BMI \geq 30$). Smoking status was categorized as former, current, or never smokers (see Table 1). Current smokers consisted of those participants who responded "Yes" to the question "Do you smoke cigarettes now?" Participants were categorized as never smoked if they responded "No" to the questions "Have you smoked at least 100 cigarettes (5 packs of cigarettes) in your entire life?" and "Do you smoke cigarettes now?" Former smokers were those who responded "Yes" to the question "Have you smoked at least 100 cigarettes (5 packs of cigarettes) in your entire life?" and "No" to the question "Do you smoke cigarettes now?" Additionally, obstacles to healthy eating (yes/no) and strategies to keep from gaining weight (yes/no) were each measured by seven items. These items assessed for the presence of common obstacles such as cost of low-fat food, food preparation time, family eating habits, lack of will power, taste of high fat foods, emotional eating, and other reasons. For each item, participants had to indicate (yes/no) if the item was an obstacle or strategy.

Frequency and percentage was given to understand baseline characteristics of the participants. One way ANOVAs were used to examine if there is a statistically significant difference between the mean healthy eating habits scores by demographic and lifestyle characteristics and independent samples t-tests were used to examine if there is any statistically significant difference by by strategies used to keep from gaining weight, and obstacles to eating low fat foods. For all tests, a p-value of < 0.05 was significant. All data analyses were conducted using SAS software, Version 9.4 of the SAS System for Windows (SAS Institute Inc., Cary, NC, USA).

RESULTS
Demographic and Lifestyle Characteristics

Similar number of participants were involved by geographic location, gender, and employment status, while majorities of the participants were single, separated, divorce, widowed or never been married (73%), had high school or below education level (67%), had household income of below $15,000 per year (60%), self-rated health status as good or very good or excellent (72%), had medical visit in the past 12 months (78%), only 64% of the participants had health insurance, they were overweight or obese (74%), never smoked (58%), did no moderate physical activity (150 minutes per week, 97%) and no vigorous physical activity (75 minutes per week, 100%). Demographic and lifestyle characteristics of the study participants are presented in Table 1.

Mean healthy eating habits scores by demographic characteristics and life styles

The mean healthy eating habits scores by demographic characteristics and life styles are presented in Table 1. Participants from Nashville, those who were 60 years and older, female participants, participants who were separated, divorced, or widowed and participants who had greater than a high school education had the highest mean healthy eating habits scores for the geographic location, age, gender, marital status and education categories respectively ($p < 0.01$ in each case). Participants that made a medical visit in the past 12 months had higher mean healthy eating habits scores than those who had not ($p < 0.01$), and participants who had health insurance

had higher mean healthy eating habits scores compared to those who did not have insurance (p < 0.01).

Table 1. Mean healthy eating habits scores by socio-demographic variables and life styles			
Characteristics	**Frequency (%) (N = 1116)**	**Mean (SD)**	**P-value***
City			
Nashville	336 (30)	5.24 (2.44)	
Chattanooga	390 (35)	5.00 (2.42)	<0.01
Memphis	390 (35)	4.69 (2.40)	
Age at interview (years)			
18 to 39	442 (40)	4.67 (2.35)	
40 to 59	440 (40)	5.03 (2.48)	<0.01
60+	226 (20)	5.49 (2.37)	
Gender			
Male	550 (49)	4.66 (2.20)	<0.01
Female	566 (51)	5.26 (2.59)	
Employment status			
Employed	531 (51)	4.97 (2.42)	0.49
Not employed	511 (49)	5.07 (2.36)	
Marital status			
Married/partner	283 (27)	5.14 (2.38)	
Separated/divorce/widowed	351 (33)	5.40 (2.51)	<0.01
Single, never been married	428 (40)	4.64 (2.23)	
Education level			
<High school	271 (25)	4.66 (2.17)	
High school	455 (42)	4.85 (2.25)	<0.01
>High school	349 (32)	5.50 (2.64)	
Household annual income			
<$15,000/Y	626 (60)	4.93 (2.23)	0.08
≥$15,000/Y	427 (40)	5.19 (2.53)	
Self-rated health			
Excellent/very good/good	766 (72)	4.98 (2.46)	0.75
Fair/poor	302 (28)	5.03 (2.32)	
Medical visit in the past 12 months			
Yes	844 (78)	5.17 (2.44)	<0.01
No	237 (22)	4.36 (2.18)	
Health insurance			

Yes	695 (64)	5.15 (2.51)	<0.01
No	396 (36)	4.65 (2.17)	
BMI			
Normal weight (18.5≤BMI≤24.9)	255 (26)	4.64 (2.09)	
Overweight (25≤BMI≤29.9)	312 (32)	5.21 (2.54)	0.02
Obese (30≤BMI)	407 (42)	5.01 (2.48)	
Smoking			
Never	602 (58)	5.21 (2.48)	
Former	94 (9)	5.52 (2.53)	<0.01
Current	341 (33)	4.44 (2.08)	
At least one alcoholic beverage in the past 30 days			
Yes	446 (43)	4.66 (2.20)	<0.01
No	586 (57)	5.33 (2.46)	
Moderate activity (150 minutes/week)			
Yes	32 (3)	5.03 (3.07)	0.87
No	1084 (97)	4.96 (2.41)	
Vigorous activity (75 minutes/week)			
Yes	0 (0)		
No	1116 (100)		
* One way ANOVA test was used to compare means between categories			

Participants who were overweight had the highest mean healthy eating habits scores (p = 0.02), former smokers had the highest mean healthy eating habits scores (p < 0.01) and participants who did not report having had an alcoholic beverage in the past 30 days had higher mean health eating habits scores compared to those participants that did have an alcoholic beverage (p < 0.01). Mean healthy eating habits scores by strategies used to keep from gaining weight

Table 2 illustrates the difference between mean healthy eating habits scores by strategies used to keep from gaining weight. A statistically significant difference was observed between healthy eating habits mean scores for several strategies used to keep from gaining weight. Participants who were reducing their caloric intake had higher mean healthy eating habits scores compared to those who were not using this strategy. Participants who were reducing fat and carbohydrates in their diet as strategies to keep from gaining weight had higher mean healthy eating habit scores compared to those were not using these strategies (p < 0.01). Finally, participants who were increasing the amount they exercised as a strategy to keep from gaining weight had higher mean healthy eating habits scores compared to those who were not using this

strategy (p < 0.01). No statistically significant difference was observed for strategies: using natural supplements, prescription medications and other strategies.

Table 2. Mean healthy eating habits scores by strategies used to keep from gaining weight			
Strategies	Mean (SD)		P Value[*]
	YES	NO	
Reducing calories	5.83 (2.53)	4.50 (2.27)	<0.01
Reducing fat in diet	5.90 (2.53)	4.27 (2.21)	<0.01
Reducing carbohydrates in diet	5.89 (2.51)	4.82 (2.42)	<0.01
Exercising more	5.99 (2.56)	4.95 (2.35)	<0.01
Using natural supplements	5.80 (2.41)	5.49 (2.54)	0.28
Using prescription medications	5.30 (2.48)	5.62 (2.53)	0.35
Other strategies	5.23 (2.27)	5.58 (2.58)	0.22

* Independent sample t- test was used to compare means between the two groups (yes, no).

Mean healthy eating habits scores by obstacles to eating low fat foods

As seen in Table 3, a statistically significant difference was observed between healthy eating habits mean scores of those who faced obstacles to eating low-fat foods versus those who did not: food preparation time, family habits, lack of will power to avoid high fat foods, liking the taste of foods and emotional eating (in all cases p < 0.01 and higher healthy eating mean score was observed by those who answered yes to facing the obstacles compared to those who answered no). Cost of low fat food was not statistically significant, while those who said yes to other reasons as an obstacle had higher healthy eating habits mean score (p = 0.04).

Table 3. Mean healthy eating habits scores by obstacles to eating low fat foods			
Obstacles	Mean (SD)		P Value[*]
	YES	NO	
Cost of low fat foods	5.16 (2.38)	4.99 (2.33)	0.39
Food preparation time	5.19 (2.41)	4.50 (2.15)	<0.01
Family habits	5.28 (2.43)	4.38 (2.17)	<0.01
Lack of will power to avoid high fat foods	5.31 (2.42)	4.23 (2.02)	<0.01
Liking the taste of high fat foods	5.30 (2.44)	4.30 (1.97)	<0.01
Emotional eating	5.18 (2.40)	4.44 (2.05)	<0.01
Other reasons	5.13 (2.42)	4.56 (2.18)	0.04

* Independent sample t- test was used to compare means between the two groups (yes, no).

DISCUSSION

The mean healthy eating habits score for all the study participants was 4.96 out of a maximum score of 13. This score reflected efforts made by participants to avoid engaging in unhealthy eating such as overeating and unplanned snacking. A potential explanation for the low overall mean heathy eating habits score is that the study sample consisted primarily of low-income participants, a group that has documented high obesity rates and poorer eating behaviors (Drewnowski, 2012; Rehm, Monsivais, & Drewnowski, 2016). Income influences on eating behavior may be the result of the cost of healthy foods. Poorer diets have a positive correlation with higher consumption of food with high added sugars, refined grains, and solid fats (Drewnoswski & Kawachi, 2015; Rehm, et al., 2015).

The findings from the current study support findings in the extant literature about the associations between several sociodemographic characteristics and healthy eating habits. For example, the participants who had greater than high school education also had the highest healthy eating habits score. Higher education levels have been linked not only to healthy eating but also to a variety of health issues such as diabetes (Lallukka, Laaksonen, Rahkonen, Roos, & Lahelma, 2007). A potential explanation for this link may have to do with knowledge about healthy eating, including the role of fat, sugars, and energy dense foods. People with lower education levels may not have the adequate knowledge about what constitutes healthy eating and hence are less prone to engage in it. Another potential explanation is that higher education levels are strongly associated with higher incomes and increased access to health-related resources and healthier food options. Energy dense foods with low nutritional values may be more frequently chosen by people with low education as a way to meet their caloric requirements at a low cost.

As in previous studies, having health insurance and making a medical visit during the past 12 months was associated with a variety of healthy behaviors (Patel, et al., 2012). Medical visits

often serve as reminders or cues to action for people to adopt healthy behaviors, as well as avoid risky ones based on health provider's recommendations. Also, having health insurance coverage may facilitate going to the doctor and hence it makes people more likely to receive messages about healthy eating from their health providers.

Most research in the area of smoking, diet, and weight has indicated that smoking is an appetite suppressant and could be used as a strategy to maintain weight (Ma, et al., 2016; Munt, et al., 2017). There is little research examining how smoking status is related to healthy eating behaviors. In this study, former smokers had the highest healthy habits eating scores. The act of quitting smoking is likely driven by health concerns and these concerns may extend to other behaviors beyond smoking such as trying to eat better and maintaining a healthier diet.

An interesting finding of this study is the impact of geography on eating behavior. The study had participants from three urban areas in Tennessee, with those in Nashville having the highest healthy eating habit scores. These results indicate that geographic location may have a significant impact on the norms and other social factors that could affect eating habits and other health-related behaviors.

Another interesting finding of this study is that people who were overweight had the highest mean healthy eating habits scores. Previous research in this area has generally indicated that obesity is associated with poorer eating habits such as not eating enough fruits and vegetables and increased unhealthy snacking and fast food consumption (Emery, et al., 2015; Swinburn, et al., 2011). One potential explanation for these findings in this study is that people who are overweight may be a group that is most active in trying to lose weight or prevent from gaining weight. People who are normal weight may not be as concerned about their weight, and people who are obese may to some extent have given up trying to lose weight through healthier eating habits and exercise.

The current study found several statistically significant difference between mean healthy eating habits scores by obstacles to eating low fat foods. Interestingly, mean healthy eating scores were higher for those participants who reported food preparation time, family habits, lack of will power to avoid high fat foods, liking the taste of high fat foods, and emotional eating as obstacles to eating low-fat foods. It could be that people who are trying to eat healthy are having to actively work through an obstacle or multiple obstacles to eating low-fat foods, hence they may have a more realistic understanding of the impact of various obstacles to eating healthy.

Several statistically significant difference were observed between mean healthy eating habits scores by strategies to keep from gaining weight. Participants who tried to reduce their overall calorie intake, reduce carbohydrates and fats in their diets, and exercise more. The two strategies that did not have a statistically significant difference mean healthy eating habits scores were using natural supplements to lose or maintain weight and use of prescription medications. The results suggest that people trying to lose or maintain their weight are most likely to use changes in diet and physical activity before they engage in medications or surgery to achieve these results.

Strengths and limitations. This study has some notable strengths. It provides information about sociodemographic variables that affects healthy eating. In addition, it provides information about obstacles to eating low-fat foods, strategies to lose or maintain weight and healthy eating for low-income African Americans, a group particularly at risk for obesity and a number of chronic diseases where weight and dietary practices are risk factors. This study had-limitations. All of the data are cross-sectional, hence causation cannot be inferred. In addition, all the variables were

based on a self-report methodology and the respondents may have been unwilling to provide or may not have had accurate information about their health status or actual screening behaviors.
Future directions. The results from our study clearly showed that there were several statistically significant differences observed between sociodemographic variables and healthy eating habits scores such as marital status, age, education, and geographic location. Additionally, there were statistically significant difference observed by strategies used to keep from gaining weight and healthy eating habit scores including reducing fat and carbohydrate intake and exercising. There were also statistically significant difference observed by obstacles to eating low fat foods and healthy eating habit scores including family habits and food preparation time. Future studies investigating weight-loss interventions and improving healthy eating among low-income African American populations should incorporate information about obstacles and predictors to healthy eating to maximize their efficacy.

ACKNOWLEDGEMENTS

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