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Collective Efficacy and Obesity-Related Health Behaviors in a Community Sample of African Americans

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Abstract

The social environment is important to body mass index and obesity. However, it is unknown if perceptions of the social environment are associated with obesity-related behaviors in populations at greatest risk for being overweight or obese. We evaluated the relationship between collective efficacy and diet and physical activity in a community-based sample of African American adults who were residents in an urban area. Data were collected as part of an academic-community partnership from November 2009–2011. We evaluated whether participants met the recommended guidelines for diet and physical activity based on collective efficacy and their sociodemographic background, health care variables, and self-efficacy in a community-based sample of African American adults (n=338) who were residents in the Philadelphia, PA metropolitan area. Overall, many participants did not meet the recommended guidelines for fruit and vegetable intake or physical activity. The likelihood of meeting the recommended guidelines for fruit intake increased with greater levels of collective efficacy (OR=1.57, 95% CI=1.18, 2.07, p=0.002) and self-efficacy for diet (OR=1.56, 95% CI=1.19, 2.04, p=0.001). Collective efficacy was not associated with physical activity and the positive association between collective efficacy and vegetable intake was

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not statistically significant (OR=1.25, 95% CI=0.94, 1.65, p=0.12). It is important to determine the most effective methods and settings for improving diet and physical activity behaviors in urban African Americans. Enhancing collective efficacy may be important to improving adherence to recommended guidelines for obesity-related health behaviors.

INTRODUCTION

Obesity continues to be a pervasive problem among African Americans.[1] Efforts are ongoing to reduce and prevent obesity and excess body weight among African Americans through community-based initiatives and weight loss programs in primary care.[2–5] Structural changes are also recommended, but these approaches take considerable effort, especially during economically challenging times when policy changes may be difficult to make if they involve re-allocating limited financial resources or could generate new expenses.[6] Similarly, incorporation of weight loss programs into primary care may be challenging.[7,8] Thus, obesity-related behaviors (e.g., limited fruit and vegetable consumption and physical inactivity) continue to be high among African Americans;[9] these behaviors have been attributed to lack of awareness, psychosocial characteristics, and socioeconomic variables.[10–12] Neighborhood factors such as the availability and quality of supermarkets and physical activity resources are also important to obesity-related health behaviors. Many studies have shown that the neighborhoods in which many African Americans live are unfavorable to healthy eating and physical activity.[13–15] However, a recent qualitative study found that low-income African American women who lived in neighborhoods that had limited food resources used several strategies to adapt to and overcome these challenges.[15] Further, residents may have as many promoters to eating fruits and vegetables as barriers to consuming the recommended amounts of these foods.[10]

How individuals perceive the environments in which they live may be just as important as the actual resources that are available. Recent qualitative research has shown that social capital, or the extent to which social relationships and networks exist and are valued, is important to health among African American residents in a rural community.[16] Similarly, residents in an urban city were likely to be physically inactive if they were socially isolated.[17] Other research has shown that more positive perceptions about the food shopping environment are associated with increased consumption of fruits and vegetables among residents in low-income and mostly minority neighborhoods.[18] To our knowledge, however, the relationship between perceptions of the social environment and fruit and vegetable intake and physical activity has not been evaluated among African Americans while considering psychological and socioeconomic factors that are important to these behaviors.[19,20] The purpose of this study was to evaluate the independent associations between obesity-related health behaviors and perceptions of neighborhood support and cohesion and self-efficacy for diet and physical activity in a community-based sample of African American adults.

MATERIALS AND METHODS

Study Population

This research was conducted as part of an academic-community partnership;[20,21] participants were African American men and women who were residents in an urban city. To be eligible for participation, individuals had to be ages 18–75 and be a current resident in the Philadelphia, PA metropolitan area. Residency was determined by self-report using zip code. Individuals who had a personal history of cancer and those who had ever had a heart attack, stroke, or heart disease were not eligible for participation because our interest was in assessing the impact of a health education program on behavior change for the primary prevention of these conditions. This study was approved by the Institutional Review Boards at the University of Pennsylvania and the Medical University of South Carolina.

Procedures

Participants were recruited into the study through self-referrals from community-based resources; details about our recruitment methods has been published elsewhere.[22] Following self-referral, a screening interview was completed to determine eligibility; those who were eligible completed a baseline telephone interview. The baseline telephone interview was a 30-minute structured survey that obtained information on socioeconomics, perceptions about the social environment, health care resources, and diet and physical activity. This interview was conducted by research assistants at the University of Pennsylvania following provision of verbal consent.

Measures

Socioeconomics—Gender, age, marital status, education level, employment status, and income were obtained by self-report using items from the Behavioral Risk Factor Surveillance Survey.[23] We re-coded marital status, education, employment, and income into dichotomous variables based on the distribution of responses.

Health care resources—Participants were asked if they had health insurance coverage (yes or no) and where they usually received medical care (doctor's office versus other types of places). We also asked participants how long it had been since their last physical check-up using an item from the BRFSS.[23] We re-coded the amount of time since the last physical check-up as one year or less or greater than one year.

Psychological characteristics—We used instruments from previous research to evaluate self-efficacy to eat a healthy diet and to be more physically active.[24,25] These instruments asked participants how confident they were in terms of their ability to eat fruits and vegetables and to be physically activity under a variety of circumstances. Both instruments had good internal consistency. The Cronbach's alpha for dietary self-efficacy was 0.93 and was 0.83 for physical activity self-efficacy.

Social environment—We measured perceptions of one's social environment in terms of neighborhood cohesion, support, and satisfaction. Specifically, we used the collective efficacy scale to evaluate perceptions of neighborhood support and cohesion.[26,27] This 8-

item Likert style scale measures the extent to which individuals in a neighborhood trust and help others. This instrument has been used in a number of studies to evaluate social capital in racially diverse samples[27,28] and had good internal consistency (Cronbach's alpha=0.79). We used the neighborhood satisfaction sub-scale of the Neighborhood Environment Walkability Scale (NEWS) to evaluate perceptions of satisfaction with the neighborhood in which participants lived.[29] This 17-item Likert-style scale asks participants how satisfied they are with city services, safety, access to food resources and shopping, and traffic and noise levels. The neighborhood satisfaction scale had good internal consistency (Chronbach's alpha=0.87). Lastly, participants were asked to provide the number of community organizations to which they belonged.

Obesity-related health behaviors—We used items from the Health Information National Trends Survey (HINTS) to evaluate obesity-related health behaviors in terms of fruit and vegetable intake and physical activity.[30] Specifically, participants were asked how many cups of fruit and vegetables they eat each day (1=none/don't know, 2=½ cup or less, 3=½ to 1 cup, 4=1 to 2 cups, 5=2 to 3 cups, 6=3 to 4 cups, 7=more than four cups). Participants who reported eating at least 2 to 3 cups were categorized as meeting recommended guidelines for each variable. For physical activity, participants were asked if they had participated in any physical activities or exercises during the past month (yes or no). Those who reported yes were asked how many days they do any physical activity or exercise of at least moderate intensity and on these days, how long they typically perform these behaviors. We calculated the total number of minutes for moderate intensity physical activity per week by multiplying the number of days by the minutes reported. As in previous research,[11] participants who reported no physical activity during the past month were coded as not being physically active. Similarly, participants who reported that they had been physically active during the past month, but had not been active during the past week were coded as not being physically active. The remaining participants were coded as engaging in low (<150 minutes/week), medium (150–300 minutes/week), or high (>300 minutes/week) levels of moderate intensity physical activity.[11]

Data Analysis

First, we generated descriptive statistics to characterize participants in terms of socioeconomics, health care resources, social environment, and obesity-related health behaviors. Next, we used chi square tests of association to evaluate the relationship between these factors and obesity-related health. Finally, we used multivariate regression analysis to identify factors having significant independent associations with each obesity-related health behavior. Separate models were generated for each behavior; variables that had a bivariate association of $p<0.10$ with each behavior was included in the model for that variable.

RESULTS

Table 1 shows the characteristics of our study sample and levels of fruit and vegetable intake and physical activity. Thirteen percent of participants reported that they had not consumed any fruit during the past week and 9% reported that they had not consumed any vegetables. Fifty-one percent of participants were either inactive or engaged in low levels of moderate

intensity physical activity. Overall, 49% of participants met the recommended levels of physical activity; we used this dichotomous variable in the subsequent analyses for physical activity to be consistent with how fruit and vegetable intake were analyzed.

Table 2 shows the results of the bivariate analysis of fruit and vegetable intake and physical activity by socioeconomics and health care variables. None of the socioeconomic factors had a significant association with fruit intake. But, participants who met the recommended guidelines for vegetable intake were older in age (Mean [SD]=48.3 [9.5]) compared to those who did not meet the recommended guidelines (Mean [SD]=45.4 [10.4], t=−2.56, p=0.01). In addition, participants who had health insurance (52%) were significantly more likely than those without coverage (39%) to meet the recommended guidelines for physical activity (Chi Square=4.37, p=0.04). In terms of social environment variables, membership in a community organization was associated significantly with vegetable intake; those who belonged to at least one group were more likely to meet the recommended guidelines for vegetable intake compared to those who did not belong to any organization. As shown in Table 3, collective efficacy was associated significantly with both fruit and vegetable intake; participants who meet the recommended guidelines for these behaviors reported significantly greater levels of collective efficacy compared to those who did not meet recommended guidelines. Levels of neighborhood satisfaction were also significantly higher among participants who met the recommended guidelines for fruit intake compared to those who did not meet this guideline.

The results of the multivariate logistic regression model for fruit and vegetable intake are shown in Table 4. We did not generate a regression model for physical activity because only two variables had significant associations with this variable in the bivariate analyses. Collective efficacy and dietary self-efficacy had significant independent associations with fruit intake. The likelihood of meeting recommended guidelines for fruit intake increased with greater levels of collective efficacy (OR=1.57, 95% CI=1.18, 2.07, p=0.002) and self-efficacy (OR=1.57, 95% CI=1.20, 2.05, p=0.001). Collective efficacy had a similar association with vegetable intake, but this relationship was not statistically significant. As with fruit intake, the likelihood of meeting guidelines for vegetable intake increased with greater levels of self-efficacy (OR=1.96, 95% CI=1.46, 2.63, p=0.0001).

DISCUSSION

Our study is the first to assess within group variation in diet and physical activity in a community-based sample of African American adults based on perceptions of their social environment. Our study extends previous qualitative research that explored social determinants of health behaviors in an important way, but some limitations, which include self-reported behaviors and using a cross-sectional design, should be noted. First, self-report for obesity-related health behaviors is subject to over-estimation. However, we used items from a national survey that has been validated in prior reports;[30] if over-estimation is an issue, then it is also exists in national samples. An additional limitation may be that participants were recruited through self-referrals from community-based resources; however, our previous research has shown that these methods are effective at enrolling a sample of African Americans that is demographically representative of our target

population.[22] Despite these potential limitations, our findings show a novel association between collective efficacy and obesity-related health behaviors in a community sample of African American adults.

We found that perceptions about one's social environment were important to fruit and vegetable consumption. Specifically, the likelihood of meeting the recommended guidelines for fruit intake increased with greater levels of collective efficacy. Collective efficacy also had a positive association with vegetable intake, but this relationship was not statistically significant in the regression analysis. Although different aspects of the social environment have been linked conceptually and empirically with physical activity,[31] neither collective efficacy nor neighborhood satisfaction had a significant association with physical activity in our study. The relationship between health and place is now widely recognized[32] and previous research has shown that greater collective efficacy is associated with lower BMI, a lower risk for being overweight, and a reduced likelihood of being overweight among children.[26] Our findings show that collective efficacy has a significant positive independent association with one of the behaviors that contribute to excess body weight and obesity in an adult sample.

Collective efficacy is one aspect of the social environment that reflects the extent to which community members are cohesive and connected to each other, are willing to look out for each other, and would intervene when trouble arises.[27,28] Collective efficacy has been associated with many outcomes and the availability and quality of community resources for physical activity.[27,28,33,34] Various aspects of the social environment have been addressed in previous health behavior interventions through programming in which participants are asked to complete study activities with a support person or friend, or in which the intervention is delivered in a group setting.[20,35,36] Interventions that specifically target individuals who live in public housing units or work in particular settings are other examples of programs that address aspects of the social environment.[37,38] Targeted interventions and those that address social support and interpersonal relationships have an important role to play in health promotion and disease prevention among African Americans, especially since these approaches also provide opportunities for healthy behaviors to be modeled in a supportive environment. Modeling and establishing specific-short term goals in a supportive environment are among the strategies that are used to enhance self-efficacy in health behavior interventions.[39] As in other studies,[19] we found that self-efficacy had a significant independent association with both fruit and vegetable intake in the regression models and was one of the two variables that had a significant relationship with physical activity in our bivariate analysis. Recent research has shown that when individuals enroll in a weight loss program with family members or friends, they are successful at losing weight, which involves making dietary changes and being more physically active if their support person actively participates in the program and also loses weight.[35] Thus, it is important to continue to target self-efficacy as part of interventions that address obesity-related health behaviors. But, our findings also suggest that it may be important to address collective efficacy as part of interventions that are developed for African Americans.

Some of the strategies that are recommended as part of community level interventions to modify the built environment might also be useful for enhancing collective efficacy. That is,

cohesion and interpersonal connections are dependent on meaningful and effective interactions;[40] the creation and maintenance of parks and recreation facilities would provide a setting in which community residents could be physically active while interacting with one another. But, recent research found significant declines in park use even though major improvements had been made recently.[41] Other work has shown that park use is highly variable and more than 60% of park users are sedentary.[42] This may be because the social environment in parks is not conducive to physical activity.[33] Thus, other strategies and venues may be needed to address collective efficacy.

Efficacy beliefs reflect the extent to which someone believes that they are capable of organizing and completing the actions that are necessary to achieve a specific goal, regardless of if it is measured from an individual or group perspective.[39] When individuals have an opportunity to influence organizational decisions, or exercise organizational agency, then collective efficacy is increased.[43] But, confidence is needed to be involved in organizational decisions and those that will impact a community. Research has shown that many individuals lack confidence in their ability to advocate for the changes that are needed in their community to promote health and well-being even though many are willing to participate in these activities.[44] Data from the 2010 Community Health Survey of Southeastern Pennsylvania show a similar disconnect. About 50% of Philadelphia residents were not involved in any community organization and 17% did not believe that their neighbors are willing to help each other, but 73% of residents reported that they have worked on a together on a project or to achieve a common goal.[45] There are many different types of projects and goals on which individuals could work together; findings from a clinic-based study found that there is considerable variation in the types of community advocacy activities in which individuals are willing to be involved.[44] Specifically, being willing to organize a group of neighbors or friends to visit a city official and being willing to speak at a city council meeting to support a community change had the lowest endorsement among under and un-insured women.[44] Sixty-one percent of participants in our study were involved in at least one community organization. We did not ask participants to describe the types of organizations to which they belonged, but there is likely to be considerable variation organizational membership, whether or not these organizations provide health information, and trust in and quality of the information that is provided.[45,46] Studies are needed to determine if membership in different types of community organizations is associated with the extent to which individuals believe they can change circumstances in their neighborhood and are willing to advocate for these changes.

CONCLUSION

Perceptions about the social environment are important to health behaviors; our findings show that collective efficacy is important to meeting the recommended guidelines for fruit intake in a community sample of African Americans. Previous research has shown that community outreach and engagement activities play an important role in enhancing collective efficacy among African Americans.[47] But, there is considerable variation in the types of community activities in which residents are likely to participate.[44] Additional research is needed to identify the types of community activities in which African Americans in diverse geographic areas are most and least likely to be involved and how participation in

community outreach and engagement activities vary depending on collective efficacy. These data would identify barriers and facilitators to advocacy efforts and would also provide insight on factors that are important to collective efficacy so that these issues could be addressed as part of healthy interventions that are developed for African Americans.

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Table 1

Sample Characteristics (n=338)

Variable	Level	n (%)
Gender	Male	145 (43%)
	Female	193 (57%)
Marital status	Married	37 (11%)
	Not married	300 (89%)
Education level	≥ Some college	165 (48%)
	≤ High school	176 (52%)
Employment status	Employed	119 (35%)
	Not employed	218 (65%)
Income level	> $20,000	152 (48%)
	< $20,000	165 (52%)
Age	Mean (SD)	46.4 (10.2)
Health insurance	Yes	259 (77%)
	No	79 (23%)
Source of medical care	Doctor's office	232 (69%)
	Other	106 (31%)
Last check-up	≤ 1 year	295 (87%)
	> 1 year	43 (13%)
Community organization	One or more	205 (61%)
	None	130 (39%)
Collective efficacy	Mean (SD)	3.2 (0.66)
Neighborhood satisfaction	Mean (SD)	3.6 (0.72)
Physical activity self-efficacy	Mean (SD)	23.3 (5.5)
Dietary self-efficacy	Mean (SD)	37.8 (8.6)
Vegetable intake	None/don't know	30 (13%)
	½ cup or less	26 (11%)
	½ – 1 cup	60 (17%)
	1–2 cups	99 (22%)
	2–3 cups	64 (18%)
	3–4 cups	33 (10%)
	4+ cups	26 (9%)
Fruit intake	None/don't know	45 (9%)
	½ cup or less	37 (8%)
	½ – 1 cup	57 (18%)
	1–2 cups	74 (29%)
	2–3 cups	60 (19%)
	3–4 cups	34 (10%)
	4+ cups	31 (8%)
Physical activity	Inactive	61 (18%)
	Low	111 (33%)
	Medium	81 (24%)
	High	85 (25%)

Table 2

Bivariate Analysis of Health Behaviors by Socioeconomic and Health Care Variables

Variable	Level	Fruit Intake		Vegetable Intake		Physical Activity	
		% Met Guidelines	Chi Square	% Met Guideline	Chi Square	% Met Guidelines	Chi Square
Gender	Male	36%		32%		53%	
	Female	38%	0.14	39%	1.73	46%	1.62
Marital status	Married	40%		43%		57%	
	Not married	36%	0.25	35%	0.89	48%	1.01
Education level	≥ Some college	40%		40%		52%	
	≤ High school	34%	1.66	33%	2.29	47%	0.74
Employment status	Employed	43%		38%		51%	
	Not employed	34%	2.62†	36%	0.14	48%	0.39
Income level	> $20,000	37%		40%		50%	
	< $20,000	36%	0.01	34%	1.06	50%	0.003
Health insurance	Yes	37%		36%		52%	
	No	38%	0.04	38%	0.11	39%	4.02*
Source of medical care	Doctor’s office	37%		38%		50%	
	Other	37%	0.002	32%	1.24	48%	0.06
Last check-up	≤ 1 year	39%		38%		50%	
	≥ 1 year	26%	2.75†	23%	3.67*	40%	1.81
Community organization	One or more	40%		42%		52%	
	None	32%	2.45	28%	6.98**	45%	1.83

** p<0.01;

* p<0.05;

† p<0.10

Table 3

Bivariate Analysis of Health Behaviors by Social Environment and Self-Efficacy Variables

Variable	Fruit Intake		Vegetable Intake		Vegetable Intake	
	Met	Not Met	Met	Not Met	Met	Not Met
	Mean (SD)		Mean (SD)		Mean (SD)	
Collective efficacy	3.4 (0.66)	3.12 (0.63)	3.4 (0.66)	3.1 (0.64)	3.3 (0.67)	3.2 (0.66)
	t=−4.60***		t=−3.73***		t=−0.99	
Neighborhood satisfaction	3.7 (0.70)	3.5 (0.73)	3.7 (0.66)	3.5 (0.75)	3.6 (0.73)	3.5 (0.71)
	t=−1.82		t=−1.60		t=−1.35	
Physical activity self-efficacy	23.6 (5.6)	23.1 (5.5)	24.4 (5.3)	22.6 (5.6)	23.9 (5.0)	22.6 (5.9)
	t=−0.76		t=−2.96**		t=−2.20*	
Dietary self-efficacy	35.5 (6.0)	31.2 (9.5)	36.2 (6.0)	30.8 (9.2)	33.1 (0.69)	32.5 (0.64)
	t=−5.07***		t=−6.56***		t=−0.65	

*** p<0.001;

** p<0.01;

* p<0.05;

† p<0.10

Table 4

Logistic Regression Analysis of Fruit and Vegetable Intake

Fruit Intake				
Variable	**Level**	**OR**	**95% CI**	**p-value**
Employment status	Employed Not employed	1.39	0.84, 2.28	0.19
Last check-up	≤1 year >1 year	1.59	0.74, 3.39	0.24
Collective efficacy	[continuous]*	1.57	1.18, 2.07	0.002
Neighborhood satisfaction	[continuous]*	0.95	0.92, 0.98	0.71
Dietary self-efficacy	[continuous]*	1.56	1.19, 2.04	0.001

Vegetable Intake				
Variable	**Level**	**OR**	**95% CI**	**p-value**
Age	[continuous]	1.19	0.91, 1.54	0.20
Last check-up	≤1 year >1 year	1.54	0.68, 3.50	0.30
Community organization	One or more None	1.40	0.82, 2.37	0.22
Collective efficacy	[continuous]*	1.25	0.94, 1.65	0.12
Neighborhood satisfaction	[continuous]*	0.92	0.70, 1.21	0.54
Dietary self-efficacy	[continuous]*	1.96	1.46, 2.63	0.0001
Physical activity self-efficacy	[continuous]*	1.25	0.96, 1.60	0.07

* OR for continuous variables represent 1 SD unit change.

* OR for continuous variables represent 1 SD unit change.