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Perceived stress and eating behaviors in a community-based sample of African Americans†

Regina Sims[a,*], **Shalanda Gordon**[a], **Wanda Garcia**[a], **Elijah Clark**[a], **Deloris Monye**[a], **Clive Callender**[b], and **Alfonso Campbell**[a]

a *Department of Psychology, Howard University, 525 Bryant Street, NW Washington DC 20059, United States*

b *Minority Organ Tissue Transplant Education Program (MOTTEP), Howard University Hospital, 2041 Georgia Avenue, Washington, DC 20060, United States*

Abstract

Previous studies have reported that psychological stress is associated with greater food consumption, particularly consumption of high fat foods. We are unaware of any studies that have examined stress-induced eating among African Americans (AAs). The goals of the current study were to examine the relationship between perceived stress and high fat eating behaviors in a sample of AAs, to examine whether this relationship is stronger among overweight and obese participants, and to examine whether haphazard meal planning mediates the relationship between perceived stress and high fat eating behaviors. One hundred fifty-nine adults from a metropolitan area completed the Perceived Stress Scale (PSS-10), the Eating Behaviors Pattern Questionnaire (EBPQ), a demographic questionnaire, and body mass was assessed with BMI. Perceived stress was associated with haphazard planning and emotional eating, but not related to other high fat eating domains in the overall sample. These findings held for overweight and obese participants with the addition of snacking on sweets. High fat eating behaviors were not mediated by haphazard meal planning. These findings are consistent with other studies which demonstrate a link between stress and eating. Long-term interventions for high fat consumption and obesity should include an examination of perceived stress among AAs.

Keywords

Eating; Stress; African Americans; Dietary fats; Food habits; Adults

1. Introduction

It has been widely reported that psychological stress and food consumption are related (Greeno & Wing, 1994; Lattimore, 2001; Oliver & Wardle, 1999; Roemmich, Wright, & Epstein, 2002). Various kinds of psychological stressors are implicated in overeating and poor eating choices. For example, prolonged work stress is associated with higher energy consumption, saturated fat and sugar intake, and possible weight gain, especially in restrained eaters, or those who intentionally restrict their consumption (Wardle, Steptoe, Oliver, & Lipsey, 2000). Stress induced by social situations also leads to the increased consumption of foods that are sweet, high in fat, and more energy dense (Oliver, Wardle, & Gibson, 2000). When individuals are asked to reflect upon and report their stressful experiences, perceived stress is associated with

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* Corresponding author. Tel.: +1 202 806 9455; fax: +1 202 806 4873.

greater food consumption. Perceived stress predicts binge eating frequency three times greater than that reported by individuals with low negative stress (Pendleton, Poston, Goodrick, & Foreyt, 2001). In addition, greater perceived stress in both men and women is associated with a higher fat diet and less frequent exercise, both risk factors for obesity (Ng & Jeffery, 2003).

While greater levels of stress result in overeating, the health risks may be compounded if individuals tend to eat foods with a high fat content, primarily because high fat intake is a significant risk factor for obesity (Dreeben, 2001). Among stress-driven eaters, body-mass index (BMI) tends to be greater compared to nonstress-driven eaters. In addition, stress-driven eaters tend to eat more sausages, hamburgers, pizza, and chocolate, which are traditionally high in fat content, and consume more alcohol (Laitinen, Ek, & Sovio, 2002). Adolescents report that stress is associated with a shift toward more unhealthy dietary practices (Cartwright et al., 2003).

Greater perceived stress has been linked to poorer health outcomes for African Americans (AAs) in previous studies. More perceived stress, as measured by the Perceived Stress Scale (PSS-10-10), was shown to be negatively correlated with self-reports of health status and well-being among AA women (Young et al., 2004). The data suggest that stress reduction interventions may improve minority health outcomes thereby reducing mortality. We are unaware of any studies that have examined the relationship between perceived stress and the eating behaviors of AAs.

While the relationship between stress and eating has been supported in the literature, stress-induced eating which includes the consumption of foods that are high in fat content is of particular concern. A measure which examines the high fat eating behaviors of AAs was appropriate for this investigation. The high fat eating behaviors examined in the current study include emotional eating, snacking on sweets, cultural/lifestyle behaviors, haphazard planning, and meal skipping. These eating behavior domains were derived from the construction of the Eating Behavior Patterns Questionnaire (EBPQ) (Schlundt, Hargreaves, & Buchowski, 2003). During test construction, 40 AA women were enrolled in focus groups where they discussed food consumption patterns, completed the Meharry Food Frequency Questionnaire (Schlundt, Hargreaves, & Buchowski, 2000), and provided a 24-hour dietary recall. Utilizing these resources, items were generated which described eating attitudes and behaviors. Factor analysis was utilized to create subscales of the generated items. Ten categories of food-related attitudes and eating behaviors were reduced to six eating behavior domains using principal components analysis. The remaining items were validated with the Eating Styles Questionnaire and the Barriers to Low Fat Eating and Barriers to Eating Fruits and Vegetables questionnaires (Hargreaves et al., 1999; Schlundt et al., 2000). Scale items were deemed to be sufficiently reliable.

Due to the absence of studies concerning perceived stress and eating behaviors in the AA population, this study attempted to examine these relationships to stimulate further investigation of the stress-eating link among ethnic minorities. As such, one of the goals of the current study was to examine the relationship between perceived stress and high fat eating behaviors in a community-based sample of AAs. The second goal of the study was to examine whether the relationship between perceived stress and high fat eating behaviors is stronger among overweight participants in the sample. The final goal of the study was to examine whether the relationship between perceived stress and high fat eating behaviors is mediated by haphazard meal planning.

2. Method

2.1. Participants

The participants were 159 African American adults recruited from the Washington, D.C. metropolitan area. A total of 32 participants were excluded from the analyses due to missing data. There were 76 males and 83 females that remained. Participants were enrolled in a larger study that examined the relationship between stress and psychoneuroimmunological factors and renal health outcomes in a community-based sample of AAs. Recruitment took place at local community events, churches, and health fairs as well as through recruitment of non-patient individuals at the University hospital. Exclusion criteria included a recent history of drug abuse or psychiatric illness.

2.2. Materials and procedure

The sample completed a battery of psychosocial measures including the PSS-10 and Eating Behavior Patterns Questionnaire (EBPQ), and a battery of neurocognitive measures was administered to each participant. The additional psychosocial measures and neurocognitive measures were relevant to the larger study, but not the current study.

The PSS-10 is the most widely used psychological instrument for measuring the perception of stress (Cohen & Williamson, 1988). It is a 10-item assessment designed to measure the degree to which an individual perceives and appraises life events as stressful (Cohen, Kamarck, & Mermelstein, 1983).

Participants also completed the EBPQ. The EBPQ is a valid and reliable measure utilized to group people by risk-factor status based on the presence or absence of a particular pattern of eating. The 51-item EBPQ was specifically constructed to measure dietary fat intake among AA women (Schlundt et al., 2003), but was utilized to assess dietary fat intake in both men and women in the current study. The EBPQ assesses eating behaviors in the following domains: low fat eating, emotional eating, snacking on sweets, cultural/lifestyle behaviors, haphazard planning, and meal planning. An example of an item for each domain can be found in Table 1. A demographic measure was utilized to determine the level of income and education of study participants. Body mass was assessed with BMI.

3. Results

The demographic characteristics of participants can be found in Table 2. The sample had a mean age of approximately 46 years (M=45.79; SD=11.46), a mean of approximately 14 years of education (M=13.91; SD=2.43), and mean BMI fell into the obese range (M=31.02; SD=8.95).

Mean scores for the PSS-10 and EBPQ can be found in Table 3. Gender differences were found for the PSS-10 and EBPQ. Based on independent samples t-tests, females scored significantly higher on the PSS-10 than males (t=2.00; p=.05). In addition, females scored significantly higher than males on the cultural/lifestyle eating (t=−2.12; p=.04) and snacking on sweets (t=−2.12; p=.04) domains of the EBPQ.

Multiple regression analyses were utilized to explore the relationships between responses on the PSS-10 and EBPQ. Statistical adjustments were made to control for age, education, and income. Each eating behavior domain was regressed on the PSS-10. Perceived stress significantly predicted responses for the emotional eating (B=.29; p<.01) and haphazard planning domains (B=.22; p<.01) of the PSS-10. Perceived stress accounted for nine percent of the variance in emotional eating and 11% of the variance in haphazard planning. Perceived stress did not predict responses for the following eating behavior domains: low fat eating,

cultural/lifestyle eating, snacking on sweets, and meal skipping. Additional regression statistics can be found in Table 4.

Additional regression analyses examined the relationships between responses on the PSS-10 and EBPQ among participants in the sample that fell into a BMI category of overweight or obese with a BMI greater than or equal to 25. One hundred twenty-two of 159 participants in the sample met this criterion. Similar relational patterns between the PSS-10 and EBPQ were found for overweight and obese participants, though the prediction strength was greater. While perceived stress accounted for eight percent of the variance in emotional eating in the entire sample, it accounted for 11 percent of the variance in the subsample of overweight and obese participants. Similarly, perceived stress accounted for 12 percent of the variance in haphazard planning within the overweight subsample as compared to eight percent in the entire sample. Within the overweight subsample, perceived stress predicted snacking on sweets (B=.21; p<.05); however, this prediction was not significant across the entire sample. Other non-significant relationships remained the same for prediction of low fat eating, cultural/lifestyle eating, and meal skipping.

Mediation analysis was utilized to determine whether the relationships between perceived stress and the eating behavior domains were mediated by haphazard planning. This analysis was carried out for the only dependent variable other than haphazard planning that was predicted by perceived stress in the entire sample in the multiple regression analyses-emotional eating. Haphazard planning was not found to mediate the relationship between perceived stress and emotional eating; however, some moderation effects may exist. See Table 5 for mediation findings.

4. Discussion

One of the goals in the present study was to examine the relationship between perceived stress and high fat eating behaviors in a sample of African Americans. This question was partially supported. Consistent with evidence showing that self-reported stress is associated with a shift toward unhealthy dietary practices (Cartwright et al., 2003), greater perceived stress was associated with unhealthy eating behaviors among participants with regards to emotional eating and haphazard planning.

Conceivably, participants in our study cope with the negative emotions generated by stressful life events by engaging in “emotional eating” (Macht & Simons, 2000). Emotional eating involves the consumption of foods that are high in sugar and fat. Researchers report that these highly palatable foods, called “comfort foods,” eliminate or reduce the intensity of negative emotional states (Bjorntorp, 2001; Dallman et al., 2003). The consumption of comfort foods may lead to a more positive dispositional state for several reasons including increased sensory pleasure, the reduction of hunger, and the diminution of aversive physiological symptoms (Gibson, 2006). The latter depends on the psychological disposition of the individual.

The association between perceived stress and haphazard planning of meals suggests that, during stressful periods, individuals are less likely to plan their meals carefully. Consequently, they are more likely to indulge in those foods that are characteristically high in fat.

Gender differences emerged and suggest that females in the sample experience a greater degree of perceived stress than their male counterparts. Future research might explore the differential stressors between African American males and females and how within-group differences affect eating behaviors. Females, in addition, are more likely to engage in cultural/lifestyle eating and snacking on sweets. Cultural/lifestyle eating refers to eating that is characteristic of African American culture, such as large meals on Sunday or preparing meals which always consist of a meat and a starch. Items in the cultural/lifestyle eating domain of the EBPQ

acknowledge that eating behavior is shaped by sociocultural factors. It is worth exploring whether African American females were more likely to endorse these items because they are more likely to be the preparers of these culturally-defined meals. Furthermore, the issue of snacking on sweets should be explored in relation to African American females.

The second goal of the study was to determine whether the relationship between perceived stress and high fat eating behaviors is stronger among overweight participants in the sample. This question was also partially supported. Among participants in the subsample who were categorized as overweight or obese, emotional eating and haphazard planning were more related to perceived stress than in the entire sample. We would expect individuals with greater weight to have engaged in more high fat eating behaviors, and as further support, the overweight subsample showed a significant relationship between perceived stress and snacking on sweets that did not exist for the entire sample. Apparent here is the notion that when individuals are stressed they will display less healthy eating patterns, but if they are overweight or obese, this effect will be stronger.

The final goal of the study was to examine whether the relationship between perceived stress and high fat eating behaviors is mediated by haphazard meal planning. The prediction was that if participants did not plan their meals when stressed, it would result in greater participation in high fat eating behaviors. This prediction could only be tested in part with emotional eating, and it was not supported. Haphazard planning does not appear to contribute to emotional eating. Perhaps those who engage in emotional eating will do so regardless of the availability of planned meals or more convenient unplanned meals.

Several important questions emerge from this study. Perceived stress was associated with haphazard planning and emotional eating. Are other variables mediating this relationship? What interventions might contribute to healthier eating patterns in African Americans? Furthermore, African American females are more prone to stress-related eating than males. What might account for this finding? Finally, is stress and eating a one-way relationship among the overweight or obese or is it a circular problem? Does stress contribute to obesity, does obesity contribute to stress, or does an interaction exist?

As obesity grows as a public health problem, the challenge that health researchers and professionals will face is to develop more effective and innovative strategies for managing psychological stress which reduce stress-induced eating. The problem of obesity involves a variety of factors in physical, psychosocial, emotional, and even spiritual domains. Long-term solutions to this problem are likely to require a comprehensive approach and healthy lifestyle changes across these same domains.

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Table 1

Examples of EBPQ items for each eating behavior domain

Eating behavior domain	Example of an item
Low fat eating	"I reduce fat in recipes by substituting ingredients and cutting portions."
Emotional eating	"When I am in a bad mood, I eat whatever I feel like eating."
Snacking on sweets	"I eat cookies, candy bars, or ice cream in place of dinner."
Cultural lifestyle behaviors	"A complete meal includes a meat, a starch, a vegetable, and bread."
Haphazard planning	"I never know what I am going to eat for supper when I get up in the morning."
Meal skipping	"If I eat a larger than usual lunch, I will replace supper with a snack."

Table 2

Participant demographic information

	(N=159)M (SD)
Age	45.79 (11.46)
Years of education	13.91 (2.43)
BMI	31.02 (8.95)
Income	%
less than 10,000	25.8
$10,001–$20,000	16.1
$20,001–$30,000	15.5
$30,001–$40,000	11.0
$40,001–$50,000	13.5
$50,001–$65,000	7.7
$65,001–$80,000	5.2
greater than $80,000	5.2

Table 3

Gender differences in performance on the PSS-10 and EBPQ

	Males	Females	*t*	p
	M(SD)	M(SD)		
PSS-10	14.49(6.77)	16.81(7.77)	2.00	.04*
Low fat eating	40.79(8.10)	43.08(9.66)	1.62	.11
Emotional eating	29.16(7.20)	29.78(7.11)	.55	.58
Haphazard planning	25.13(6.29)	23.83(7.27)	−1.2	.23
Cultural/lifestyle	20.21(4.38)	18.65(4.84)	−2.12	.04*
Snacking on sweets	17.45(5.49)	15.75(4.97)	−2.05	.04*
Meal skipping	11.59(2.82)	11.49(3.33)	−.20	.84

* $p<.05$.

Table 4

Multiple regression analyses

PSS-10	R^2	B	s.e.	p
Low fat eating	.10	−.13	.16	.10
BMI≥25	.19	−.17	.10	.06
Emotional eating	.08	.29	.09	.00**
BMI≥25	.11	.32	.09	.00**
Haphazard planning	.08	.22	.11	.00**
BMI≥25	.12	.30	.09	.00**
Cultural/lifestyle eating	.05	−.01	.07	.90
BMI≥25	.05	.04	.06	.68
Snacking on sweets	.06	.11	.03	.19
BMI≥25	.06	.21	.07	.04*
Meal skipping	.03	.16	.03	.06
BMI≥25	.05	.16	.04	.12

** $p<.01$.

* $p<.05$.

Table 5

Mediation analysis

	B	p	R
PSS-10 × Emotional eating	.29	.00**	.28
PSS-10 × Haphazard planning	.23	.00**	.24
PSS-10 × Haphazard planning × emotional eating			
PSS-10	.18	.02*	.17
Haphazard planning	.44	.00**	.42

** $p<.01$.

* $p<.05$.