Does the Environment Exacerbate Effects of Stress on Black Women's Food Choices?

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Abstract

Diet and obesity are major risk factors for a large number of non-communicable diseases, for which black women experience disproportionately high morbidity and mortality. Psychosocial stress and the food environment have emerged as two potentially important influences on black women's food choices. The combination of stress and unsupportive environments may be particularly deleterious to black women's health. It is possible that black women living in environments with more unhealthy foods and fewer healthy options are more likely to eat energy-dense, nutrient poor foods such as snack foods when exposed to stressors than women who are exposed to stressors but live in environments with more healthy foods. Results of studies testing this hypothesis in the U.S. to date are mixed. To reduce diet- and obesity-related non-communicable diseases, interventions to promote healthy food choices are needed at multiple levels. This includes policies to make the healthy choice the easy food choice and reduce sources of stress, and interventions to help black women cope with stress in their lives. Rwanda and Sub-Saharan Africa have the opportunity to engage in such strategies to promote healthy eating and thus curb the rise in obesity and non-communicable diseases in black women.

Keywords: black women, USA, stress, environment, diet, obesity, non-communicable disease

Background

Many black women in the U.S. have good incomes, live in good environments, and are in good health. U.S. black women are a heterogeneous group; they differ in ethnicity and socioeconomic status, for example. However, when compared to white women in the U.S., black women tend to have poorer diets, such as lower consumption of fruits and vegetables and higher consumption of added sugars (Kirkpatrick, Dodd, Reedy, & Krebs-Smith, 2012). Fifty-seven percent of black women are obese compared to 33.7% of white women (Ogden, Carroll, Kit, & Flegal, 2014). U.S. black women are also at increased risk for diet and obesity-related non-communicable diseases. For example, the preterm birth rate among black women is 16.3% compared to 10.2% for white women.

There is growing evidence that two factors may contribute to poorer diets in U.S. black women: stress and unsupportive environments. Stress is one factor that may lead to poorer food choices among black women. There are many different types of stressors including acute life events, traumatic events, job strain, and daily hassles (minor events or irritants that arise from daily life). Black women are disproportionately exposed to several stressors including financial strain, exposure to violence, and discrimination. Some research has shown that eating foods high in fat, sugar, or salt may alleviate stress through biologic and psychological mechanisms. Dr. James Jackson at the University of Michigan has theorized that intake of foods high in fat, sugar, or salt is an accessible coping response to stress in black women (Jackson, Knight, & Rafferty, 2010).

Another factor that may affect black women's food choices in the U.S. is the food environment, or the types of stores and restaurants and the availability, variety, pricing, and promotion of foods near where they live (Zenk, Thatcher, Reina, & Odoms-Young, 2014). A large body of research shows that neighborhoods where black women live tend to have fewer supermarkets and large grocery stores, which have the widest selection of healthy foods, and more convenience stores, liquor stores, and fast food restaurants, which predominately sell energy-dense, nutrient-poor food. Neighborhoods where black women live also tend to have lower absolute and relative availability of healthy foods at the stores that are present. Research has shown that living in neighborhoods with a supermarket is associated with better diets and low-

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er body weights, while living in neighborhoods with more fast food restaurants, for example, is associated with poorer diet and higher body weight.

Research on Stress-Environment Effects on Diet

Building on this work, I was interested in whether the effect of stress on food choices differed depending on the food environment. I hypothesized that women living in environments with more unhealthy foods and fewer healthy options are more likely to eat energy-dense, nutrient poor foods such as snack foods when exposed to stressors than women who are exposed to stressors but live in environments with more healthy foods. To date, I have tested this hypothesis in two studies involving black women.

This research is based on people living in two U.S. cities. The first city is Detroit, Michigan. Detroit has 700,000 residents, most of whom are black and about 40% of whom have household incomes below the federal poverty level. The second city is Chicago, Illinois. Chicago has 2.6 million residents, divided fairly equally between blacks, whites, and Hispanics, and 23% of whom are below the poverty level. The two cities share a similar history of racial residential segregation and deindustrialization. Both cities have strengths such as strong community-based organization, but they also face challenges such as inequalities in access to healthy foods.

The first was a study of chronic stress, acute life events, and diet in Detroit, conducted by the Healthy Environments Partnership (Zenk et. al., 2013). The Healthy Environments Partnership is a community-based participatory research (CBPR) partnership working together to understand and address disparities in cardiovascular disease risk in eastside, southwest, and northwest Detroit (National Institutes of Health R01ES014234; PI Schulz). The study drew on survey data from a probability sample of 460 adults ages 25+ in Detroit, about half of whom were black women, as well as observational audit data on the food environment. The survey asked women about several types of stress including chronic stressors (physical environment, social environment, safety, discrimination, financial vulnerability) as well as acute life events (e.g., divorce or separation, death of a loved one). Using a food frequency questionnaire, we measured their intake of 17 different types of snack foods such as cookies and cake. We also observed availability of food stores and restaurants (large grocery store, small grocery or "corner" store, convenience store, proportion of fast food restaurants) within 0.8 kilometers from each respondent's home. Institutional review boards at the University of Michigan (2005) and University of Illinois at Chicago (2009) approved this study.

In this sample we found no association between either chronic stress or acute life events with snack food intake. We did find that women living near a large grocery store were half as likely to consume a high amount of snack foods.We also found that each additional convenience store near their home was associated with a 14% increase in the likelihood of high snack food intake. Contrary to my hypothesis, the effect of stress on snack food intake did not differ depending on the food environment. The results generally did not differ by race/ethnicity or gender.

My colleagues and I tested the hypothesis again in a sample of 100 black women in Chicago (Robert Wood Johnson Foundation Nurse Faculty Scholar Program #68033) (Zenk et al., 2014). My focus in this study was on daily hassles and women's perceptions of food availability throughout the day. Moreover, because food choices are a product of decisions throughout the day about whether, what, and how much to eat, we examined the contributions of daily hassles and food availability to intra-individual or within-person fluctuations in diet throughout the day.

We used ecological momentary assessment to collect the data. Ecological momentary assessment is an approach to data collection that captures behaviors and states of individuals in real-time as they go about their daily life. In our study, it involved several components but particularly relevant was the use of momentary surveys. Specifically, we provided women with a smartphone to use for 7 days. Five times a day women were signaled to complete a survey on the phone. The survey included questions about their stress, mood, and intake of snack foods. The institutional review board at the University of Illinois at Chicago (2012) approved this study.

We found that women reported a stressful event at 16.8% of the EMA signals and a stressful social interaction at 11.5% of signals. Among the most common daily hassles the women reported were not having enough money for a necessity, housework, too many things to do, listening to others' problems, cooking or planning meals, traffic and hairstyling and upkeep. More than half the time, women reported that food was easily available. At 35% of signals they reported consuming at least one snack food. High snack food intake was associated with times when women perceived that food was easily available and being near a convenience store, restaurant, bakery, or candy store. Women also consumed more snack

foods on days that they experienced more daily hassles. In this sample, we found some support for our hypothesis that snack food intake would be higher when women were both stressed and food was easily available. There was no association between daily hassles and snack food intake when food was not easily available.However, the probability of snack food increased at both moderate and high levels of food availability.

Implications for the U.S., Rwanda, and Sub-Saharan Africa

While conducted in the U.S., our research may also be relevant for Rwanda and Sub-Saharan Africa. Non-communicable diseases such as type 2 diabetes, cardiovascular disease, and cancer are a growing concern in Rwanda and Sub-Saharan Africa. Obesity is a risk factor for many of these non-communicable diseases. While the overall prevalence of obesity is still low in Rwanda, it is higher in urban areas and among women (currently women of higher socioeconomic status) as well as in other Sub-Saharan African countries. Obesity is also rising among children. Obesity has been linked with prevalent health problems in Rwanda and Sub-Saharan Africa. A recent study, for example, showed that maternal obesity was associated with neonatal death in Sub-Saharan Africa (Cresswell, Campbell, De Silva, & Filippi, 2012). There is also concern that double-burden households, or households with members experience both undernutrition and obesity, may become an increasing problem (Wojcicki, 2014).

An increase in obesity at the population level may reflect the nutrition transition, or the shift towards diets high in fat, sugar, animal protein, and processed foods and more sedentary lifestyles. Greater availability and lower prices of energy-dense, nutrient poor foods, associated with globalization, urbanization, and economic development, are thought to contribute. Whether a country is early in the nutrition transition such as Rwanda or later in the nutrition transition such as South Africa, prevention is key. Rwanda and many other Sub-Saharan African countries are in an excellent position to heed calls for early public health prevention efforts to prevent or slow the nutrition transition, and in doing so curb the rise in obesity and non-communicable diseases (Steyn & Mchiza, 2014).

Conclusion

Our research suggests that in order to promote healthy diets and body weights and reduce the risk of non-communicable diseases, action is needed at multiple levels, consistent with a social ecological model (Stokols, 1996). Policies that help make the healthy choice the easy choice can facilitate healthy eating. Our findings suggest a need to reduce sources of stress for women and help women cope with stress in their lives. These implications likely apply not only to black women in the U.S. but increasingly to Rwanda and Sub-Saharan Africa.

References

Cresswell, J. A., Campbell, O. M., De Silva, M. J., & Filippi, V. (2012). Effect of maternal obesity on neonatal death in Sub-Saharan Africa: Multivariable analysis of 27 national datasets. *The Lancet,* 380(9850):1325-1330.

Jackson, J. S., Knight, K. M., & Rafferty, J. A. (2010). Race and unhealthy behaviors: Chronic stress, the HPA axis, and physical and mental health disparities over the life course. *American Journal of Public Health,* 100(5):933-939.

Kirkpatrick, S. I., Dodd, K. W., Reedy, J., & Krebs-Smith, S. M. (2012). Income and race/ethnicity are associated with adherence to food-based dietary guidance among US adults and children. *Journal of the Academy of Nutrition and Dietetics,* 112(5): 624-635.

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association,* 311(8):806-814.

Steyn, N. P., & Mchiza, Z. J. (2014). Obesity and the nutrition transition in Sub-Saharan Africa. *Annals of the New York Academy of Sciences,* 1311(1):88-101.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion,* 10(4):282-298.

Wojcicki, J. M. (2014). The double burden household in Sub-Saharan Africa: Maternal overweight and obesity and childhood undernutrition from the year 2000: Results from world health organization data (WHO) and demographic health surveys (DHS). *BMC Public Health,* 14(1):1124.

Zenk SN, Thatcher E, Reina M, & Odoms-Young A. (2014). Local food environments and diet-related health outcomes: A systematic review of local food environments, body weight, and other diet-related health outcomes. In K. Morland (Ed.), *Local food environments: Food access in America* (pp. 167-204). Baton Rouge, FL: CRC Press.

Zenk, S. N., Horoi, I., McDonald, A., Corte, C., Riley, B., & Odoms-Young, A. M. (2014). Ecological momentary assessment of environmental and personal factors and snack food intake in African American women. *Appetite,* 83:333-341.

Zenk, S. N., Schulz, A. J., Izumi, B. T., Mentz, G., Israel, B. A., & Lockett, M. (2013). Neighborhood food environment role in modifying psychosocial stress–diet relationships. *Appetite,* 65:170-177.