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Factors Associated with Home Meal Preparation and Fast-Food Sources Use among Low-Income Urban African American Adults

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Abstract

This study aimed to assess the factors associated with home meal preparation (HMP) and fast-food sources use (FFS) frequencies of low-income African-American adults and their healthy food beliefs and attitudes, food-related psychosocial factors, food acquisition patterns, food sources use, and BMI. We used cross-sectional data from 295 adults living in Baltimore, USA. HMP was inversely associated with FFS, which had lower odds of HMP 1 time/day and higher BMI scores. HMP was positively associated with positive beliefs and self-efficacy toward healthy foods, getting food from healthier food sources, and lower FFS. Higher odds of HMP 1 time/day were associated with getting food from farmers' market and supermarkets or grocery stores. FFS had an inverse association with positive beliefs and self-efficacy toward healthy foods, and a positive association with less healthy food acquisition scores. Higher odds of FFS 1 time/week were associated with getting food from corner stores, sit-down restaurants, and convenience stores.

Keywords

African-Americans; cooking; food deserts

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In the United States, food prepared outside the home is generally of poorer nutritional quality than food prepared at home, and there is evidence associating the increase in use of food prepared outside the home as a risk factor for obesity (Swinburn et al. 2004). Preparing meals at home is positively associated with higher fruit and vegetable consumption and inversely associated with consumption of daily energy, fat, and sugar and fast-food intake (Larson et al. 2006; Laska et al. 2015; Wolfson and Bleich 2014). U.S. adults have decreased home food consumption and preparation in the past decades, and eating away from home is becoming increasingly common (Dave et al. 2009; Smith, Ng, and Popkin 2013).

In the United States, low-income groups have the greatest declines in home cooking (Smith, Ng, and Popkin 2013). Studies have shown that African Americans (AA) are more likely to live in households where dinner is cooked infrequently (Virudachalam et al. 2014; Wolfson and Bleich 2014). In addition, AA are more vulnerable to obesity. For example, from 1997 to 2012, the prevalence of obesity among U.S. adults increased from 19.4% to 28.9%, with AA individuals having the highest rates of overweight and obesity in the nation (Centers for Disease Control and Prevention 2016; Ogden et al. 2014). Despite the high prevalence of obesity and increased risk of overweight and obesity among AA adults, there has been little research conducted on home cooking practices (Gordon-Larsen 2014).

Given the observed inequities in access to food sources, residents in low-income and minority urban areas may be at higher risk of unhealthy food choices (Gordon-Larsen 2014). Food choices are complex integrations of attitudes, beliefs, biological needs, and environmentally led social behaviors (Celnik, Gillespie, and Lean 2012). Several studies have investigated the individual factors associated with food choice, shedding light on taste, cost, health, and cognitive and motivational factors (Furst et al. 1996; Glanz et al. 1998). Food choices are closely related to cooking practices as they affect people's food acquisition and preparation (Furst et al. 1996). In addition, Hartmann, Dohle, and Siegrist (2013) found that food choices are related to cooking skills since individuals who have higher cooking skills consume more vegetables and less convenience food. A qualitative study on cooking at home identified time pressures, desire to save money, and convenience as barriers to cooking with raw ingredients (Lavelle et al. 2016).

Factors affecting home cooking frequency are still under-investigated (Engler-Stringer 2010; Simmons and Chapman 2012). While some studies found a positive association between the use of convenience foods and time constraints (Bava, Jaeger, and Park 2008; Candel 2001; Glanz et al. 1998; Jabs and Devine 2006; Warde 1999), other studies described no differences in the use of convenience foods among employed and unemployed women (Candel 2001; Darian and Tucci 1992). For example, a study conducted in Baltimore showed that lack of time and inability to afford scratch or fresh ingredients were common barriers to cooking, while organization, planning, and enjoyment of cooking were common facilitators (Wolfson et al. 2016). These results suggest that choosing to use convenience food over preparing food at home could be correlated with economic and psychosocial factors, including cost of healthy foods and food knowledge (Engler-Stringer 2010). In addition, food values may positively influence the decision of an individual to cook (Wolfson and Bleich 2014).

The findings of Gatley, Caraher, and Lang (2014) highlight how cooking habits are always evolving and reflect wider economic, social, and cultural changes. Daniels et al. (2012) found that people who attach great importance to the social aspects of cooking and who do not feel rushed in their daily lives are more likely to have a good experience with cooking. Hence, the meaning of cooking may be influenced by various individual, family, and cooking-related determinants. A recent review of the literature suggested that, particularly among underserved populations, it is important to address psychological factors (e.g., attitudes and self-efficacy), knowledge, confidence, and practical skills, as well as external barriers (e.g., food availability, food sources), to improve home meal preparation (McGowan et al. 2015).

Lang and Caraher (2001) highlighted the need to incorporate aspects of the food system in the research of home meal preparation. The growth of processed and prepared foods and the increase in take-out meals have contributed to the decrease in home cooking in the past decades. Thus, investigating food sources and their relation with home cooking may help explain the complex interaction between the food supply chain and individual food behavior. In a study conducted with white women in Seattle, spending more time preparing meals at home was significantly associated with less money spent on food away from home and fewer visits to fast-food restaurants (Monsivais, Aggarwal, and Drewnowski 2014).

Considering the gaps in the literature on cooking frequency among low-income AA populations, further research on home meal preparation and its association with socioeconomic, psychosocial, and environmental factors is warranted to inform policy makers on the attributes that may contribute to home cooking and potentially improve diet quality. Due to the current shift in eating outside of home, we explored the factors correlated with meal preparation and fast-food purchase to account for the possible inverse relationship between these behaviors.

We hypothesized that participants' socioeconomic characteristics (e.g., employment status, participation in food assistance programs), greater healthy food beliefs and attitudes (e.g., convenience and importance of healthy food), higher food-related psychosocial factors (e.g., intentions to healthy eating, healthy eating self-efficacy), healthier food acquisition patterns and food sources, and lower adult BMI would be associated with higher frequency of participants' home meal preparation and lower fast-food purchase frequency.

Specifically, we examined the following:

1. The home meal preparation frequency and the fast-food sources use frequency in a sample of low-income urban AA adults.
2. The associated factors between home meal preparation frequency and healthy food beliefs and attitudes, food-related psychosocial factors, food acquisition patterns, and food sources use among low-income AA adults.
3. The associated factors between frequency of fast-food acquisition and healthy food beliefs and attitudes, food-related psychosocial factors, and food acquisition patterns of low-income AA adults.

Materials and methods

Study setting and design

The study was conducted in low-income neighborhoods with predominantly AA populations in Baltimore City using a cross-sectional survey design. This study used baseline data collected from caregivers of youth ages 9–14 during the B'More Healthy Communities for Kids (BHCK), an ongoing 5-year childhood obesity prevention trial that aims to increase the demand for and access to healthy and affordable foods (Gittelsohn et al. 2014).

Study sample

Sample size and power for program impact on children's diets was calculated using national data on low-income urban AA youth diet. Assuming 600 adult caretaker-child dyad respondents postintervention, it will be possible to detect a 320- to 450-calorie difference in intake, a difference of 12–15 g of fat intake, and a difference of 1–1.5 percentage points in percentage of energy from fat on low-income urban AA youth diet, with a power of 80% ($1-\beta$) and a probability of a type I error of $\alpha = .05$ (two-sided). We used baseline data collected in the first wave of the program, so it is approximately half of the respondents.

Participants in this study were recruited in 14 low-income, predominantly AA neighborhoods (> 50% AA) in Baltimore City that were considered food deserts (Haering and Franco 2010). Baltimore City's food desert was defined as an area with limited access to and affordability of healthy and nutritious food and lack of supermarkets (Franco et al. 2009).

To recruit the adult caregiver-child dyads, we first identified 100 children/households that could be eligible for the study from each of the 14 neighborhoods. The eligibility criteria included (1) having a child between the ages of 10 and 14; (2) residence within a 1.5-mile radius of the neighborhood recreation center participating in BHCK; and (3) no intention to move within the next 2 years. After contacting the children's caregivers, the families interested and eligible for the study were included in the list. We then randomly selected 22 households from each BHCK neighborhood for inclusion in the study (Gittelsohn et al. 2014).

A total of 298 caregiver-child dyads met the eligibility requirements and completed the baseline assessment. Among those who completed the baseline assessment ($n = 298$), a total of $n = 295$ adult caregivers were included in this study (three were missing data of the main dependent variable of interest).

Measures

The Adult Impact Questionnaire (AIQ) included items to measure sociodemographic information, household participation in food assistance programs, anthropometry, home meal preparation patterns, healthy food beliefs and attitudes, food-related psychosocial factors, acquisition patterns, and food sources. This instrument was used in previous intervention trials in the same setting and measured face validity (Gittelsohn et al. 2006). The data were collected between June 2013 and June 2014 through interviews with the adult

caregiver often primarily responsible for household food acquisition and preparation. Informed consent was gathered from adults before the interview and \$20 in gift cards was provided as compensation. Data collectors underwent extensive training and received certification on the study instruments. Data were checked for errors and missing information by the interviewer and a second party following each interview. Then data were entered and cleaned by a third party. The BHCK study and data-collection materials were institutional review board– (IRB-) approved (IRB No. 00004203).

Anthropometry

Caregivers' height and weight were measured using a mobile stadiometer (Seca 213 Portable Measuring Rod, Seca Corporation, Hanover, MD) and a Tanita scale (model BF697W Duo Scale, Tanita Corporation, Tokyo, Japan). Participants were measured with their shoes removed, wearing light clothing. The measurements were taken in duplicate, and a third measure was taken if the first two measures were more than 0.2 pounds or 0.25 inches different. For participants who could not have their height and weight measures taken (e.g., in a wheelchair or heavier than scale limit) or declined to have their height and/or weight measured, self-reported data were collected ($n = 23$). Body mass index (BMI) was calculated and classified according to World Health Organization (WHO) cutoffs: underweight ($< 18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}24.99 \text{ kg/m}^2$), overweight ($25\text{--}29.99 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$) (World Health Organization 2000).

Home meal preparation frequency

All participants were asked the following open-ended question: In the past 30 days, how many times did you prepare a meal? Home meal preparation (HMP) was considered combining two or more food ingredients with or without using heat. Prepared food items only heated at home were not considered prepared. We dichotomized the variable HMP frequency to improve interpretation of the results as previous studies reported on daily frequency of home meal preparation (Kramer et al. 2012; Virudachalam et al. 2014). Reported frequency of 30 times of HMP in the past 30 days was interpreted as preparing meals at least once a day.

Healthy food beliefs and attitudes and food-related psychosocial factors

Respondents' perceptions of healthy food beliefs and attitudes were captured using 10 statements about affordability, convenience, importance, and taste. Response options were on a 5-point Likert-type scale ranging from *strongly agree* to *strongly disagree* with a neutral midpoint (Vedovato et al. 2015). We summed all subscales to generate the Healthy Food Beliefs and Attitudes Scale, which had scores that ranged from 15 to 48 with a mean of 36.1 ($SD = 5.1$; Cronbach's $\alpha = .52$; $n = 293$). Higher scores indicate that the respondent showed a positive predisposition to behave consistently favorably toward healthy food choices because he or she believes they are affordable, convenient, important to family health, and/or palatable.

Three psychosocial subscales were developed to represent different dimensions of food-related knowledge, intentions about food, and food-related self-efficacy. Eleven questions assessed nutrition knowledge related to food acquisition, home meal preparation, and

nutrition facts labels (mean of 6.9, SD = 1.8, Cronbach's alpha = .44). Ten questions regarding intentions about food focused on how respondents intended to purchase and prepare food for themselves and their children. Intention scores ranged from 1 to 18, with a mean of 9.7 (SD = 4.2, Cronbach's alpha = .71). Ten food-related self-efficacy questions elicited the respondent's level of confidence in choosing healthy foods, reading nutrition facts labels, and cooking using healthy methods. Self-efficacy scores ranged from 11 to 30, with a mean of 24.8 (SD = 3.8, Cronbach's alpha = .68). The development of these subscales has been previously described (Vedovato et al. 2015).

Food acquisition patterns

Household food acquisition patterns were based on how often the adult acquired the food in the 30 days before the interview, including food purchased using personal money, nutrition program benefits (Supplemental Nutrition Assistance Program [SNAP] and The Special Supplemental Nutrition Program for Women, Infant, and Child [WIC]), and food obtained for free. A more detailed description of the scale development has been provided elsewhere (Vedovato et al. 2015). Some examples of less-healthy food items are whole milk, regular soda, hot dog, bacon, sugary cereal, white bread, chips, cookies, ice cream, and ketchup. Both less-healthy and healthier foods were classified according to the amount of fat, sugar, sodium, and fiber. For example, a less-healthy food had higher amounts of fat, sugar, and/or sodium and/or lower levels of fiber as compared to its counterpart. For both scores, higher values indicate more foods in that group were obtained.

Food sources

Caregivers self-reported all food sources used during 30 days before the interview. Food sources were categorized as farmers' market; local or urban farm stand; mobile produce cart; street food vendor; public market; the Virtual Supermarket program (Virtual Supermarket 2015), local corner store (Haering and Franco 2010); supermarket or grocery store; wholesale food store; local carry-out; fast-food chain restaurant; specialty store (i.e., bakery, African store, coffee shop); sit-down restaurant, bar or pub; convenience store; food pantry; church or community center; family and/or friends. We developed the Fast- Food Sources (FFS) Score by summing the frequency of acquiring food from carry-out and fast-food restaurants. Scores ranged from 0 to 34 with a mean of 6.1 (SD = 6.0, $\alpha = .65$, $n = 291$). We dichotomized the variable FFS frequency to improve interpretation of the results according to the distribution of the data obtained and what was done in previous study (Larson et al. 2011). Reported frequency of 4 times of food acquired from FFS in the past 30 days was interpreted as acquiring food from FFS at least once a week.

Statistical analysis

The main dependent variables of interest were home meal preparation (HMP) and FFS frequencies. Food-related psychosocial factors, healthy food beliefs and attitudes, food acquisition patterns, and food source destinations were the independent variables. Descriptive statistics were used to analyze sample characteristics, and between-group (HMP and FFS) frequencies. Comparisons were performed using Pearson's χ^2 test for categorical outcomes (e.g., sex, race, marital status, BMI, education level, and participation in food

assistance), and Mann Whitney U-test for continuous variables of interest (e.g., age in years, household size, annual income, and number of children living in the household).

Linear regression was not used as the assumptions of linearity and normality were violated based on the relationship between HMP frequency and other independent variables and on the nonnormal error distribution. Therefore, we conducted logistic regression analyses and grouped HMP into two frequencies (< 1 time/day and ≥ 1 time/day) and FFS use into two frequencies (< 1 time/week and ≥ 1 time/week).¹ Separate logistic regression models for each independent variable were performed. All these models were repeated, adjusting for the following covariates considered confounders based on biological relevance, our understanding of the literature (directed acyclic graph), and noncollapsibility criteria: poverty status (income-to-poverty ratio < 1) adult's employment status (employed), education level (incomplete high school), BMI (kg/m²), sex (female), age (years), and participation in SNAP and WIC. Odds ratios and 95% confidence interval (CI) were calculated using multiple-logistic regression to estimate the odds of cooking at least once a day and of using fast-food sources at least once a week.

All statistical analyses were conducted using Stata version 13.0 (College Station, TX, USA 2013) in 2015. For all analyses, statistical significance has been defined by a *p* value < .05.

Results

Sample characteristics by HMP frequency and FFS frequency are presented in table 1. More than half of the study population lived in a poverty situation (ratio of income to poverty < 1) and less than half were employed. About half of the sample (51.5%) reported HMP ≥ 1 time/day. Among the higher-HMP group, we found a lower prevalence of employment (*p* = .008). In addition, there were significantly more people living in poverty among the higher-HMP (*p* = .038) group. Among the higher-FFS group, we found a lower prevalence of overweight people (*p* = .030) and a lower prevalence of employment (*p* = .017). Furthermore, there were significantly fewer people participating in the Supplemental Nutrition Assistance Program (SNAP) (*p* = .011).

Factors associated with HMP

Fifty-one percent of participants prepared food at home ≥ 1 time/day (higher-HMP group; *n* = 152) (table 2). The higher-HMP group tended to believe that healthy food was palatable (*p* = .002) (table 2). The number of times getting food from FFS was significantly lower (*p* = .010) among the higher-HMP group.

Factors associated with FFS

Fifty-nine percent of participants purchased food from FFS ≥ 1 time/week (higher-FFS group; *n* = 173) (table 2). Frequency of HMP was significantly lower in the higher-FFS group (*p* = .005). The high-FFS group showed lower healthy food belief related to the

¹We dichotomized the dependent variables using the mean frequency of home meal preparation and fast-food sources use, rounding to 30 to improve interpretation of the results (e.g., reported frequency of 30 times of food prepared in the past 30 days was interpreted as preparing food at least once a day).

importance of healthy food ($p = .004$) and self-efficacy to eat healthier foods ($p = .01$) when compared to the low-FFS frequency group. We found that those with a less-healthy food acquisition pattern were more frequent FFS customers ($p < .001$) than individuals with a healthier food acquisition pattern. Moreover, individuals in the high-FFS frequency group had significantly higher BMI when compared to individuals in the low-FFS group ($p = .040$).

Associated factors with home meal preparation frequency

Multivariable logistic regression models are showed in table 3. In the adjusted multiple logistic regression analysis, we found that having a higher perception of healthy food tasting good remained significantly associated with HMP (OR: 1.59, 95% CI [1.19, 2.12]). Having higher self-efficacy to eat healthier foods was associated with 7% increase in odds of HMP (95% CI [1.00, 1.14]). Regarding food sources, each additional fast-food purchase was associated with a 5% decrease in odds of HMP 1 time/day (95% CI [0.91, 0.99]). Each time obtaining food from a farmers' market or from supermarkets/grocery stores was positively associated higher frequency of home meal preparation (OR: 1.38, 95% CI [1.02, 1.88]; OR: 1.05, 95% CI [1.00, 1.10], respectively). The higher-FFS group was 41% less likely to engage in HMP 1 time/day than the lower FFS group (95% CI [0.35, 0.99]).

Associated factors with fast-food use frequency

Multivariable logistic regression models investigating the factors associated with fast-food use frequency are shown in table 4. In the adjusted multiple logistic regression analysis, having higher healthy food beliefs and attitudes was associated with a 5% decrease in odds of FFS 1 time/week (95% CI [0.90, 0.99]), and a higher perception that healthy food is important was still significantly associated with FFS, however with a 21% decrease in odds of FFS frequency (95% CI [0.68, 0.91]). Having higher intentions for healthy eating and higher self-efficacy to eat healthier foods were associated with 7% (95% CI [0.88, 0.99]) and 8% (95% CI [0.86, 0.99]) decrease in odds of higher FFS, respectively. Associations remained significant and in the same direction for corner-store purchase, obtaining food from sit-down restaurants, getting food from convenience stores, higher-HMP group, and less-healthy food acquisition variables in the adjusted analyses.

Discussion

This was the first study to find food-related behaviors and psychosocial factors associated with home food preparation and fast-food use frequencies among predominantly AA adults living in low-income neighborhoods. Our results show that despite recent reports that home cooking is decreasing (Smith, Ng, and Popkin 2013), around half of our participants prepared food at home at least once a day. We found an inverse association between preparing meals at home and getting food from FFS. Moreover, those who had higher frequencies of HMP also had higher positive perceptions concerning healthy food, whereas those who got food from FFS 1 time/week had lower positive perceptions of healthy food, lower self-efficacy to healthy eating, and higher BMI than individuals with lower FFS use.

Furthermore, HMP was inversely associated with getting food from FFS, which had lower odds of HMP 1 time/day. Interestingly, none of the other food stores serving prepared foods analyzed in this study, such as specialty store (bakery, coffee shop, etc.), sit-down restaurant or bar/pub, and convenience store (chain stores, i.e., Seven-Eleven, WaWa, Royal Farms, etc.), showed an association with HMP frequency. These results suggest that fast-food and/or carry-out restaurants may be the main food sources replacing HMP in this sample for this list of food outlets. The replacement of HMP by FFS has also been described in other studies (Monsivais, Aggarwal, and Drewnowski 2014; Van Der Horst and Siegrist 2011). It has been argued that socioeconomic status could affect the quality of the purchased foods since higher-income populations may afford healthier prepared meals that are often more expensive than less-healthy options. For example, Lee et al. (Lee et al. 2010) showed that carry-out restaurants were the most common prepared food source among low-income residents in Baltimore City, and the most common preparations offered were fried chicken, fried lake trout, hamburgers, and sandwiches.

Several studies have discussed the relationship between fast-food consumption and meal preparation. Van der Horst and Siegrist (2011) found participants who spent more time cooking and who had higher cooking skills were less likely to eat fast food in Switzerland. Moreover, Monsivais, Aggarwal, and Drewnowski (2014) found frequency of visits to fast-food restaurants appeared to be lower among those who spent 2 hours/day on meal-related activities (preparing, cooking, and cleaning up from meals). In addition, Kornides et al. (2014) found that a higher frequency of fast-food meal consumption during the week was inversely associated with having 5 family meals/week.

Moreover, Dave et al. (2009) suggested that interventions seeking to decrease fast-food intake should focus on strategies to increase convenience of eating healthful foods in addition to targeting food preparation through demonstrations, teaching cooking skills, and emphasizing on enjoyment aspect of cooking. Many obesity prevention strategies assume that if given access, families will purchase fresh ingredients and prepare healthy food at home, presuming the ability and desire to cook. However, in our study, HMP was not associated with healthy food acquisition, while individuals in the higher-FFS use group had higher odds for less-healthy food acquisition. Some of the “healthy food acquisition” items were not necessarily cooking foods, for example, diet soda, dried fruits and nuts, and baked chips. Those foods were listed under healthier food acquisition because of the scope of the intervention, where the program encouraged families to switch from high-fat, high-sugar foods to similar food options with lower fat, sugar, and salt content. Hence, our findings highlight the need to consider the context the individuals live in, as access to fresh and healthy foods is limited in food deserts.

In the context of high prevalence of prepared high-energy food sources, the prevailing tastes and norms may also be a barrier to cooking healthy foods. Thus, it is important that obesity interventions targeting improvement of cooking skills address the intermediary steps between food access and healthy eating, including planning meals, acquiring ingredients, and preparing food at home (Virudachalam et al. 2014). Such interventions have been described to promote motivation and reflection, increase awareness of the food relationship

in daily life, improve conceptual learning, help in daily choices, expand autonomy, and increase individuals' empowerment (Diez-Garcia and Castro 2011).

In this study, factors affecting low-income AA HMP in Baltimore, including beliefs, attitudes, and psychosocial factors toward healthy eating, are comparable to those affecting other demographic groups (Fulkerson et al. 2010; Kornides et al. 2014; Kramer et al. 2012; Mead et al. 2010). For example, positive perceptions concerning healthy food were positively and significantly associated with higher frequencies of HMP among children and adolescents in Canada (Woodruff and Kirby 2013), African American youth in Baltimore (Kramer et al. 2012), adolescents and parents of various socioeconomic statuses in Minnesota (Fulkerson et al. 2010), and Inuvialuit adults in Canada (Mead et al. 2010). Therefore, future policies should consider intrapersonal characteristics to foster healthy eating among populations.

In addition, we found that believing healthy foods are palatable and having higher self-efficacy to healthy eating increased significantly the odds of HMP of 1 time/day. Our study indicated that lower perception of the importance of healthy food for their families, lower healthy-eating self-efficacy, and lower intentions to healthy eating decreased significantly the odds of FFS 1 time/week. Concurrently, Morin et al. (2013) found that low self-efficacy related to meal management was associated with eating in fast-food restaurants. Thus, preparing food at home may induce individuals to taste greater varieties of foods, try various preparation methods and recipes, and experience positive feelings about healthy foods. Subsequently, individuals may change perceptions and attitudes toward food and healthy eating.

Displacement of foods and culinary ingredients by highly processed ready-to-consume products is believed to transform food culture and dietary patterns (Monteiro et al. 2013). Thus, it is important that interventions focusing on improving home cooking also approach culturally appropriate foods and meals. In addition, there are personal, cultural, and environmental attributes and gendered social norms to consider when developing nutrition-related programs for African Americans and other populations (Allen, Griffith, and Gaines 2013; Robinson 2008). Ultimately, the protection and maintenance of diverse culinary cultures in the globalized world is related to cooking practices.

With regard to food acquisition patterns, getting food from a farmers' market (FM) showed higher odds for HMP 1 time/day. The majority of our sample were SNAP recipients (76%); SNAP can be used to shop at some of the farmers' markets in Baltimore. However, only a few adults in our sample reported acquiring food from the farmers' market, suggesting that low-income populations living in food deserts are not accessing fresh and local produce very often. In 2015, there were 20 FMs in Baltimore City, concentrated in the downtown area, which is a wealthier region of Baltimore (Maryland Farmers' Market Association 2015). Leone et al. (2012) noted that the two main reasons for low-income people to not use a FM were not being able to use food assistance program benefits and not being aware of a FM in their area. Similarly, a qualitative study described barriers to low-income individuals buying food at FMs, including FM placement away from supermarkets and limited operating hours (Wetherill and Grey 2015). This kind of food source offers

predominantly healthy foods; thus, policies to expand and locate more FMs in food deserts and low-income neighborhoods may be a powerful strategy to improve healthy food access. Equally important, including incentives at the supply side for farmers' markets and farmer-producers to apply to become SNAP authorized retailers and strategies to improve the demand side that encourage low-income AA populations to shop at FMs should be considered at the policy level to ensure equal access to healthy food.

Our findings should be interpreted in light of a few limitations of our study. First, the cross-sectional data do not allow drawing any conclusions beyond associations. Second, the main dependent variables were self-reported, which may be biased. However, data collectors were trained to secure honest answers and help participants recall their food-related behaviors. Third, preparing a meal was considered combining two or more food ingredients with or without using heat. For this reason we could not assess the type of preparation (frozen meals, preprepared meals, and meals prepared at home from scratch); thus, it was not possible to assess healthiness of the food preparation. Fourth, FFS score and healthy food beliefs and attitudes scale had low Cronbach's alpha, so results should be interpreted with caution. Fifth, the relatively homogenous sample characteristics may have precluded finding relations between HMP frequency and some sociodemographic characteristics, including ethnicity, income, and number of individuals living in the household. Last, despite the controversies in the validity of the BMI measure to represent adiposity accurately, BMI remains the most commonly reported indicator of body fatness or obesity in population-based studies (Nevill et al. 2006).

In summary, given that our study population lives in food desert areas, where access to FFS and to high-processed foods is easy and inexpensive (Franco et al. 2008; Lee 2010), preparing food at home despite exposure to adverse circumstances may represent a form of resilience (a dynamic process encompassing positive adaptation within the context of significant adversity (Luthar, Cicchetti, and Becker 2000)). In conclusion, according to our findings, greater frequency of HMP had a positive association with positive beliefs, attitudes, and self-efficacy toward healthy food and getting food from farmers' markets and supermarkets/ grocery stores. On the other hand, greater frequency of FFS use had an inverse association with HMP, positive healthy food beliefs and attitudes, intentions to healthy eating, healthy eating self-efficacy; a positive association with less-healthy food acquisition; and higher mean BMI than lower frequency of FFS use. These findings reinforce the importance of future interventions and policies to focus on developing cooking skills, overcoming cooking barriers, and improving access to healthy foods as a way to improve healthier home meal preparation and diet among populations. Provided the suggestion that FFS are the main food sources when food is not prepared at home and given the relation between FFS and lower prioritization of healthy foods, motivations and barriers to preparing meals at home and meal composition should be further explored in future research

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Table 1

Socioeconomic Characteristics of Low-Income African American Adults by Home Meal Preparation Frequency and Fast-Food Sources use Frequency Living in Baltimore City ($n = 295$).

	Home meal preparation frequency		Fast-food sources use frequency	
	< 1 time/day ($n = 143$)	1 time/day ($n = 152$)	< 1 time/week ($n = 121$)	1 time/week ($n = 173$)
Age (years)	38.3 $\pm$ 9.2	38.6 $\pm$ 10.0	39.5 $\pm$ 9.7	37.8 $\pm$ 9.5
Women (%)	86.7	84.9	86.8	85.0
African American (%)	92.7	90.1	89.2	93.0
Marital status (%)				
Never married	58.2	60.0	61.0	58.1
Married	22.0	24.0	22.9	23.2
Separated/divorced	16.3	13.3	12.7	15.7
Widowed	3.5	2.7	3.4	2.9
BMI Classification (%)				
Underweight	0.7	1.3	0.0	1.7
Normal weight	12.6	11.8	11.6	12.1
Overweight	20.3	21.7	27.3	16.8 [*]
Obese	66.4	65.1	61.1	69.4
Household size (n)	4.6 $\pm$ 1.5	4.7 $\pm$ 1.8	4.8 $\pm$ 1.7	4.6 $\pm$ 1.7
Children 18 living in the household (n)	2.6 $\pm$ 1.3	2.8 $\pm$ 1.6	2.8 $\pm$ 1.4	2.7 $\pm$ 1.5
School level completed (%)				
Did not graduate high school	18.2	17.9	22.5	15.0
Graduated high school	44.8	40.4	44.2	41.6
Some college experience or college degree(s)	37.1	41.7	33.3	43.3
Unemployed (%)	38.5	53.9 ^{**}	45.4	59.5 [*]
Annual household income per capita (USD)	5,919.7 $\pm$ 4,353.3	5,298.7 $\pm$ 4,265.0	5,014.6 $\pm$ 4,292.2	6,022.9 $\pm$ 4,615.6
Ratio of income to poverty < 1 (%) ^a	53.3	65.5 [*]	65.2	55.2
Participation in food assistance programs (%)				
WIC	22.4	22.4	19.8	24.3
SNAP	71.3	80.3	83.5	70.5 [*]

Note. BMI = body mass index (underweight < 18.5 kg/m², normal weight 18.5–24.9 kg/m², overweight 25–29.9 kg/m², obese $\geq$ 30 kg/m²); WIC = The Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP = Supplemental Nutrition Assistance Program.

^aSource: Census Bureau (2015).

^{*} $p < .05$;

^{**} $p < .01$ for differences between groups.

Table 2

Food-Related Factors by Home Meal Preparation Frequency and Fast-food Sources Use among Low-Income African American Adults Living in Baltimore City.

	Home meal preparation frequency		Fast-food sources use ^a	
	< 1 time/day	1 time/day	< 1 time/week	1 time/week
	(n = 143)	(n = 152)	(n = 121)	(n = 173)
Number of times getting food from fast-food sources (times per month)	7.0 ± 6.5	5.3 ± 5.3 *	-	-
Number of times preparing meal at home meal (times per month)	-	-	41.1 ± 26.6	32.7 ± 26.1 **
Healthy food beliefs and attitudes scale	35.5 ± 5.7	36.7 ± 4.2 *	36.7 ± 4.6	35.8 ± 5.3
Affordability	9.5 ± 3.2	9.8 ± 2.7	9.7 ± 2.8	9.7 ± 3.0
Convenience	9.9 ± 2.3	10.2 ± 1.7	10.2 ± 1.8	10.0 ± 2.1
Importance	12.4 ± 1.9	12.5 ± 1.9	12.8 ± 2.0	12.2 ± 1.8 **
Tastes good	3.7 ± 1.0	4.1 ± 0.8 **	3.9 ± 0.9	3.9 ± 0.9
Food-related psychosocial factors scale				
Food and nutrition knowledge	7.0 ± 1.7	7.2 ± 1.8	7.1 ± 2.0	7.1 ± 1.6
Intentions on healthy eating	11.1 ± 4.0	11.6 ± 4.0	11.8 ± 4.2	11.1 ± 3.9
Healthy eating self-efficacy	24.4 ± 4.3	25.1 ± 3.3	25.3 ± 3.8	24.4 ± 3.8 *
Food acquisition score				
Healthy food acquisition	14.1 ± 4.1	14.4 ± 4.0	14.2 ± 4.5	14.3 ± 3.7
Less-healthy food acquisition	18.3 ± 3.8	19.0 ± 3.8	17.6 ± 3.9	19.4 ± 3.6 ***
BMI (kg/m ²)	34.0 ± 8.4	32.96 ± 7.6	32.4 ± 7.0	34.3 ± 8.5 *

Note. BMI = body mass index.

^a Carryout and/or fast-food restaurants

* $p < .05$;

** $p < .01$;

*** $p < .001$ significantly different from < 1 time/day group.

Table 3

Factors Associated with Home Meal Preparation Frequency (> 1 Time/Day) among Low-Income African American Adults Living in Baltimore City ($n = 295$).

	Unadjusted		Adjusted	
	OR	95% CI	OR	95% CI
Healthy food beliefs and attitudes scale	1.04	[0.99, 1.09]	1.05	[1.00, 1.10]
Affordability	1.04	[0.96, 1.12]	1.04	[0.96, 1.13]
Convenience	1.07	[0.95, 1.20]	1.08	[0.95–1.22]
Importance	1.04	[0.92, 1.17]	1.04	[0.91, 1.19]
Tastes good	1.54 ^{**}	[1.18, 2.00]	1.59 ^{**}	[1.19, 2.12]
Food-related psychosocial factors scale				
Food and nutrition knowledge	1.07	[0.94, 1.23]	1.13	[0.97, 1.32]
Intentions on healthy eating	1.03	[0.97, 1.09]	1.04	[0.98, 1.11]
Healthy eating self-efficacy	1.05	[0.99, 1.11]	1.07 [*]	[1.00, 1.14]
Number of times getting food from:				
Farmers' market	1.29	[0.98, 1.68]	1.38 [*]	[1.02, 1.88]
Corner store	1.00	[0.99, 1.01]	1.00	[0.98, 1.01]
Fast-food sources ^a	0.95 [*]	[0.91, 0.99]	0.95 [*]	[0.91, 0.99]
Sit-down restaurant	0.88	[0.78, 1.00]	0.90	[0.78, 1.03]
Specialty store	0.98	[0.93, 1.04]	0.98	[0.92, 1.04]
Convenience store	0.98	[0.95, 1.01]	0.98	[0.95, 1.01]
Supermarket or grocery store	1.04	[0.99, 1.09]	1.05 [*]	[1.00, 1.10]
Consuming food from fast-food sources ^a 1 time/week	0.55 [*]	[0.34, 0.88]	0.59 [*]	[0.35, 0.99]
Food acquisition score (yes/no)				
Healthy food acquisition	1.02	[0.96, 1.08]	1.01	[0.95, 1.07]
Less-healthy food acquisition	1.04	[0.98, 1.11]	1.06	[0.99, 1.13]

Note. Multiple logistic regression analysis adjusted for employment status (unemployed), poverty status, education level (< high school degree), BMI (kg/m^2), sex (female), age (years), participation in food assistance programs (SNAP and WIC). BMI = body mass index; WIC = The Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP = Supplemental Nutrition Assistance Program; OR = odds ratio; CI = confidence interval.

^a Carryout and/or fast-food restaurants.

^{*} $p < .05$;

^{**} $p < .01$ for differences between groups.

Table 4

Factors Associated with Fast-Food Sources Use Frequency (1 Times/Week) among Low-Income African American Adults Living in Baltimore City ($n = 295$).

	Unadjusted		Adjusted	
	OR	95% CI	OR	95% CI
Healthy food beliefs and attitudes scale	0.96	[0.92, 1.01]	0.95 [*]	[0.90, 0.99]
Affordability	0.99	[0.92, 1.08]	0.99	[0.90, 1.08]
Convenience	0.93	[0.82, 1.04]	0.90	[0.79, 1.02]
Importance	0.84 [*]	[0.74, 0.96]	0.79 ^{**}	[0.68, 0.91]
Tastes good	1.02	[0.80, 1.30]	0.98	[0.75, 1.28]
Food-related psychosocial factors scale				
Food and nutrition knowledge	0.97	[0.85, 1.11]	0.88	[0.75, 1.03]
Intentions on healthy eating	0.95	[0.90, 1.01]	0.93 [*]	[0.88, 0.99]
Healthy eating self-efficacy	0.93 [*]	[0.88, 0.99]	0.92 [*]	[0.86, 0.99]
Number of times getting food from:				
Farmers market	1.03	[0.80, 1.32]	0.93	[0.70, 1.23]
Corner store	1.05 ^{**}	[1.02, 1.07]	1.06 ^{***}	[1.02, 1.09]
Sit-down restaurant	1.60 ^{***}	[1.27, 1.98]	1.53 ^{**}	[1.20, 1.93]
Specialty store	1.00	[0.94, 1.07]	0.98	[0.93, 1.05]
Convenience store	1.06 [*]	[1.01, 1.11]	1.06 [*]	[1.01, 1.12]
Supermarket or grocery store	1.06 [*]	[1.01, 1.11]	1.06	[0.99, 1.12]
Food acquisition score (yes/no)				
Healthy food acquisition	1.00	[0.95, 1.06]	1.00	[0.94, 1.07]
Less-healthy food acquisition	1.13 ^{***}	[1.06, 1.21]	1.17 ^{***}	[1.09, 1.26]

Note. Multiple logistic regression analysis adjusted for employment status (unemployed), poverty status, education level (< high school degree), BMI (kg/m^2), sex (female), age (years), participation in food assistance programs (SNAP and WIC). Fast-food sources = carryout and/or fast-food restaurants; BMI = body mass index; WIC = The Special Supplemental Nutrition Program for Women, Infants, and Children; SNAP = Supplemental Nutrition Assistance Program; OR = odds ratio; CI = confidence interval.

^{*} $p < .05$;

^{**} $p < .01$;

^{***} $p < .001$ for differences between groups.