Personal characteristics, cooking at home and shopping frequency influence consumption

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ABSTRACT

This study examines how the consumption of fruits and vegetables is affected by home cooking habits and shopping patterns, including distance to patronized stores and frequency of shopping, in two low-income predominantly African American urban neighborhoods in New Orleans, Louisiana.

In-person interviews were conducted in 2013 with 901 adult residents who identified themselves as the primary household shopper. Respondents were asked where and how often they shopped and answered a food frequency questionnaire. Addresses were geocoded and distances to the stores where respondents shopped were calculated. Multivariable logistic regression was used to examine the relationship between food consumption and personal factors, neighborhood factors and shopping habits.

Consumption of daily servings of fresh produce increased by 3% for each additional trip to a grocery store, by 76% for shopping at a farmer's market, and by 38% for preparing food at home. Each additional trip to a convenience store increased the frequency of consumption of chips, candy and pastries by 3%. The distance from residence to the type of store patronized was not associated with consumption of produce or chips, candy or pastries.

Shopping at full-service grocery stores, farmer's markets and cooking at home were positively associated with the consumption of fresh produce while shopping at convenience stores was associated with increased consumption of chips, candy and pastries. These findings are useful for designing programmatic interventions to increase fresh fruit and vegetable consumption among residents in low-income urban communities.

1. Introduction

Diets are important determinants of health (Hung et al., 2004). Fruit and vegetable (F/V) consumption is known to promote health and prevent diseases such as CVD, type 2 diabetes, hypertension, osteoporosis, and cancer due to their concentration of nutrients including vitamins, folate, potassium, minerals, and dietary fiber (Hung et al., 2004; Heimendinger et al., 1996; Steffen, 2006; Bazzano, 2006; Dietary Guidelines Advisory Committee, 2010). Frequent consumption of food high in calories, fat, salt and sugar may increase one's overall daily energy intake and is associated with overweight and obesity, risk factors for developing CVD, diabetes, and hypertension [(van der Horst et al., 2008;

Hu & Malik, 2010; Mrdjenovic & Levitsky, 2003; Roberts & Barnard, 2005; Joint WHO/FAO Expert Consultation, 2003). Understanding the determinants of food consumption and identifying related health promotion opportunities are crucial to the prevention of chronic diseases such as cancer, cardiovascular disease, Type 2 diabetes, obesity and metabolic syndrome (Heimendinger et al., 1996; van der Horst et al., 2008; McCrory et al., 1999; Zenk et al., 2005; Wu et al., 2011).

Age, income, and education have been found to be related to food choices (Zenk et al., 2005). F/V consumption is greater in older, higher income and more educated people (Zenk et al., 2005; Wu et al., 2011; Jaime et al., 2009). Men tend to consume F/V less frequently than women (Fraser et al., 2000; Krebs-Smith et al., 1995). Food choices are important in determining an individual's BMI [(Rose et al., 2009; Tohill et al., 2004). Uglem and colleagues found that young men with high intakes of plant foods were less likely to have a high BMI than their counterparts (Uglem et al., 2011). In contrast, restaurant food consumption, especially fast food, has been associated with higher BMI

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among adults (McCrory et al., 1999; Bowman & Vinyard, 2004). Kant et al. found that in the US, younger individuals consume greater amounts of beverages and snacks compared to older individuals with a higher percentage of energy consumed as sweetened beverages among younger individuals (Kant et al., 2012).

The food environment is an important factor associated with food consumption patterns (Zenk et al., 2009). People are more likely to meet national guidelines for F/V consumption when there are supermarkets or grocery stores in their neighborhood (Rose et al., 2009; Zenk et al., 2009; Morland et al., 2002a). Residents in poor and minority communities are less likely to have access to these stores and therefore, healthy food, than those in nonminority and higher income communities (Morland et al., 2002b; Apparicio et al., 2007; Crabtree & Mushi-Brunt, 2013). Recent studies indicated that distance to a grocery store was important but only in the context of frequency of shopping (Gustat et al., 2015; Aggarwal et al., 2014). A grocery store farther away was related to a lower frequency of shopping trips and lower consumption of produce. These barriers may influence people's dietary choices.

Convenience stores are often located throughout low-income neighborhoods and can be a substitute for supermarkets that may be located farther away (Sharkey et al., 2013). It has been shown, however, that convenience stores do not typically offer fresh produce and are known to have an unhealthier mix of food compared to larger food stores (Glanz et al., 2007). A study by O'Malley et al. indicated that shopping at corner stores was associated with the purchase of prepared foods and beverages (O'Malley et al., 2013).

Farmer's markets are another mechanism to supplement access to fresh foods. People who shop at a farmers' market at least once a week are more likely to consume F/V than those not shopping at a farmers' market (Bower et al., 2014; Kahin et al., 2016; McCormack et al., 2010). Farmer's markets may be a way to increase neighborhood access to F/V especially in low-income areas (McCormack et al., 2010). However, more research is needed in this area.

Cooking dinner at home is associated with healthy dietary patterns. Respondents in one study who cooked dinner six to seven times per week consumed less fat and sugar per day compared with those who cooked dinner zero to once per week.(Wolfson & Bleich, 2015) In our busy modern society, people spend more time at work or work multiple jobs making it more difficult to prepare meals at home from scratch than buying pre-prepared food, fast food or box mixes. The term 'scratch' refers to meals prepared at home without box or pre-prepared mixes and sauces. However, research is not clear how people understand and use this term (Smith et al., 2013; Wolfson et al., 2016). Nevertheless, a connection is seen with cooking at home and increased consumption of F/V (Wolfson & Bleich, 2015). A study by Pérez-Lizaur found that children with parents who cook at home have diets higher in consumption of F/V than other children (Pérez-Lizaur et al., 2008). Additionally, Monsivais et al. identified time as an essential factor in healthy eating habits among adults (Monsivais et al., 2014). The food industry has produced a range of convenient alternatives to cooking from scratch at home (Gehlhar & Regmi, 2005; Monteiro et al., 2013). These convenient alternatives such as frozen pizza, prepared and canned foods, are often high in sodium, fat and non-essential nutrients (Ahuja et al., 2015; Maalouf et al., 2015; Monteiro et al., 2010; Baker & Friel, 2014; Ryan et al., 2004). Cooking at home may affect daily intake of fresh F/V.

In order to better understand the relationship with patterns of food consumption among residents of low-income primarily African American urban neighborhoods, we examined various factors such as shopping frequency, cooking food at home, shopping at a farmer's market, grocery, corner and convenience stores with consumption of fresh F/V, total F/V and consumption of chips, candy and pastries in a neighborhood sample.

2. Materials and methods

2.1. Participants and recruitment

In-person interviews were conducted by trained interviewers in 2013 with 901 adults who identified themselves as the primary household shopper in two neighborhoods in New Orleans in this cross-sectional study. The neighborhoods were selected because of similar area household density, number of people per household, racial composition, age distribution, median income and homeownership and were chosen to examine future changes in anticipation of a grocery store being opened in one of the neighborhoods. All blocks within each neighborhood were enumerated by listing residential addresses and selecting every third housing unit for inclusion in the study sample. Households selected for inclusion were visited up to six times to obtain an initial contact for the interview.

In order for respondents to be included, they had to be the main shopper for the household, at least 18 years old and residing in the neighborhood for a minimum of three months and have the ability to speak English. The interview took approximately 20 min and assessed demographic characteristics, average distance to the store or place where the respondent purchased food, number of food shopping trips per month, how often food was prepared at home from scratch, and dietary patterns. Consumption of food was assessed in a modified food frequency format including frequency of fresh, canned, and frozen produce along with other food categories such as salty snacks, candy and pastries/sweet baked goods, and diet and regular carbonated drinks. The questions were based on the Behavioral Risk Factors Surveillance System (BRFSS) questions and used by the authors in a previous telephone survey conducted city-wide in 2011 (Gustat et al., 2015; Centers for Disease Control and Prevention, 2011). All respondents provided oral consent and all protocols were approved by the Tulane Institutional Review Board.

2.2. Measures and outcomes

Four dependent variables were examined in the present study: fresh F/V consumption, total F/V consumption, consumption of chips, candy and pastries including regular (sweetened) carbonated drinks and consumption of chips, candy and pastries not including regular carbonated drinks (Block, 2004). The question assessing fresh fruit consumption was phrased "How many servings of FRESH fruit do you usually eat?" Similar questions were used to assess fresh, canned and frozen F/V consumption. Respondents could indicate their consumption in terms of day, week, month or year. The food frequency information was converted to servings per day or times per day by dividing (i.e. If respondent consumed 10 servings per week, it was divided by 7 to obtain daily servings). The fresh produce consumption variable was created by summing average daily servings of fresh F/V. The consumption of total F/V variable was created by summing daily servings of fresh, canned, and frozen F/V. Consumption of chips, candy and pastries with regular carbonated drinks was created by summing the frequencies of average daily consumption for responses to the following items: "How often do you eat chips or salty snacks?"; "How often do you eat candy?"; "How often do you eat cookies, doughnuts, sweetened baked goods or pastries?"; "How often do you drink sugar sweetened carbonated drinks such as Coke, Pepsi, Sprite, Big Shot, Barq's root beer, et cetera?" Because we were unsure of the influence of regular carbonated beverage consumption on overall consumption of chips, candy and pastries, we examined consumption of these items with and without regular carbonated beverages. As the main outcomes were not normally distributed, we used quartiles as the cut-off points. For fresh F/V and total F/V, consumption was categorized into two groups, (top three quartiles versus bottom quartile). The cut point of the bottom quartile of fresh produce was ≤1 serving per day. The cut point of the bottom quartile of total produce was ≤1.7 servings per day. Chip, candy and pastry consumption was