

Using a Grocery List Is Associated With a Healthier Diet and Lower BMI Among Very High-Risk Adults

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ABSTRACT

Objective: Examine whether use of a grocery list is associated with healthier diet and weight among food desert residents.

Methods: Cross-sectional analysis of in-person interview data from randomly selected household food shoppers in 2 low-income, primarily African American urban neighborhoods in Pittsburgh, PA with limited access to healthy foods.

Results: Multivariate ordinary least-square regressions conducted among 1,372 participants and controlling for sociodemographic factors and other potential confounding variables indicated that although most of the sample (78%) was overweight or obese, consistently using a list was associated with lower body mass index (based on measured height and weight) (adjusted multivariate coefficient = 0.095) and higher dietary quality (based on the Healthy Eating Index–2005) (adjusted multivariate coefficient = 0.103) ($P < .05$).

Conclusions and Implications: Shopping with a list may be a useful tool for low-income individuals to improve diet or decrease body mass index.

Key Words: food desert, food shopping, grocery list, dietary quality, body mass index (*J Nutr Educ Behav.* 2015;47:259–264.)

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INTRODUCTION

In the US today, individuals face a myriad of daily food choices and a great deal of marketing. Shopping thus requires calculated tradeoffs between taste, nutrition, price, and convenience. This may make it particularly difficult to eat nutritiously or maintain a healthy weight.

African Americans and low-income individuals are at increased risk for poor diet, overweight, and obesity.^{1–3} It is especially difficult to eat healthfully with barriers such as targeted marketing, or residence in an area with no access to healthy, fresh foods.^{4–8} Living in a food desert, or a geographic area with limited access to healthy foods, may cause “deprivation amplification,”⁹ whereby

the multiple barriers (eg, limited access to healthy options, targeted marketing) may exacerbate health risk because of the additional barriers faced by residents.

Grocery shopping with a list is a tool that may help people to navigate complicated food marketing environments.¹⁰ A shopping list can function as (1) a memory aid, (2) a guide to limiting impulse purchases, and (3) a formal planning method that structures meals and eating habits and preserves financial resources.^{11–14} For shoppers attempting to eat a healthy diet or limit calories, attending to a list may help filter out products and promotions that undermine these goals. Among low-income individuals, lists may be particularly effective at directing purchases if, after paying

for all items on the list, there are little or no funds remaining to spend on discretionary items such as snack foods and sweets.¹⁵ For food deserts residents, lists might also optimize purchases during trips to distant, less frequently visited stores.

Prior studies employing a variety of designs and measures provide mixed evidence that using a list is associated

Using a list when shopping can be a useful tool to limit extraneous purchases and counter the effects of marketing of unhealthy options.

with improved dietary quality or weight.^{16–19} Only 1 examined a high-risk population of low-income women with limited access to healthy foods.²⁰ In an analysis of households that were part of the Supplemental Nutrition Assistance Program survey, half used shopping lists *pretty much all the time* and those who did were significantly more likely to meet daily

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recommended dietary guidelines for certain nutrients.²⁰

Because of limited evidence, this research builds on the opportunity to examine a sample of low-income, predominantly African American household food shoppers residing in 2 urban food deserts, to determine the characteristics of grocery list users and whether using a list was associated with a better diet and a healthier weight.

METHODS

Participants and Procedures

The researchers collected data as part of the Pittsburgh Hill/Homewood Research on Eating, Shopping, and Health (PHRESH) study, a population-based longitudinal survey designed to improve understanding of the food shopping and dietary patterns of urban food desert residents. The PHRESH participants were 1,372 adults who were the primary food purchasers for households sampled from 2 socio-demographically similar, low-income, predominantly African American neighborhoods characterized by poor access to healthy food options such as fresh fruit and vegetables, both of which were in the Pittsburgh area.

Households were enrolled and baseline surveys were administered in summer and fall, 2011 (May to December). Households were randomly selected from a complete list of neighborhood addresses obtained from the Pittsburgh Neighborhood and Community Information System, which had been merged with Allegheny County Office of Property Investment data to identify residential addresses. All residential addresses were cross-referenced with postal service data to remove vacant properties from the sample. Stratified random sampling was applied to the cohort within the intervention neighborhood (the authors sampled 3 concentric radii of distances to where the construction of a full-service supermarket was planned). There also was oversampling of households in the intervention neighborhood. Pre-notification postcards and letters were mailed to each selected address.

Eighteen trained data collectors who lived in the neighborhoods went door-to-door to enroll households. They were able to speak with an adult and identify the address as a

residence for 1,956 households (67% of all selected addresses). Of those households, 1,649 were eligible (ie, the study was able to contact the primary food shopper who was aged ≥ 18 years and cognitively and physically able to complete the interview); 1,434 (87%) agreed to do so. Of those who participated, 62 (4%) had large amounts of missing data, which left a final sample of 1,372 household shoppers (70% of those with whom data collectors were able to speak).

Data collectors interviewed participants in their homes, entering data into a laptop computer. The survey assessed sociodemographic characteristics including educational attainment, household income, employment status, marital status, food security, food shopping behaviors, and a variety of factors related to food purchasing. Residents self-administered sensitive questions (eg, income). Interviewers measured respondent height and weight at the conclusion of the interview and guided respondents through a 24-hour online dietary recall. Approximately 1 week later, participants repeated this dietary recall via telephone. Participants gave informed consent for the study and received \$25 for the initial survey (and dietary recall), and an additional \$15 for completing the second dietary recall. All study protocols were approved by the RAND Human Subjects Protection Committee. Analyses presented here use PHRESH baseline data, collected before a supermarket was constructed and subsequently opened in the study areas.

Measures

Shopping with a list was measured with the question, *In general, how often do you go grocery shopping with a list of things you need to buy?* Response categories were *Never*, *Sometimes*, *Often*, or *Always*. Based on the distribution of responses and for ease of presentation, responses were dichotomized to create a group of users who responded that they always use a list vs inconsistent or non-list users (all others) for the analyses.

Diet was assessed with the Automated Self-administered 24-Hour Dietary Recall.²¹ Data collectors guided respondents through the recall, which is based on a modified version of the US Department of Agriculture's

Automated Multiple-Pass Method. Healthy Eating Index–2005 (HEI-2005) scores were derived from the average of the 2 recalls unless participants completed only 1 (7% of participants).^{22,23} The HEI-2005 includes 12 components: total fruit, total vegetables, total grains, milk, meat and beans, whole fruit, dark green and orange vegetables and legumes, whole grains, oils, saturated fat, sodium, and calories from solid fat, alcohol, and added sugar. The HEI can range from 0 to 100, with higher scores indicating a higher-quality diet. Average HEI score in the US is 57.2; for non-Hispanic black people, it is 55.0.²³

Body mass index (BMI) was based on interviewer-measured height and weight (respondents were clothed but measured without shoes) from May to September, 2011. Interviewers measured height to the nearest eighth inch using a carpenter square (triangle) and an 8-ft folding wooden ruler marked in inches. Interviewers entered adjustments to the height (eg, for shoes or hair ornaments that the respondent chose not to remove). Weight was measured using the Seca Robusta 813 digital scale (Chino, CA), to the nearest 10th of a pound.

Age, race, gender, education, adjusted household income, marital status, number of children in the household, and employment were measured using validated items from the US Census/American Community Survey,²⁴ as well as the Los Angeles Family and Neighborhood Study²⁵ and the Project on Human Development in Chicago Neighborhoods Community Survey.²⁶ Other factors that might confound relationships between list use and dietary quality or BMI were measured. Food security was assessed with the US Household Food Security Module.²⁷ As an indicator of nutritional knowledge, respondents were asked, *How many servings of fruit and vegetables are recommended for daily consumption?* Responses of ≥ 5 were accepted as correct. Similar items have been validated in multiple studies, including one of a large sample of low-income African American men.²⁸ Respondents also reported the number of people for whom they typically purchase food and how much they typically spend on food each week (both were open-ended). Weekly food expenditures

were calculated as the amount spent per person. To measure attempts to limit calories, respondents were asked, *In the past month, have you been eating fewer calories to lose weight or keep from gaining weight?*

Data Analysis

Descriptive statistics were calculated, including demographics, food security, and the primary predictor and outcomes (shopping with a list, BMI, and HEI). Variation in these characteristics with respect to shopping with a list was tested using 2-tailed *t* tests for means and chi-square for proportions. Two ordinary least-square regression models tested whether a dichotomous indicator of always shopping with a list was associated with (1) dietary quality and (2) BMI, after controlling for other factors. A second pair of models tested whether model results were robust to use of a continuous measure of list-use frequency. A *post hoc* Bonferroni correction was applied to each comparison between those who always shopped with a list and those who did not always shop with a list, to assess whether associations remained statistically significant. All analyses were conducted using SAS software (version 9.2, SAS Institute Inc, Cary, NC, 2013).

RESULTS

The majority of the sample was African American (91%) and reported a household income of < \$20,000/y (80%). The average participant had a BMI of 30.6; the average score on the index of dietary quality was 48.9. Most participants were aged 45–75 years (57%), 33% were employed, 70% were high school graduates or had completed some college or technical school, 74% were female, 19% were married or living with a partner, and 27% had children in the household. Just under one third (31%) of the sample reported that they always shopped with a list, 17% said they often did so, and 26% used a list sometimes, and 26% never.

Table 1 compares characteristics of food shoppers who reported always using a shopping list with those who reported all other categories (never, sometimes, or often). Those who reported always using a list had significantly higher dietary quality. They

were more likely to be female and older, and less likely to be employed or to have low or very low food security. After the researchers applied Bonferroni correction, the marginal association between participants who always used a list and BMI was eliminated, as well as the association between those who always used a list, knowledge of eating fruits and vegetables, and trying to eat fewer calories.

After controlling for these factors, dietary quality remained significantly higher among residents who reported always using a list, by an average of 1.4 points (Table 2). Adjusted multivariate coefficient of the model was .103. Other predictors of higher dietary quality included older age, having a college degree, knowledge of government recommendations of fruit and vegetable consumption, and trying to eat fewer calories.

In this adjusted model, the association between BMI and always using a shopping list became significant (Table 3). Adjusted multivariate coefficient of the model was .095. List shopping was associated with a lower BMI of 1 unit, equivalent to weighing an average of 5 fewer pounds for a person whose height is 5'5" (1.65 m). Being male was associated with a lower BMI. Having children in the household, knowing government-recommended fruit and vegetable servings, and trying to eat fewer calories were associated with a higher BMI.

Independent associations between list use and dietary quality, and between list use and BMI were also tested using the ordinal version of the list-use variable (ie, never, sometimes, usually, always) in regression equations otherwise identical to those reported in Tables 2 and 3. Both associations remained significant: dietary quality $\beta = 0.59$ (standard error, .025), $P = .02$; BMI $\beta = -0.35$ (standard error, .17), $P = .04$.

DISCUSSION

Among this predominantly low-income African American sample of food desert residents, most reported that they did not always shop with a list, but those who did had better dietary quality and lower BMI. Indeed, there appears to be a relationship between list use and these factors such

that individuals who reported always shopping with a list had slightly better dietary quality and slightly lower weight status.

The frequency of list use observed appears to be somewhat lower than that obtained by Hersey et al,²⁰ who found that 50% of National Food Stamp Program Survey participants used a shopping list *pretty much every time* and 25% of Expanded Food and Nutrition Education Program Evaluation/Reporting System participants *almost always* used a shopping list, whereas the current study found that 17% *often* and 31% *always* used a list. Direct comparison is difficult because of the rough, different response categories used across studies.

Associations between list use and nutrition obtained here are consistent with others. A similar study found that low-income shopping list users were more likely to meet Recommended Dietary Allowances for a few key nutrients. The current work extends these findings and those of other prior studies^{16,17} to the very high-risk, high-priority population of low-income, African American US food desert residents. This study also expands these prior studies to show associations between list use and BMI.

The exact mechanism through which lists are associated with a lower weight and better diet is speculative, but it is possible that a shopping list acts as a shield against the availability of unhealthy foods and may limit impulsive choices. People experience diminished self-control as the number or difficulty of decisions made increases.^{29,30} Shopping with a predetermined list of items spreads the number of decisions made over different conditions (eg, at home, where the list is constructed; at the market when shopping), conserving self-regulatory energy. Such an aid may be even more important for low-income individuals because they have less discretionary spending and need to make more complicated trade-offs between price and nutrition. This would be consistent with a recent United Kingdom-based qualitative study that explored how 26 residents of a low-income area made food shopping decisions. Shoppers who used an item-by-item or restricted and budgeted approach, including behaviors

Table 1. Sociodemographic Characteristics of People Who Do or Do Not Always Shop With a List, and Their Comparison, Employing 2-Tailed *t* and Chi-Square Tests

Characteristic	Always Shops With a List (n = 424)	Does Not Always Shop With a List (n = 948)	P
Mean age, y	57.0	52.4	< .001*
Female	80.0%	71.4%	.001*
African American	88.6%	91.4%	.252
College degree	16.3%	14.9%	.506
Adjusted household income (USD)	\$13,144	\$13,518	.626
Employed	27.3%	35.4%	.003*
Families with children	25.2%	27.9%	.314
Married or living with partner	19.4%	18.2%	.609
Weekly food expenditures per person feeding (USD)	\$37.50	\$36.60	.580
Mean body mass index (kg/m ²)	30.1	30.8	.084
Mean Healthy Eating Index score	50.3	48.2	.001*
Food-insecure	26.0%	34.3%	.002*
Knowledge of eating ≥ 5 servings of fruits/vegetables per day	24.5%	19.4%	.035
Trying to eat fewer calories in past month	38.4%	32.7%	.039

*Significant after applying Bonferroni correction for the 14 tests conducted, resulting in a cutoff of $P < .004$ for significance (ie, $P < .05/14 = P < .004$).

Note: For each variable, the researchers looked at the mean for participants who always shop with a list and those who do not always shop with a list. They then tested for statistically significant differences using 2-tailed *t* tests for means and chi-square for proportions.

such as shopping with a list or pre-planning purchases, relied less on in-store cues and were more successful at constraining their food choices to

match their health and/or financial values.¹⁵

It is tempting to conclude that using grocery lists leads to healthier

eating and lower weight, but the cross-sectional nature of the data and analysis in this study does not allow for casual inference. It is

Table 2. Predicting Dietary Quality With Shopping List Use Among Low-Income, Predominantly African-American Shoppers: Ordinary Least-Square Regression Model of Associations Between Sociodemographic Characteristics, Shopping With a List, and Dietary Quality (n = 1,344)

Variable	β Coefficient	Standard Error	95% Confidence Intervals	2-Tailed P
Intercept	39.54	1.35	36.88–42.19	< .001**
Always shops with list	1.42	0.62	0.20–2.64	.022*
Age	0.11	0.02	0.08–0.15	< .001**
Male	−0.38	0.67	−1.70–0.93	.569
Adjusted household income/1,000	0.05	0.02	0.00–0.10	.036*
College degree	3.81	0.82	2.21–5.42	< .001**
Married	0.14	0.73	−1.29–1.57	.851
Any children in household	0.23	0.79	−1.32–1.77	.775
Food-insecure (low/very low security)	−0.45	0.63	−1.69–0.78	.472
Know ≥ servings/d	2.76	0.71	1.36–4.16	< .001**
Trying to eat fewer calories	3.18	0.60	2.00–4.37	< .001**

* $P < .05$, ** $P < .005$.

Notes: The authors employed an ordinary least-square regression model in which dietary quality (Healthy Eating Index) was the dependent variable, always shopping with a list was the independent variable of interest, and covariates included age, sex, adjusted household income, college degree, being married, having children in the household, food insecurity, knowledge of fruit and vegetable serving recommendations, and report of trying to eat fewer calories per day. Adjusted multivariate coefficient = .103.

Table 3. Predicting Body Mass Index With Shopping List Use Among Low-Income, Predominantly African American Shoppers: Ordinary Least-Square Regression Model of Associations Between Sociodemographic Characteristics, Shopping With a List, and Body Mass Index (n = 1,344)

Variable	β Coefficient	Standard Error	95% Confidence Intervals	2-Tailed P
Intercept	29.73	0.94	27.89–31.57	< .001**
Always shops with list	−0.99	0.43	−1.83 to −0.14	.022*
Imputed: age	−0.004	0.01	−0.03–0.02	.780
Male	−2.01	0.46	−2.92 to −1.10	< .001**
Adjusted household income/1,000	−0.01	0.02	−0.05–0.02	.474
Education	−1.38	0.57	−2.50 to −0.26	.016*
Married	0.38	0.50	−0.61–1.37	.448
Any children in household	2.01	0.55	0.93–3.08	< .001**
Food-insecure (low/very low security)	0.50	0.43	−0.35–1.36	.249
Know $\geq$ 5 servings/day	1.13	0.50	0.15–2.10	.024*
Have been eating fewer calories	3.63	0.42	2.81–4.46	< .001**

* $P < .05$, ** $P < .005$.

Notes: The researchers employed an ordinary least-square regression model in which body mass index was the dependent variable, always shopping with a list was the independent variable of interest, and covariates included age, sex, adjusted household income, college degree, being married, having children in the household, food insecurity, knowledge of fruit and vegetable serving recommendations, and report of trying to eat fewer calories per day. Adjusted multivariate coefficient = .095.

equally likely, if not more so, that individuals with healthier eating habits and healthier weights more often choose to shop with lists. Using a list may reflect conscientious personality,³¹ a trait that also might lead to greater attention to nutrition and a healthy weight. Results also cannot be generalized to higher-income households or to people who do not live in a food desert. Finally, if lists function differently in different seasons, results may not generalize to January through April, because data were not collected in these months. However, results did not change when season was controlled for in ancillary models. Future research should also address the use of shopping lists in higher-income households and those not living in food deserts.

A shopping list may be a useful tool to support healthy eating and weight among low-income individuals living in a food desert.

IMPLICATIONS FOR RESEARCH AND PRACTICE

More frequent use of a shopping list was associated with a better-quality diet and slightly lower weight among high-risk, low-income individuals living in a food desert. Further research is needed to address whether lists exert a causal influence, but the existence of these associations in a population much in need of effective interventions is promising. A shopping list may serve as a useful, easily implemented, and practically no-cost tool to support food purchasing consistent with healthier eating and healthier weight.

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CONFLICT OF INTEREST

The authors have not stated any conflicts of interest.