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A Multilevel Assessment of Barriers to Adoption of Dietary Approaches to Stop Hypertension (DASH) among African Americans of Low Socioeconomic Status

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Abstract

Background—We examined perceptions of Dietary Approaches to Stop Hypertension (DASH) and the food environment among African Americans (AA) with high blood pressure living in two low-income communities and objectively assessed local food outlets.

Methods—Focus groups were conducted with 30 AAs; participants discussed DASH and the availability of healthy foods in their community. Sessions were transcribed and themes identified. Fifty-four stores and 114 restaurants were assessed using the Nutrition Environment Measures Survey (NEMS).

Results—Common themes included poor availability, quality, and cost of healthy foods; tension between following DASH and feeding other family members; and lack of congruity between their preferred foods and DASH. Food outlets in majority AA census tracts had lower NEMS scores (stores: −11.7, p=.01, restaurants: −8.3, p=.001) compared with majority White areas.

Conclusions—Interventions promoting DASH among lower income AAs should reflect the food customs, economic concerns, and food available in communities.

Keywords

Hypertension; diet; food deserts; African American

Approximately 30% of adults in the United States have hypertension (HTN),[1] and the prevalence of HTN among African American adults (approximately 42% in recent national

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surveys) is disproportionally high compared with that among non-Hispanic Whites.[1,2] Indeed, despite higher levels of awareness and treatment compared to non-Hispanic Whites,[3] control of HTN remains comparatively low among African Americans. The prevalence of HTN has increased among African American adults since 1988,[4] adding urgency to the imperative to develop effective strategies to prevent or treat HTN in this population.

Several organizations, such as the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7),[5] and the International Society on Hypertension in Blacks (ISHIB)[6] have endorsed the adoption of "therapeutic lifestyle changes," such as the Dietary Approaches to Stop Hypertension (DASH) eating pattern. This pattern is rich in fruits, vegetables, whole grains and low-fat dairy foods and has been shown to lower systolic blood pressure (SBP) by 6–14 mmHg, which is similar to the effect of pharmacologic monotherapy.[7] Several randomized trials have provided evidence not only of efficacy, but also that this dietary pattern is as effective in AAs as in Whites.[8–10] There is little evidence that DASH has been widely adopted by people with HTN,[11] or indeed by the general public.[12] Research suggests that food consumption patterns are affected by multiple, potentially overlapping interpersonal, cultural, and environmental factors which may promote or hinder healthier eating.[13] Adoption of DASH may be hampered by several barriers among AAs, including cultural norms and backgrounds,[13] and perception that pharmaceutical treatment for HTN is adequate.[14] Moreover, residents of low-income and/or minority areas may face additional ecologic barriers, including impeded access to supermarkets, poorer quality of fruits and vegetables, and more fast-food restaurants and convenience stores.[15,16] Thus, identifying the factors that may influence healthy eating among AAs is an informative first step in the development and translation of culturally-tailored lifestyle interventions to this population.

In consideration of these issues, the purposes of this investigation were to use qualitative and quantitative approaches to perform a multi-level assessment to identify barriers to the implementation and acceptance of the DASH eating plan in low socioeconomic status (SES) AA neighborhoods. Specifically we assessed: (1) attitudes, perceptions, and barriers that may influence adoption of the DASH eating pattern among African American adults; and (2) the local food environment including food stores and restaurants, both conducted in majority AA census tracts in Winston-Salem, North Carolina. The results of this work were used to plan the intervention phase of the Translating Dietary Trials into the Community Study, which is a study designed to assess the environmental and intra-personal, interpersonal, and cultural factors that may affect translation of the DASH diet to low-income African American adults.

Methods

Focus groups

Participants for focus groups were recruited from two ZIP codes (27101 and 21705) in Forsyth County, North Carolina. These were selected because of the high percentage of AA residents (57% and 63%, respectively) compared with a range of 4% to 33% for adjacent ZIP codes in the county. Recruitment strategies consisted of mass media advertisements, mailings to potentially eligible participants previously having contact with university research studies, e-mail distribution of information to community groups and requests from local physicians and ministers targeting age-eligible adults. After a brief telephone interview to determine eligibility, participants were invited to participate in a focus group. Along with the residency requirement, all participants met the following inclusion criteria: self-identification as African American; age 21 years or older; blood pressure between 120/80 and 150/95 mmHg; currently taking fewer than three antihypertensive medications; ability to read and speak English; and height and weight corresponding to a body mass index (BMI)

between 18.5 kg/m^2 and 45.0 kg/m^2. Exclusion criteria included: having post-college education; current pregnancy; self-reported clinical history of diabetes, congestive heart failure, kidney disease, schizophrenia, or dementia; or excessive alcohol consumption (defined as more than 14 drinks per week for men aged younger than 65 years, or more than seven drinks per week for men aged 65 or older or women regardless of age).

These criteria were selected to recruit a pool of participants similar to those in prior DASH trials, while focusing on lower-SES participants. Participants received incentives valued at $20 for participation in the focus groups. We invited 6–10 participants to each session, which was located at a municipal recreation center in the 27105 ZIP code. All procedures were reviewed and approved by the Wake Forest University School of Medicine Institutional Review Board and participants provided written informed consent.

Four focus groups queried participants regarding usual food habits, availability of foods in the community and feasibility of following a DASH pattern of eating. Two other focus groups revolved around obtaining the participants' perceptions regarding existing DASH eating plan materials from the National Heart, Lung, and Blood Institute (NHLBI, see www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf). Participants from the first four groups were eligible to participate in the second set of groups. Focus group guides were developed that were designed to identify or clarify themes regarding the participants' usual diets and perceptions regarding availability of healthy foods, and perceptions regarding the DASH study literature. Each focus group session was approximately 60 minutes in length and was led by a trained female moderator. Questions were open-ended and iterative, so that issues identified in previous focus groups were incorporated into questions in subsequent focus groups. Each session was tape-recorded and was transcribed *verbatim*. An example of the focus group questions is found in the Appendix.

Food environmental assessment

We utilized commercial sources to identify all businesses whose North American Industry Classification System (NAICS) category suggested it was either a restaurant or a food outlet (supermarkets, groceries, convenience stores) in the 27101 or 27105 ZIP code areas. We added to these lists select establishments outside of these two ZIP codes when participants of the focus groups specifically mentioned them and three supermarkets outside of the catchment areas from chains represented inside the study area. After determining in which census tract businesses were located, census data (year 2000) were obtained for the 27 different census tracts (proportion AA, proportion living below 200% of the federal poverty level) in which the food outlets surveyed were located. We excluded businesses that either were wholesalers or required a membership, and businesses that sold food while the primary business was alcohol or entertainment (e.g., bars, warehouse clubs, and movie theaters). The quality and availability of healthy foods in the identified food outlets were evaluated by trained data collectors using the Nutrition Environment Measures Survey in Stores (NEMS-S)[17] and the Nutrition Environment Measures Survey in Restaurants (NEMS-R).[18] Two training sessions (one for each instrument) where held and included field trips to local food outlets and restaurants that were not going to be included in the data collection. Stores and restaurants were assessed in 2009.

The NEMS-S assesses the availability and pricing of healthy and less-healthy options among 10 food categories (fresh fruit, fresh vegetables, milk, ground beef, hot dogs, frozen dinners, soda and juice, baked goods, bread, and snack chips). These categories represent foods of a typical American diet, as well as those that are recommended for a healthy eating pattern.[17] In this study, several other foods were added (sugar and artificially sweetened yogurt, regular and lower sodium soups, canned fruit packed in juice *vs.* syrup, pork and turkey bacon, and local vegetables (e.g., collard greens) to reflect better the local food preferences

of the study population and foods that are the focus of the DASH eating pattern. The NEMS-S consists of three subscales: availability of healthy foods (range 0 to 43), price of healthier options (range −14 to 26), and quality of produce (range 0 to 6), with higher scores indicating more healthy and higher quality options. The total score is a composite of the availability, price, and quality subscales (range −14 to 74).

The assessment of the nutritional environments at restaurants was conducted using the NEMS-R.[18] The NEMS-R focuses on eight types of food indicators (healthy main dish choices, availability of fruits and vegetables without added sauce, whole grain bread and baked chips, beverages, children's menus, signage and promotions, facilitators and barriers to healthy eating, pricing and accessibility). Individual item scores ranged from −3 to 3, where a negative score was given if items made healthier eating more difficult. For example, an item would be rated negatively if the establishment held super-sizing promotions and healthier entrees were more expensive. For these analyses we did not score the children's menus, as the focus of this investigation was adults. The NEMS-R total score ranged from −27 to 63. Higher scores indicate increased healthier restaurant options.

Data analyses

Focus group participants were characterized by demographic characteristics. Focus group recordings were transcribed and verified from the notes taken. A codebook was developed after preliminary review of the transcripts. The codes included core concepts that would foster successful implementation of the DASH eating pattern (meal patterns, assessment of food resources, perceptions of the DASH diet and fruits and vegetables, facilitators and barriers to DASH diet, positive and negative perceptions of brochures, suggestions for improvement, positive and negative perceptions to two recipes from DASH materials). Text was coded by authors SAQ and JCH. Codes were then entered into Atlas.ti Version 6 (Atlas.ti, Berlin, Germany). Text segments were abstracted by code and reviewed. Themes were determined according to (1) level of consensus of a concept, (2) strength and depth of a concept, and (3) frequency of a concept throughout the focus group.

The food establishment scores were analyzed quantitatively. To determine the association between racial composition of census tracts and NEMS-S or NEMS-R scores, one-way analyses of variance (ANOVA) were conducted on the total scores of each instrument. In addition, one-way ANOVAs were conducted upon the NEMS-S availability price and quality subscales, and on the availability, facilitators, barriers, and pricing subscales of the NEMS-R. The *a priori* alpha level of significance was set at <.05. All analyses were conducted using Stata 11.0 (Statacorp, College Station, TX).

Results

Focus groups

We had contact with 67 potential focus group participants; 38 met inclusion criteria and were invited to attend; 30 participated (25 women, five men). There were six separate sessions; the number of participants present ranged from three to 10 (mean, six). Six participants participated in one of the initial four focus groups and, subsequently, one of the final two groups. The mean age of this sample was 51.7 (range 34–63) years and the mean BMI was 34.3 kg/m^2. The mean blood pressure was 136.0/84.7 mmHg and 22 of the 30 were on one or two anti-hypertensive agents.

Several common themes, listed in Box 1, emerged from the focus groups, as well as which barrier domain the theme exemplified (the food environment, economic concerns, cultural factors, and family influences on dietary choices). Themes included environmental concerns regarding availability, quality, and cost of fresh fruits and vegetables and leaner meats

compared with other parts of the county; economic concerns regarding the inability to consume fresh produce before spoilage; tension with other family members' willingness to follow healthier eating patterns; and lack of familiarity with the DASH menu options.

Environmental concerns: availability and quality of healthier options—Many participants expressed a concern that the availability of fruits, vegetables and lean meats was poor in their neighborhoods. Despite this concern, many participants expressed a desire to consume fresh fruits and vegetables. They mentioned several supermarkets outside of their immediate neighborhoods as sources for fresh produce and other healthier items. One person noted:

> … around here you're going to find nothing but fast food restaurants. There are no sit-down restaurants in the community where you could actually sit down and try something that's different, that's just a vegetable meal or just prepared, not with a bunch of grease and lard or whatever. So if you have access to something that you want to try different, then you might be willing to maybe try it at home, *versus* trying to get all the ingredients and trying to see if it works, if this is the right taste or whatever.

Another person stated:

> … Everybody likes fresh vegetables, but where are you going to get them? You gotta get the can.

Concerns regarding consuming fresh produce before spoilage—Many participants expressed hesitation to buy fresh produce because of the possibility that it might spoil before all would be consumed. There were several questions raised about whether using canned or frozen fruits and vegetables (to avoid spoilage) would be a reasonable alternative.

> A head of lettuce, it always goes bad before I get done eating it … end up throwing half of it away.
>
> … along with cost, is keeping what I buy fresh. I buy a bag of spinach, but we don't eat it every day, so it goes bad quickly. Keeping fresh vegetables, that's the opposite side of buying in bulk.
>
> I like zucchini and squash every now and then, and I try to find the smallest one I can because I know they [my family] won't eat it, so I'm picking it up only for myself. And it goes bad.

Tension with other family members regarding healthier eating patterns—Another emergent theme centered on possible disagreement with other family members regarding food choices. In particular, discussion focused on the difficulty of getting spouses and children to consume more fruits and vegetables.

> I think most of us have family members, and we're not gonna cook two separate meals. They'll say, "Well, I'll try that for you one day this week, but the rest of the week I want regular food."
>
> … and if I put them on healthy food, they're kids! They're not getting ready to eat baked chicken or broiled chicken every day, and fresh fish and vegetables all the time.
>
> It's really hard for me to get fruit into my daughter. I have to make smoothies. She doesn't like bananas, and I'll buy bananas just for myself.

Lack of familiarity with the DASH menu options—Several focus group members stated that the DASH menu items included foods or preparation techniques that were not commonly used in their households or in the African American community in general. There seemed to be a consensus that cultural factors may pose formidable barriers to the DASH eating plan.

> … when we get together with our families, we cook culturally, the old fashioned way. An Asian culture probably wouldn't cook what we cook for Thanksgiving and Christmas and all that. So, your culture's gonna be the biggest barrier, you know, for the whole community.
>
> … When you look at this stuff like dried basil, it's just not based in our community. A lot of people in our area don't cook like that.

Comments in response to specific recipes in the DASH guide echoed this theme.

> [on zucchini lasagna] … It's a hundreds-year-old culture, so it's going to be hard to try to change it to go to zucchini lasagna from regular lasagna. If you took this to a church potluck or something, it's going to be still sitting there.
>
> [on chicken and rice] … We would try that chicken and rice dish, but we don't do brown rice.

Perceptions of DASH literature—Participants felt that the brief DASH promotional brochure obtained from the NIH website was appropriately simple and self-explanatory, and that the foods were ordinary (as opposed to requiring organic or exotic items to make). They felt, however, that some design features were too medical or seemed unrealistic (e.g., blood pressure cuff artwork, models that were not significantly over-weight). The potential cost of preparing the recipes as written was seen as high, and the unfamiliarity of some menu options was seen as detracting from them. Participants questioned whether a single, generic brochure was appropriate for all segments of the population, given that people had different body types, levels of physical activity, and cultural norms. One participant noted, "Stop giving us standard material for everybody, because what may work for him is not going to work for me."

Suggestions for improvement included providing alternatives for foods in the recipes. Participants also recommended keeping the material at a seventh grade reading level, and providing more information about how to reach nutrition goals. Participants stated:

> It's sensible [the brochure], but with some people who are on a budget, even sensible is unattainable. You can look at this and say, "Yeah, I need to eat more fresh fruit." But if there's no money in my budget for that, what can I substitute?
>
> If you can't afford to get chicken breasts, what's another alternative? Or suppose I say, I don't want to eat chicken all the time? I know they're gonna say pick leaner cuts of the meat, but if you're eliminating red meat, what other alternative can I use?
>
> On the very back page, where it says "nutrients per day," there's always been this confusion about saturated fat, trans fat … even if you could just have a little guide to help me understand what's good, what's not good, what does that mean?

NEMS-S and NEMS-R scores

Of 82 potential food outlets identified, 10 were not in business, eight denied access to the surveyor (all convenience stores), four did not sell any food, two were wholesalers, and in four establishments catering to Hispanic clientele the employees spoke insufficient English

to comprehend the purpose of the survey. The remaining 54 stores were assessed using the NEMS-S; there were 10 supermarkets, eight smaller groceries, 31 convenience stores, and five other types of outlets (four butcher shops, one discount store with some food items). The mean total NEMS-S score (SD) was 14.8 (16.9), with a range of 1 to 55. The 10 stores that were supermarkets had a mean score of 47.5 (SD 5.8), whereas non-supermarkets had mean scores of 7.3 (SD 6.2).

A total of 163 potential restaurants were identified. Of these, 14 were not in business, 15 did not sell food (e.g., bars), 16 were not open to the public (e.g., private clubs, employee cafeterias) and four refused, resulting in final sample of 114 restaurants. Many restaurants were outlets of fast food chains (32/114). Few restaurants in this community got high scores. The mean NEMS-R total score was 14.4 (SD 9.9) and it ranged from −6 to 49.

The distribution of scores and a comparison of individual survey items by food outlet location are detailed in Table 1. Stores in majority AA census tracts had significantly lower NEMS scores than stores in majority White tracts (20.4 *vs.* 8.7, p=.01). This result was driven primarily by poorer NEMS-S scores availability in majority AA areas (Table 1). Availability of foods featured in DASH was suboptimal among these stores, including low-fat dairy products, fruit, vegetables, and low-fat ground beef, but tended to be poorer in stores located in majority AA districts (Table 1). The distribution of NEMS-S scores is depicted in Figure 1. Both of the top scoring outlets in majority AA census tracts were supermarkets. Notably, eight of the 10 supermarkets in our survey were in majority White census tracts. The distribution of NEMS-R scores is depicted in Figure 2. There were relatively few restaurants in majority AA census tracts (only 17 of the 114), and nearly half of them were fast-food outlets. These 17 restaurants had significantly lower NEMS-R scores (12.6 *vs.* 4.4, p<.01). A similar pattern as above was seen with specific survey items (Table 1), including more restaurants with characteristics that might promote overeating, through super-sizing options and combination meals having a lower price compared to the individual items bought separately in AA tracts and fewer having whole grain bread or non-fried vegetables as a side item.

We repeated our analyses (results not shown) of NEMS data comparing total scores by poverty status rather than race. We found no difference in store or restaurant summary NEMS scores in census tracts according to the proportion residing in the tracts that were below 200% of the federal poverty level.

Discussion

Our results support several broad conclusions regarding barriers to adoption of DASH. First, AA adults residing in this community perceive the availability of healthier foods in their specific local environments to be suboptimal; this included both fewer grocery stores as well as a paucity of establishments where DASH type foods might be tried before making them at home. Second, our comprehensive assessment of stores and restaurants serving this community provides objective evidence that the food environment for inhabitants of majority AA census tracts is, in fact, worse than in the surrounding areas. Third, the perceived cost of a healthier diet is high, in ways that extend beyond the price of foods in their community. Specifically, spoilage of fresh produce was seen as making it more expensive to eat healthy, as well as use of expensive cuts of meat to follow recipes in DASH promotional materials. Additionally, there were concerns about having to cook more than one meal for the family, which raises the time cost of eating. The acceptability of DASH pattern eating to others in the household was seen as a significant barrier, and we noted a perception that the DASH diet (or specific examples of DASH meals provided in literature) was incongruent with cultural norms in this community. Both of these translate into the

notion that DASH foods are not familiar in the household or other places where meals are taken (restaurants, church and other community events). We did not hear that participants in this sample were unwilling to try these foods, however.

We interpret our qualitative findings as evidence that an ecological model of multilevel influences, as described by Sallis et al.,[19] is necessary to promote and maintain behavior changes by individuals. Our conceptual framework for the larger study of which this is a part emphasizes the necessary, but insufficient conditions for dietary change afforded by concentric rings of influence.[13] Appropriate foods must be available (in proximity to people's regular routes as well as financially), although improving access does not increase consumption if foods are perceived to be culturally inappropriate. Similarly, culturally appropriate foods increase the likelihood of consumption, but do not guarantee it. Operating at the interpersonal level within families, adults (particularly women), in their roles of provider and parent, must adapt available and culturally recognized foods to the idiosyncratic preferences of individuals, as the construction of meals operates as a way to bind diverse individuals together into a social unit.[20] The themes from the study focus groups reflect these different levels of influence on dietary intake patterns and specify factors at multiple levels to be addressed in promoting the DASH diet in the AA community.

Several large-scale randomized trials have established that DASH lowers blood pressure.[8–10] Notably, however, trial participants are typically highly selected, and interventions intensive and complex, such that the efficacy demonstrated in RCTs may not be generalizable.[21] For example, PREMIER participants were highly educated and few were poor; 91% had education beyond high school (including 32% with graduate level education) and only 10.4% reported annual household incomes below $30,000.[22] Although there is evidence that among most of the American population, there is sub-optimal consumption of foods that are consistent with DASH pattern eating, two studies suggested AAs were less likely to follow this eating pattern.[11,23] Given the high prevalence of HTN and pre-HTN in the AA population, an important challenge is finding effective ways of disseminating DASH and changing the eating habits of the at-risk population. While the literature already suggests various barriers, we conducted this research to focus on a specific population which has been underrepresented in the clinical trials: AAs residing in lower SES areas. Strengths of this project include this focus on lower SES participants who would benefit from DASH, and a systematic approach to surveying the food environment including both stores and restaurants. Some limitations should be noted as well, including the fact that participants were not a random sample of residents in these areas, and we did not survey farmers markets or other, less formal outlets for food (such as produce trucks or community gardens).

Geographic areas with few stores selling healthier foods have been labeled *food deserts*; a recent review found 31 papers focused on *food deserts* the United States.[24] While much of the literature focused on lack of supermarkets, and/or excess fast-food and convenience outlets in food deserts according to race/ethnic composition, relatively few assessed both food markets and other food outlets, or took into account residents' perceptions of the food environment.[24] Kumar et al. recently demonstrated that, in addition to there being fewer supermarkets in lower-income areas of Pittsburgh, AA residents of those communities perceived the supermarkets that were there provided lower-quality produce and meats than branches of the same chain serving White neighborhoods.[25] We are aware of two publications that have specifically focused on availability of DASH foods. Young et al. assessed availability and cost of DASH foods in 20 grocery stores in Boston (10 in low and 10 in higher SES neighborhoods). They found a non-significant trend towards less availability of DASH foods in the lower SES areas (75% of items available *vs.* 46.5%, p=.3).[26] Their approach was limited, however, in that they did not sample all potential grocery stores in this community, nor did they assess restaurants. Franco et al. used the NEMS-S

survey and assessed 226 food stores in 156 census tracts in Baltimore City and Baltimore County, Maryland.[27] They found that predominantly Black and lower-income neighborhoods have a lower availability of healthy foods than White and higher-income neighborhoods due to the differential placement of types of stores as well as differential offerings of healthy foods within similar stores. They did not assess restaurants, however. Although we assessed a smaller geographic area, our findings are largely consistent with their results; additionally, we can conclude that the availability of healthier options in restaurants in this community differs with respect to where the majority of AAs live. We note, however, that the availability of healthier options in many convenience stores and restaurants is limited, regardless of where they are located. This is may be an important barrier to healthier eating across all communities.

Our results regarding the acceptability of the DASH eating pattern in this AA, lower-SES community are consistent with prior work; indeed, cultural backgrounds have long been known to influence eating patterns.[13] James et al. conducted an investigation to evaluate how culture and community could affect nutrition attitudes, food choices, and dietary intake of AA males and females residing in northern Florida.[28] Focus groups revealed a general opinion that eating healthfully meant giving up part of their cultural heritage. Barriers to eating a healthful diet included the social and cultural symbolism of certain foods, and an unappealing taste of healthy foods. Horowitz et al. reported similar results when they conducted focus groups with hypertensive AA and Latino patients regarding the use of diet modification to improve blood pressure control.[14] Specifically, participants thought that the prescribed healthier diets were difficult to follow in the context of their cultures and family lives, and represented a departure from their traditional diets.

Our results suggest that current DASH brochures, available at low cost in bulk from NHLBI or freely over the internet, which might seem an easy way of disseminating information about this eating pattern, are unlikely to effectively communicate to AA adults living in a Southern, predominantly lower-SES community. Indeed, examples of the DASH diet found in these materials were not often seen as familiar, or congruent with cultural norms. Additionally, there was some confusion about some of the nutritional and health information included.

One implication of this research is that interventions intended to encourage low-income African Americans in the South to adopt the DASH eating pattern need to take into account the barriers such communities face. For example, interventions might recommend use of healthy substitutes for fresh produce (e.g., frozen, canned in lower sodium or in juice, and/or draining and rinsing canned produce) to mitigate cost and spoilage concerns. Another strategy might be to utilize familiar recipes, but adapt them to better conform to the DASH pattern. Efforts to improve hypertension prevention and control though dietary methods are likely to find that the availability of healthier foods in the communities perhaps most in need of such efforts is very limited. However, it may be difficult for individuals to overcome this barrier without significant changes to the food environment. Efforts to promote alternatives, such as farmers' markets, or policies that provide incentives to place supermarkets in areas where they are currently few, should be investigated as one approach to eliminating the food deserts in which many people reside.

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Appendix 1. Translating Dietary Trials into the Community Focus Group Guide: DASH Materials

Thank you again for your participation in this group. My first question for you this morning/afternoon/evening is:

1. Ignoring for a moment the DASH materials in front of you, please tell me what attracts you, in general, to a particular brochure or other piece of literature. What would be the characteristics that make you want to read it?
2. Now, turning to the DASH materials we've given you, is there anything about the brochure that attracts you? If so, what is it?
3. Looking at these same DASH materials, what, if anything, is a turn-off or a barrier that would make you not want to read it?
4. Please tell me about how the brochure is written. Do you think the wording is appropriate for people living in East Winston? If not, how should things be worded differently?
5. What about the pictures? Do you think people in East Winston will be able to relate to the pictures that are used in this brochure? If not, what other kinds of pictures would you recommend?
6. This brochure provides several tools to help people follow the DASH diet. For example, it has menu planning guides, DASH hints, and a one-day sample of a meal plan.
    a. What do you think about these tools? Are they helpful?
    b. Are they appropriate for people living in your community?
    c. What other tools would you like to see?
    d. Are there any tools that are not particularly helpful that perhaps could be deleted?
7. How about eating a diet that is low in salt? Does that appeal to you?
    a. What kinds of things might make it difficult to eat a low-sodium diet?
    b. What can be done to make it easier for folks to eat a low-sodium diet?
8. We have given you a couple of menus to examine. Let's talk about them for a moment, starting with Zucchini Lasagna.
    a. Is the Zucchini Lasagna recipe something that would appeal to you? In other words, would you find it appetizing personally?
    b. How likely is it, do you think, that other people in your family might want to try this recipe?
    c. Thinking a bit more broadly now, do you think others in your community would find that recipe appetizing? Is it the type of food that you think people would eat on a regular basis?
    d. Tell me about how appropriate this recipe is for your community.
    e. How about the recipe itself? Please tell me about how easy it is to read, understand, and follow.

f. Tell me how easy it would be to obtain the ingredients for this recipe. Do you have the ingredients at home, or could you obtain them easily?

g. [Repeat a through f for other recipe]

9. What other kinds of recipes do you think would be most appropriate to encourage people in your community to eat more fruits and vegetables?

10. Tell me what you think about how much these recipes would cost. Do you think it would be more expensive to follow these recipes? If so, would you be willing to pay the extra cost?

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Box 1

ANALYSIS OF FOCUS GROUPS CONDUCTED TO ASSESS THE FEASIBILITY OF FOLLOWING THE DIETARY APPROACHES TO STOP HYPERTENSION EATING PATTERN

Theme	Domains
Poor availability and quality of healthier food in stores	Environment
Limited options to eat healthier foods in restaurants	Environment
Cost of healthier foods	Economics
Concerns about produce spoilage	Economics
Lack of familiarity with DASH menus	Culture
Tension with family members' food preferences	Culture, Interpersonal

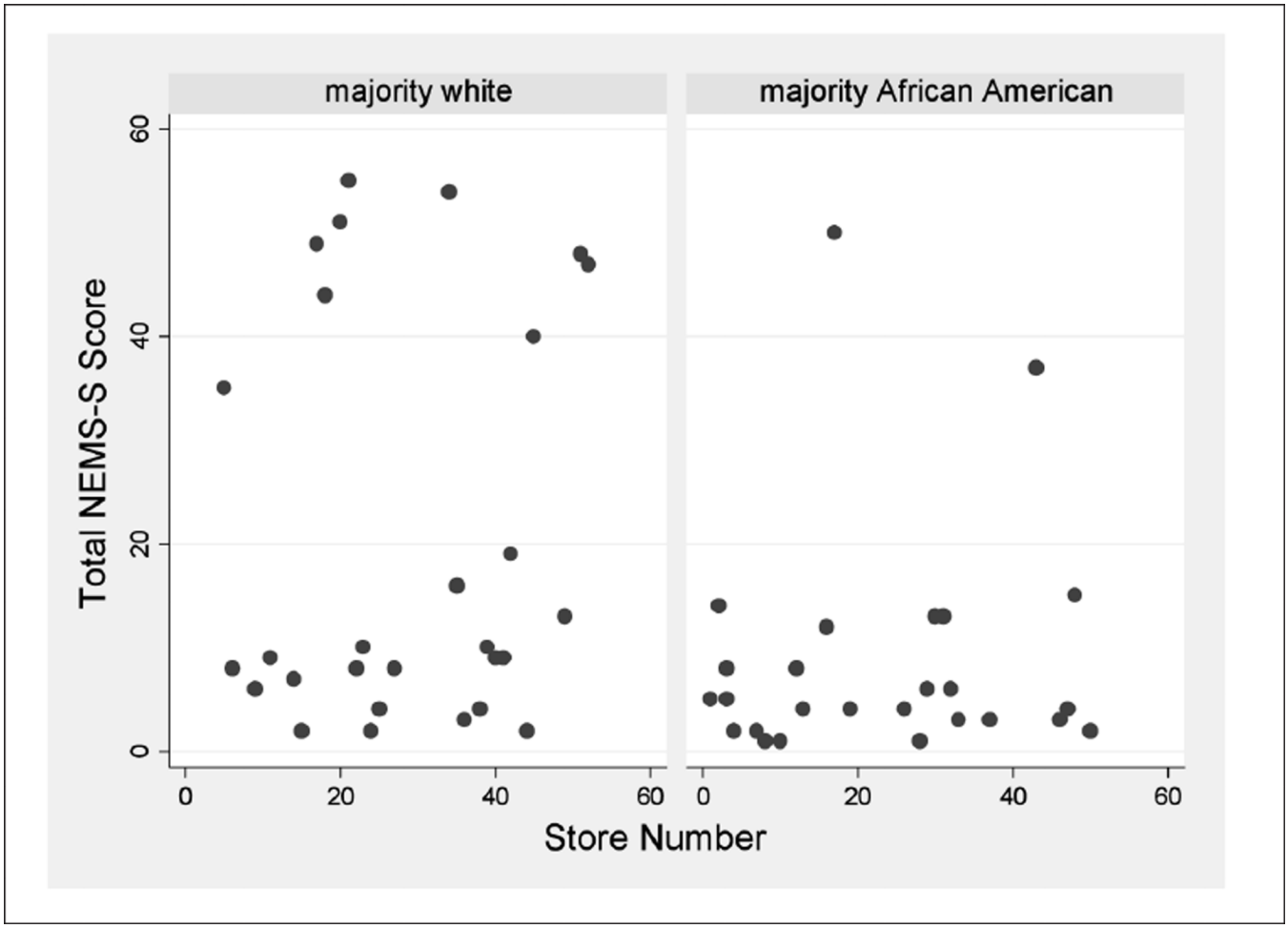

Figure 1.
Nutrition Environment Measures Survey in Stores (NEMS-S) total score by racial composition of selected census tracts in Forsyth County, North Carolina, 2009.

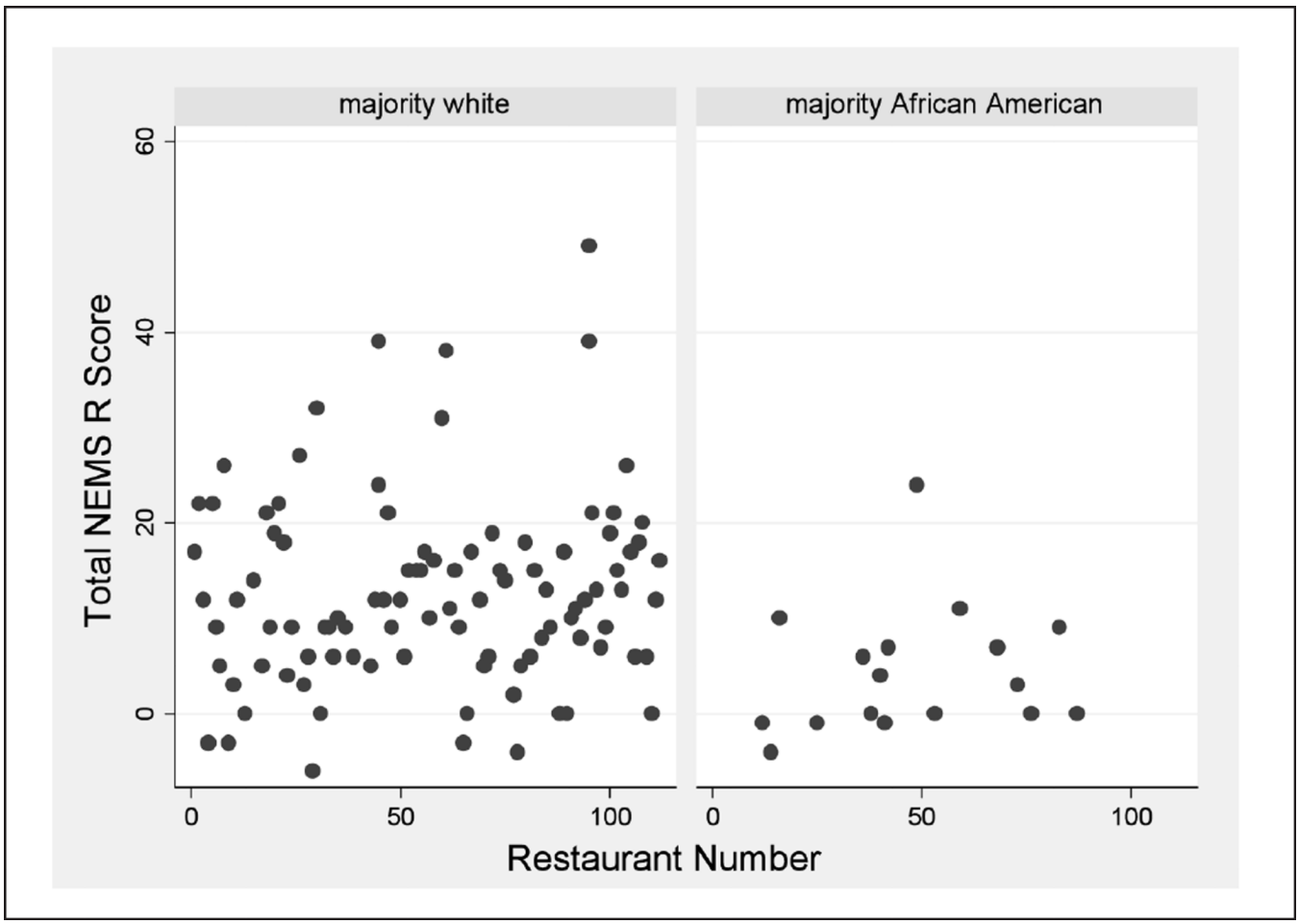

Figure 2.
Nutrition Environment Measures Survey in Restaurants (NEMS-R) total score by racial composition of selected census tracts in Forsyth County, North Carolina, 2009.

Table 1

DATA FROM SURVEY OF FOOD OUTLET S IN SELECTED MAJORITY WHITE COMPARED TO MAJORITY AFRICAN AMERICAN CENSUS TRA CTS IN FORSYT H COUNTY,NORT H CAROLINA

Stores	Majority White N=28 Score	Majority African American N=26 Score	p value
Availability score	15.6	7.1	.013
Price score	1.4	−0.2	.09
Quality score	3.4	1.4	.02
Total score	20.4	8.7	.01
Individual Survey Items	**Proportion or number**	**Proportion or number**	
Supermarket	28.6%	7.7%	
Milk available	96.4%	73.0%	
Low fat milk	39.0%	11.5%	
Low fat or 2% milk	75.0%	53.8%	
Low fat yogurt available	39.3%	19.2%	
Any yogurt available	42.8%	26.9%	
Any fruit available	67.9%	30.8%	
Average number fruit varieties (range 0–10)	4.3	1.7	
If fruit present, average number of varieties	6.3	5.5	
Any vegetables available	50.0%	34.6%	
Average number of vegetable varieties (range 0–11)	4.3	1.5	
If vegetables present, average number of varieties	8.5	4.4	
Low fat ground beef	32.1%	7.7%	
Regular ground beef	35.7%	19.2%	
Healthier menu item score	8.3	6.1	0.048
Menu barriers score	−0.9	−1.9	0.025
Pricing barriers score	−1	−2.5	0.002
Total score	12.6	4.4	0.001
Individual survey items	**Proportion or number**	**Proportion or number**	
Fast food restaurants	28.9%	47.1%	
Signs encouraging unhealthy eating	34.0%	47.1%	
Super-size encouraged	17.5%	41.2%	
Combination meals cheaper	34.0%	70.6%	
Whole grain bread	47.4%	11.8%	
Fruit juice available	56.7%	47.1%	
Lowfat milk available	20.6%	11.8%	
Non fried side vegetables	67.0%	41.2%	
Salad entrees	32.0%	23.5%	
Healthy entrees	30.9%	23.5%	