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The role of SNAP in home food availability and dietary intake among WIC participants facing unstable housing

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Abstract

Objective—Little nutrition research has been conducted among families with unstable housing. The objective of this study was to examine the role of food stamps (i.e. Supplemental Nutrition Assistance Program; SNAP) in home food availability and dietary intake among WIC families who experienced unstable housing.

Design—Cross-sectional study among vulnerable families.

Sample—Low-income, multi-ethnic families with children participating in WIC (n=54).

Measurements—Dietary intake was assessed with 24-hour recalls. Home food availability was assessed with an adapted home food inventory for low-income, multi-ethnic families. Validation results from adapted home food inventory for these families are also reported.

Results—SNAP households had more foods than non-SNAP households; few significant associations were observed between food availability and child dietary intake.

Conclusions—With few exceptions, the home food environment was not related to children's dietary intake among these vulnerable families. More research is needed on food access for families facing unstable housing.

Keywords

diet; nutrition; maternal-child health; minority health; food insecurity; unstable housing

BACKGROUND

Clear evidence shows that participation in food stamps, now known as Supplemental Nutrition Assistance Program (SNAP), results in more consistent access to food for vulnerable families (Mykerezzi & Mills, 2010; Nord & Golla, 2009; Nord & Prell, 2011). Yet, questions remain whether participation in SNAP is related to more healthful diets and

home food environments. USDA has published findings that participation in SNAP had been shown to be slightly protective and may provide healthier diets for food insecure families (Deb & Waehrer, 2012; Gregory, Ver Ploeg, Andrews, & Coleman-Jansen, 2013). However, an emerging body of literature indicates that for some, diet quality is lower and risk for obesity is higher among SNAP participants as compared to eligible non-participants (Barroso, et al., 2016; Kohn, Bell, Grow, & Chan, 2014; Leung et al., 2013; Webb, Schiff, Currivan, & Villamor, 2008).

Research on correlates to participation in SNAP is lacking for infant and young child populations. The majority of the research with low-income families with young children is understandably focused on the effects of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), which consistently has been found to positively impact dietary intake and health outcomes of participants (Kreider, Pepper, & Roy, 2016; Black et al., 2012; Buescher, Larson, Nelson, & Lenihan, 1993). The eligibility criteria for WIC includes income limits, proof of state residency and nutritional risk while the eligibility for SNAP includes more requirements such as documentation of resources, income limits, deductions, employment requirements, special rules for elderly or disabled, and immigrant eligibility. When the WIC food package was revised, it showed a positive impact on home food availability and intake among participating households (Odoms-Young, Kong, Schiffer, et al., 2014). We have a good understanding that SNAP participation improves food access (e.g., Shannon, 2014; Mancino, Ver Ploeg, Guthrie & Lin, 2016); through receipts analyses, we know what SNAP participants purchase using their benefits (e.g., Mancino, Ver Ploeg, Guthrie & Lin, 2016). Andreyeva et al. (2012) examined beverage expenditures by WIC and SNAP participants and found that WIC participants purchased more juice as compared to SNAP participants; SNAP participants purchased more sugar-sweetened beverages (Andreyeva, Luedicke, Henderson, & Tripp, 2012). However, more research such as this is needed on the role of participation in multiple food assistance programs (e.g., SNAP plus WIC participation) and if it is related to child dietary intake and the home food availability for sub-populations. Thus, the primary aim for this study was to examine the role of SNAP participation in home food availability and dietary intake among WIC families with young children. Since there are few studies validating home food inventories among diverse population groups, as a secondary research aim, we also took the opportunity to examine the utility of a home food inventory for low-income, multi-ethnic families against the gold standard of self-reported intake, the 24-hour recall. Results are expected to provide guidance on the nutritional assessment of a high-risk, highly vulnerable WIC population. The study is based in the framework of the socio-ecological model (McLeroy, Bibeau, Steckler, & Glanz, 1988). We examine how societal and public policy supports (SNAP and WIC) interact with community level supports (unstable housing and food access) and interpersonal factors (home food environment) to relate to child eating behaviors. By assessing the construct validity of a home food inventory (interpersonal factor) adapted for low-income, multi-ethnic families, we will provide insights on the usefulness of a short tool to examine food access and its relationship to consumption (intrapersonal factor) among vulnerable families.

This study draws upon baseline data from 54 diverse families who participated in *Jump Start for Health*. *Jump Start for Health* was an NIH-funded intervention study that recruited its first subjects from Galveston, TX on September 5, 2008 only three days before Hurricane

Ike devastated the community. Further compounding the difficulties faced by the population, four low income housing complexes were flooded and all the residents of these complexes were evacuated from the city of Galveston. Many of these residents were enrolled in the WIC program and they were all displaced as the city of Galveston, which owned many of the low income housing units that were flooded, demolished the units after they stood vacant for nearly a year and became health hazards. Most of the low income residents had to find alternative housing and over 50,000 were approved for participation in government programs following Hurricane Ike (Wild, 2009). The majority of the enrollees lived in an area further inland where flooding occurred but housing was not lost. However, 90% of the subjects evacuated (but subsequently returned), 71% experienced housing damage, 37% registered with Federal Emergency Management Agency (FEMA) and 33% received FEMA assistance (Reifsnider, et al., 2014). We did not measure the length of time that our subjects resided in temporary housing, but anecdotal evidence suggests that most displaced persons resided in areas close to their damaged housing.

Studies have demonstrated that families who have greater institutional embeddedness (i.e., institutional support for housing programs) have greater success of positive social and health well-being (Bolin, 1976; Tierney, 2012). Adults and families who report housing insecurity are more likely to be food insecure as well as having a higher odds of postponing medical care, not taking needed medications, and having higher rates of hospitalization (Ma, Gee, & Kushel, 2008; Stahre, VanEenwyk, Siegel & Njai, 2015); access to care is compromised even when not homeless or hungry by definition (Stahre, VanEenwyk, Siegel & Njai, 2015; Ma et al., 2008). Participants for this secondary analysis were facing unstable housing as a result of Hurricane Ike. They were not recruited as such, but the context provides unique opportunity to understand what these vulnerable families were facing in terms of the involvement of SNAP, home food availability, and child intake. Public health nurses have the core competencies to support the health and well-being of families, particularly those in greatest need. In particular, public health nurses can uniquely assist families to connect to community resources in times of need. By understanding how the families from this current study accessed existing food assistance systems in the context of unstable housing and how this was related to their eating behaviors, public health nurses can better support these families in transition.

METHODS

Design and Sample

The purpose of the original intervention study was to determine the impact of the intervention, *Jump Start for Health*, delivered in WIC clinics on childhood overweight (BMI 85th for age and sex) in 3-year-old children. An ideal sample of 100 3-year old children who were overweight and enrolled in WIC clinics in Galveston County (which serve a largely tri-ethnic population) was sought to participate. However, the landfall of Hurricane Ike severely impacted recruitment and retention efforts, resulting in a total of 54 dyads enrolled. Mother-child dyads were eligible to participate in the original study if: 1) the mother was a WIC participant; 2) the children were 3 years old at enrollment; 3) the children had a BMI greater than 95th percentile for age/gender; and 4) the children did not have any

major disease, metabolic illness, or neurological or developmental delays. *Jump Start for Health* was presented in English and Spanish by bilingual, trained peer leaders. Key elements of *Jump Start for Health* included: (a) healthy eating, selection of food items, portion size, and meal planning; (b) physical activities for children and families; and (c) parenting education and anticipatory guidance to change interaction patterns between children and parents. All participating households completed written consents in English or Spanish; the University of Texas Medical Branch and the Arizona State University IRBs approved all study protocols. The current study is a secondary data analysis utilizing baseline measures of the study variables.

Measures

Demographics—Characteristics of child, parent, and family situation were collected. Data included maternal and child age, nativity, and length of stay in current residence.

Anthropometrics—*Height* was measured with a stadiometer to the nearest mm and *weight* was measured to the nearest 0.1 kg using a balance beam scale with shoes removed and participants wearing indoor clothing. Body mass index (BMI) weight-for-length was calculated using methods established by the National Center for Health Statistics. Children categorized as overweight/obese (≥ 85th percentile for weight-for-length) (Barlow, 2007).

Food-Related Measures—The *Household Food Inventory*, (HFI; Patterson, Kristal, Shannon, Hunt, & White, 1997; Satia, Patterson, Kristal, Hislop, & Pineda, 2001) a 15-item survey of foods that are major contributors to total fat in the US diet, was also administered to the mothers at the same time as all other measurements. The HFI was adapted for Hispanic families in our sample to include items such as chicharrones and pan dulce. Via a checklist, subjects were asked by trained research assistants if any of the following 29-item foods items were present in their homes (yes/no). For analyses, we grouped the 29 items foods into sub-categories: 1. Offal (variety meats, organ meats), 2. Processed meats (ham, sausage, bacon, canned/processed meats, lunch meats), 3. Other meats (beef, pork), 4. Legumes (nuts, peanut butter), 5. High fat dairy (whole milk, hard cheese, soft cheese, velveeta, ice cream), 6. Salty snacks (chips, chicharrones), 7. Sugary snacks and desserts (cakes, sweetened cereal, pan dulce, candy, fruit snacks), 8. Sugar-sweetened beverages (soda, punch), 9. Added fats (butter, mayo, salad dressing, crisco/lard), 10. Sides/others (ramen, mac and cheese, mayo-based salads).

In order to limit participant burden, a single 24-hour diet recall questionnaire was used to collect information on food intake in the past 24 hours for the child was completed by the mothers. This technique is appropriate for this population because it does not require any literacy or computation skills as does a food frequency questionnaire. Using the facilities of the Nutrition Data System for Research (NDSR), data for dietary analysis were entered and analyzed to represent daily intakes of variables of interest. In order to validate the HFI, we compared intake of categories of foods as measured in the 24-hour dietary recall: fruits (no juice), vegetables (no potatoes), processed meats, other meats, legumes, high fat dairy, salty snacks, sugary snacks/desserts, sugar-sweetened beverages, and added fats. In order to assess how the home food inventory was associated with nutrient intake (macro and

micronutrient intake), we also included total calories, total fat, carbohydrates, protein, sugar, percent of calories from fat, percent of calories from carbohydrates, percent of calories from protein, and total fiber, which were obtained via the NDSR from 24 hour diet recalls.

SNAP Enrollment—Data regarding food stamp participation (now known as SNAP) was assessed. The question of enrollment in food stamp program was queried at enrollment through a demographic questionnaire that also included other items that indicated socioeconomic status such as CHIP enrollment (yes/no).

Analytical Strategy

Data were analyzed using SPSS version 22 (SPSS Inc., Chicago, IL). Analyses included descriptive statistics and frequency distributions (Tables 1–3). We examined counts of the foods and the relationship between the HFI categories (Table 2). Means and standard deviations for study variables are shown in Tables 4–6. Independent samples *t*-tests were conducted to compare the mean scores on foods in the home and children's food intake between households who did and did participate in the food stamp program. Validating the HFI against the 24-hour dietary recall, bivariate correlations analyses were used.

RESULTS

Participant Characteristics

The characteristics of the mother-child dyads are shown in Table 1. The average age of participants was almost 3.6 years old; most participants were female (64%). The average child BMI percentile was quite high at over 98 percentile for age; however, this was to be expected since childhood obesity was an inclusion criteria in the study. Almost all mothers were overweight or obese (92%); the mean BMI was significantly higher among mothers participated in SNP as compared to those who did not (38.88 vs. 33.09 respectively).

Relationship between SNAP and Food-Related Measures

Mean differences in HFI subscales, NDSR subscales, and energy/nutrient intake by food stamp participation are summarized in Tables 2–4. No significant differences in energy and macro/micronutrients were found between the families who participated in SNAP compared to those who did not participate in SNAP, although the nutrient breakdown as shown by NDSR are intrinsically related to food item consumption as shown by the HFI. Results indicated that mothers/households who participated in the food stamp program reported having significantly more unhealthy legumes, high fat dairy, salty snacks, sugary snacks/desserts, added fats, and sides in the home compared to mothers who did not participate in the food stamp program (Table 2). Mothers/households who participated in the food stamp program also reported that their child consumed more legumes than children of mothers who did not use food stamps (Table 3). There were no differences in consumption of fruits, vegetables, sugary snacks/desserts, sugar-sweetened beverages, add fats, salty snacks, high-fat dairy, processed meat, and other meat. There were also no significant other energy/nutrient intake differences between children whose mothers/households did and did not participate in the food stamp program (Table 4).

Correlation Analyses of HFI and 24-hour recall

Bivariate correlation analyses among the HFI subscales indicated that there were significant, positive relations ranging from .34–.94 (Table 5). Thus, having one type of unhealthy food in the home was significantly, positively related with having any other types of food in the home. While sugar-sweetened beverage availability was significantly correlated with all other food categories in the HFI, the correlations were weak or moderate. The lowest correlation sugar-sweetened beverage availability was .34 (with legumes, added fats, and sides) and the highest correlation was .56 (with salty snacks), indicating other aspects of the home food environment were not as correlated with sugar-sweetened beverages.

Bivariate correlations between the HFI subscales and NDSR child intake subscales for all, regardless of enrollment in food stamps are shown in Table 6. Correlations between the dairy subscale of the NDSR and HFI subscales were significant and negative, ranging from $-.40$ to $-.55$. The results indicated that the more high-fat dairy consumed by children based on NDSR reports, the less unhealthy foods in the home based on HFI reports. The amount of fruit consumed by the children based on NDSR reports was significantly, negatively related with offal meat, processed meat, other meat, protein, and sides from the HFI subscales. Thus, mothers reporting that their child consumed more fruit also reported having less unhealthy meat, protein, and sides in the home. There was also a significant, negative correlation between child vegetable intake and having legumes in the home. All other bivariate correlations between NDSR and HFI subscales were not significant.

DISCUSSION

The purpose of this study was to conduct a secondary analysis on the relationship between food stamp participation and home food access among WIC mothers and children and experiencing unstable housing after a hurricane. A secondary aim was to validate an adapted food inventory for low-income, multi-ethnic populations with 24-hour recall data by examining the construct validity of the HFI. We observed that while there were significantly more unhealthy foods available in the homes of the WIC families participating in the SNAP program, with few notable exceptions, the home food environment was not related to children's dietary intake. Findings provide insights on how participating in WIC and participating in the SNAP program may or may not impact the home food environment and dietary intake among families in transition.

The population for this study was in greater need, and as such, was more likely to use multiple existing food assistance programs such as WIC and SNAP together. Those families participating in SNAP had less healthful food environments compared to families not participating in SNAP. In particular, households participating in food stamps reported having significantly more salty snacks, high-fat dairy, and sides at home. Distance and frequency of shopping at supermarkets has been associated with increased fruit and vegetable consumption (Rose & Richards, 2004). Many of these families did not have access to reliable transportation, which likely affected their access to healthy foods. In addition, high fat foods may be viewed as comfort food during stressful life events (Chao, Grilo, White, & Sinha, 2015; Zellner, Loaiza, & Gonzalez, 2006). Given the trauma that many of these families underwent, it is understandable that families would seek foods that are perceived to

be fulfilling. Families participating on SNAP reported having more foods on the home food inventory overall. SNAP is a major policy-level safety net against hunger and poverty in the US (Wilde & Nord, 2005). Perhaps, the differences observed in home food availability in the current study was simply a function of the SNAP program doing its job.

Food availability tends to cluster within communities, with unhealthy foods more available for some groups more than others (Campbell et al., 2007; Day & Pearce, 2011; MacFarlane, Crawford, Ball, Savidge, & Worsley, 2007). With the exception of the correlation of home food availability of animal proteins and child fruit intake, and overall availability of high-fat and sugar items with high-fat dairy intake, we did not observe any significant correlations between home food availability and children's intake. Not surprisingly, since this HFI targeted high-fat, high-sugar foods, we saw high correlations of availability within items on the HFI tool. Despite having a higher frequency of unhealthy foods in the home, the dietary intake of the children in households participating in food stamps did not differ from those children not participating. In other words, for this sample, the home food environment (interpersonal level) did not predict intake, contrary to others' findings (Campbell & Crawford, 2001; Campbell, Crawford, & Ball, 2006; Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005). In fact, we found availability of high-fat dairy was inversely associated with child high-fat dairy intake, which seems counter-intuitive. Perhaps, mothers may select healthier versions of foods to serve their young children; however, more research is needed to examine how the food environment differentially affects intake among members of a household. Given that the home environment seems to increase in importance as children age (Gerards & Kremers, 2015; Birch & Fisher, 1998), more longitudinal studies are needed to examine the relative importance and interaction of the home food environment with feeding practices among at-risk populations. Objective validation studies assessing the relationship between self-report of home food availability and actual availability are needed. More research is warranted to assess how the home food inventory is linked to intake of people within the household. If found to be linked to intake within the home, then this tool could be used to better understand the quality of food consumed with families, resulting in more targeted interventions.

Given that others have documented that unstable housing and inconsistent access to food are related to poorer access to health care including acute and ambulatory care and more unhealthy behaviors (Stahre, VanEenwyk, Siegel & Njai, 2015; Kushel et al., 2006; Ma et al., 2008; Reid, Vittinghoff, & Kushel, 2008), ramifications to public health nursing are vast. Public health nurses should be consistently engaged in the process to ensure that families dealing with unstable housing are getting adequate care, including access to healthy foods, as well as connected to all resources that could benefit families. The PHN can liaise with public housing at the federal state, and local level as well as promote stable housing for families in need. The food environment should be a priority for assessment following a population displacement such as one occurring after a natural disaster, or from forced relocation. The food environment can be assessed at the individual, family, and neighborhood/community level and the PHN can advocate for policy changes that create an awareness of the need to consider food security equal to housing security following displacement, either temporary or permanent. The HFI is an instrument that can be completed and analyzed easily by the PHN when assessing a family's food security and can

be useful for times when it is vital to know what level of food security is present in a family, neighborhood or community, particularly after displacement.

Limitations should be considered in interpreting these findings. As a secondary data analyses with a limited sample size complex multivariate regression models are not appropriate; however, findings do provide insights for future hypotheses. Sample sizes for the HFI validation are similar to other home food inventory validations studies (Hearst et al, 2013). Self-reported dietary data are prone to recall bias and social desirability; we only had access to one 24-hour recall, when three days of diet recall would have been ideal. Further, we were unable to assess eating habits and the home food environment prior to the displacement, so are unable to assess if these findings causally related. The length of time that the families faced unstable housing is unknown; however, many families lost all possessions in the hurricane. Unfortunately, it was not asked whether families were eligible for SNAP participation, as all WIC families may not be eligible for SNAP program participation. Since participants were drawn from one community during a unique time period (after a hurricane), findings may not be generalizable to others.

This study provides insights in how the home food environment differentially affects WIC families participating and not participating in the SNAP program many of which were dealing with unstable housing. Families participating in both WIC and SNAP had more overall home food availability, indicating that SNAP improves food access overall. Albeit, less healthful foods were more prevalent in SNAP households. Despite that, children's intake was generally not related to the home food availability. Public health nurses can continue to work with families to improve access to available resources for displaced groups. These findings need to be confirmed with additional research. More research is needed on how eating behaviors are affected during times of extreme distress. Longitudinal studies of how public policy, home food environment, parent-child interactions, and eating change among young children are needed.

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Table 1

Participant Characteristics

	No Food Stamp Program Participation (n = 26)	Food Stamp Program Participation (n = 24)	Full Sample (N = 50)
Child Gender: n (%) ^a			
• Boys	14 (54%)	4 (17%)	18 (36%)
• Girls	12 (46%)	20 (83%)	32 (64%)
Child Age in months: M (SD)	42.39 (6.22)	41.25 (9.26)	41.86 (7.71)
• Range	32–58	25–59	25–59
Child BMI Percentile: M (SD)	98.68 (.90)	97.57 (3.34)	98.17 (2.39)
• Range	95–99	85–99	85–99
Child Height in inches: M (SD)	39.33 (2.18)	39.31 (3.12)	39.32 (2.62)
Child Weight in pounds: M (SD)	46.57 (8.01)	47.36 (13.29)	46.93 (10.64)
Mothers' BMI: M (SD) ^b	33.09 (7.20)	38.88 (8.78)	35.46 (8.29)
• Range	23.4–55.8	22.7–51.2	22.7–55.8
• % Overweight	35%	6%	23%
• % Obese	61%	81%	69%

^a. indicates a significant difference between groups at p<0.05 as tested by chi-square tests

^b. indicates a significant difference between groups at p<0.05 as tested by t-tests

Table 2
Comparison of Home Food Inventory Subscales by Food Stamp Program Participation

	<i>X</i> ± <i>SD</i>		<i>t</i> -Test		
	No Food Stamps (<i>n</i> = 27)	Used Food Stamps (<i>n</i> = 27)	<i>t</i>	<i>p</i>	95% <i>CI</i>
Offal Meat	1.32 (1.57)	2.27 (1.80)	-2.00	.05	-1.90, 0.01
Processed Meat	4.24 (2.05)	4.82 (1.88)	-1.06	.30	-1.67, 0.52
Other Meat	1.59 (0.84)	1.89 (0.42)	-1.63	.11	-0.66, 0.07
Legumes	1.65 (1.13)	2.26 (0.98)	-2.08	.04	-1.19, -0.02
Other Protein	8.79 (5.14)	11.19 (4.53)	-1.76	.09	-5.15, 0.35
High Fat Dairy	4.84 (2.95)	6.81 (2.97)	-2.37	.02	-3.63, -0.30
Salty Snacks	1.46 (1.24)	2.33 (1.04)	-2.78	.01	-1.50, -0.24
Sugary Snacks and Desserts	4.07 (2.48)	5.48 (2.62)	-2.03	.05	-2.80, -.001
Sugar-Sweetened Beverages	1.74 (1.13)	1.93 (0.62)	-.75	.46	-.68, 0.31
Added Fats	3.33 (1.88)	4.41 (1.60)	-2.26	.03	-2.03, -0.12
Sides/Others	2.37 (1.18)	3.11 (1.12)	-2.36	.02	-1.37, -0.11

Table 3
Comparison of Food Intake (NDSR Subscales) by Food Stamp Program Participation

	<i>X</i> ± <i>SD</i>		<i>t</i> -Test		
	No Food Stamps (<i>n</i> = 25)	Used Food Stamps (<i>n</i> = 19)	<i>t</i>	<i>p</i>	95% <i>CI</i>
Fruits	.70 (1.13)	.66 (0.97)	.12	.90	−0.61, 0.69
Vegetables	1.00 (2.15)	.69 (0.95)	.58	.56	−0.76, 1.38
Processed Meat	.12 (0.23)	.23 (0.58)	−.86	.39	−.37, 0.15
Other Meat	.70 (1.47)	.89 (1.23)	−.45	.65	−1.03, 0.66
Legumes	.01 (0.06)	.17 (0.37)	−2.04	.05	−0.31, −0.01
High Fat Dairy	1.52 (1.39)	1.03 (1.13)	1.27	.21	−0.29, 1.29
Salty Snacks	.20 (0.62)	.22 (0.53)	−.13	.90	−.038, 0.34
Sugary Snacks/Desserts	.98 (1.55)	.54 (0.72)	1.15	.26	−0.33, 1.21
Sugar-Sweetened Beverages	.58 (0.84)	.86 (0.63)	−1.21	.23	−.074, 0.19
Added Fats	1.14 (1.17)	1.42 (2.69)	−0.47	.64	−1.49, 0.93

Table 4

Comparison of Nutrient Intake by Food Stamp Program Participation

	<i>X</i> ± <i>SD</i>		<i>t</i> -Test		
	No Food Stamps (<i>n</i> = 25)	Used Food Stamps (<i>n</i> = 19)	<i>t</i>	<i>p</i>	95% <i>CI</i>
Energy (kcal)	1480.91 (625.27)	1380.35 (731.07)	.49	.63	-312.59, 513.71
Total Fat (g)	53.51 (30.90)	53.70 (43.24)	-.02	.99	-22.73, 22.36
Total Carbohydrates (g)	199.10 (80.60)	173.92 (77.18)	1.05	.30	-23.44, 73.80
Total Protein (g)	56.27 (26.09)	54.07 (30.37)	.26	.80	-15.00, 19.40
Total Saturated Fatty Acids (g)	20.87 (11.29)	19.26 (14.18)	.42	.68	-6.13, 9.36
Sucrose (g)	30.21 (21.36)	31.17 (25.18)	-.14	.89	-15.13, 13.21
% Calories from Fat	31.65 (8.26)	33.19 (10.43)	-.55	.59	-7.22, 4.15
% Calories from Carbohydrates	53.15 (10.04)	50.65 (11.45)	.77	.44	-4.05, 9.06
% Calories from Protein	15.17 (3.90)	16.09 (3.80)	-.78	.44	-3.29, 1.45
Total Dietary Fiber (g)	11.13 (6.71)	9.34 (5.66)	.94	.35	-2.06, 5.65

Table 5

Correlations among HFI Subscales (N = 54)

	1	2	3	4	5	6	7	8	9	10	11
1. Offal Meat	--										
2. Processed Meat	.78***	--									
3. Other Meat	.59***	.64***	--								
4. Legumes	.72***	.74***	.46**	--							
5. Other Protein	.92***	.94***	.71***	.85***	--						
6. High Fat Dairy	.91***	.76***	.60***	.77***	.89***	--					
7. Salty Snacks	.83***	.75***	.63***	.64***	.83***	.87***	--				
8. Sugary Snacks and Desserts	.84***	.72***	.55***	.64***	.81***	.88***	.87***	--			
9. Sugar-Sweetened Beverages	.43**	.50***	.36**	.34*	.48***	.39**	.56***	.41**	--		
10. Added Fats	.78***	.74***	.66***	.73***	.83***	.79***	.79***	.74***	.34*	--	
11. Sides/Others	.72***	.71***	.59***	.66***	.78***	.80***	.74***	.70***	.34*	.70***	--

Note.

* p<.05;

**

p<.01;

p<.001.

Table 6

Correlations between HFI and NDSR Subscales (N = 44)

NDSR Subscales										
HFI Subscales	Fruits	Vegetables	Processed Meat	Other Meat	Legumes	High-Fat Dairy	Salty Snacks	Sugary Snacks/Desserts	Sugar-Sweetened Beverages	Added Fats
1. Offal Meat	-.30 *	-.09	-.22	-.09	.28	-.55 ***	.17	.10	.15	-.01
2. Processed Meat	-.30 *	-.28	-.28	.03	.08	-.43 **	.18	.09	.02	.16
3. Other Meat	-.31 *	.03	-.15	.04	.03	-.40 **	.22	-.07	.27	.12
4. Legumes	-.20	-.31 *	.04	.06	.21	-.45 **	.12	.01	.02	.01
5. Other Protein	-.33 *	-.21	-.21	-.01	.18	-.53 ***	.19	.07	.10	.08
6. High Fat Dairy	-.23	-.11	-.10	-.04	.26	-.54 ***	.20	.09	.24	.03
7. Salty Snacks	-.21	-.11	-.17	-.01	.19	-.50 **	.18	-.01	.20	.01
8. Sugary Snacks and Desserts	-.15	-.04	-.18	-.06	.20	-.50 **	.16	.06	.14	-.02
9. Sugar-Sweetened Beverages	-.20	-.12	-.21	-.18	.01	-.34 *	.03	.01	-.07	.15
10. Added Fats	-.12	-.17	-.05	.02	.22	-.50 **	.13	-.01	.09	-.07
11. Sides/Others	0.31 *	.02	-.06	.04	.25	-.42 **	.16	.12	.03	.04

Note.

* p<.05;

** p<.01;

*** p<.001.