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What Do You Want to Eat? A Descriptive Study of Native Hawaiian
and Pacific Islanders' Home Food Environment

Petr Ruda

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

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Abstract

What Do You Want to Eat? A Descriptive Study of Native Hawaiian and Pacific Islanders' Home Food Environment

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Objectives: Home food environments are created when families stock their kitchens with food, which contributes to their dietary patterns and weight management. Native Hawaiians and Pacific Islanders (NPHIs) have a high prevalence of overweight and obesity. A description of their home food environment can help nurses understand NPHIs' dietary patterns. Our purpose was to describe NPHIs' home food environments by analyzing grocery store and restaurant receipts.

Design and Sample: This descriptive study used analyzed qualitative and quantitative data from eight NHPI families, collected over an 8-week period.

Measures: Grocery store and restaurant receipts were analyzed with descriptive statistics. Families' dietary patterns were studied with open-ended questions and compared to receipt data.

Results: Food groups with the highest percent expenditures included combination foods (20%), protein foods (19%), and empty calorie food and drinks (11%). The lowest percent expenditures included fruits (8%), grains (7%), vegetables (7%), and dairy (6%). Families visited restaurants zero to 10 times ($M = 2$) per week.

Conclusions: Results can help nurses address NPHIs' home food environment challenges by increasing their awareness of typical food purchases and helping NPHIs assess their own grocery and restaurant purchases and improve their own home food environments.

Key Words: home food environment

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Background

What do you want to eat? What is in the fridge? These questions are asked countless times each day, and possible answers are constrained by what is in a family's fridge and cupboard, or the home food environment. Among other things, the home food environment is influenced by availability/scarcity of food, family members' cooking skills, food preferences, mealtime behaviors, habits related to grocery shopping, and household income (Dammann & Smith, 2010).

When parents purchase food to stock the kitchen, they create a home food environment from which children make their early food choices (Kumanyika, 2006). Family members influence children's dietary patterns and attitudes toward food, which can last a lifetime (Hughes, Sherman, & Whitaker, 2010). According to Golan and Weizman's (2001) Familial Approach to the Treatment of Childhood Obesity based on Bandura's (1998) Social Cognitive Theory, children's positive attitudes about healthy food and dietary patterns can be created in families as parents build healthy home food environments, model healthy behaviors, and encourage healthy dietary patterns in children.

Culture also influences people's food preferences, purchases, and dietary patterns. These cultural components overlap with home food environments. In many cultures, food is an important part of the community's identity, and sharing food brings people together as they gather routinely as well as to celebrate accomplishments and major life events (Lassetter, 2011). Thus, culture and home food environments might have an important interplay that would be helpful for public health nurses to understand and incorporate in health promotion efforts for populations at risk for overweight and obesity.

NHPI Home Food Environment

Native Hawaiians and Pacific Islanders (NHPIs) are an ethnic group with high prevalence of overweight and obesity. The World Health Organization (WHO, 2010) found several Pacific Island countries among the nations with the highest prevalence of overweight and obesity. Similarly, NHPIs living in the U.S. have a high prevalence of overweight and obesity. In a study in Hawaii and Utah, 84.3% of an NHPI adult sample was overweight or obese, and those living in Utah had significantly higher BMIs than their counterparts living in Hawaii (Lassetter, 2015). Likewise, NHPI children have higher rates of overweight and obesity than other children. Compared to the overall obesity prevalence of 22.9% among school-aged children in Los Angeles, NHPI children had an obesity prevalence of 35.6% (Shabbir, Kwan, Wang, Shih, & Simon, 2010). Identifying ways to reverse the obesity trend among NHPI families is vital to health promotion efforts among them. Research on their home food environments can provide an important foundation on which to build effective health promotion efforts.

Little research has been conducted on home food environments in general, and no research was located that examined NHPIs' home food environments. Understanding NHPIs' home food environments will help identify strengths and challenges to target in health promotion efforts. Therefore, the purpose of this study was to describe the home food environments of NHPI families by analyzing their grocery store and restaurant receipts over an eight week period.

Research Questions

In our study, we sought to answer the following research questions:

- 1) Which ChooseMyPlate categories (United States Department of Agriculture, n.d.) are represented in NHPI families' grocery store receipts, and what percentage of total food expenditure do families spend per category?

- 2) What percentage of NHPI families purchased food from all Choose My Plate categories?
- 3) How frequently do NHPI families visit fast food and sit down restaurants, and how much do they spend when eating out?
- 4) How do food purchases on participants' receipts compare with their recalled food intake?

Methods

Design and Sample

In this descriptive study, we evaluated the home food environment by analyzing the grocery store and restaurant receipts of eight participant families with 11 adults and 11 children over an 8-week period from March to May 2013. Participant families were part of a larger study involving a physical activity and nutrition intervention that took place on four consecutive Saturdays with a reunion session four weeks later. Sessions were held at a Hawaiian Cultural Center in the western United States. The location was chosen because it is familiar to the NHPI community.

We received Institutional Review Board approval before recruiting participant families. To inform the NHPI community about our study, we posted announcements on websites for the Hawaiian Cultural Center and the MANA Challenge, which is a grass-roots intervention to reduce obesity among NHPI adults – it preceded our family-based intervention called the Ohana MANA Challenge. *Ohana* and *mana* are Hawaiian words for family and strength. The intervention's title also serves as an acronym for movement, awareness, nutrition, and action. To be included, participant families had to: (a) self-identify as NHPI, (b) be free of known heart

disease, and (c) have family members willing and available to participate in the study, including at least one child 5 to 17 years of age.

When people contacted the primary investigator about the intervention, she explained the study and what participants would do, including weekly submission of receipts from grocery stores and fast food and sit-down restaurants, answered questions. Interested families who met inclusion criteria were asked to sign consent forms (ages 18 years and older) and assent forms (ages 8 to 17 years). Fourteen families expressed interest in participating, but only eight were available on the days the intervention sessions and reunion were held.

When we gathered the receipts, we marked out credit and debit card information, wrote the family's code number on the receipts and placed them in an envelope labeled with the family's code number. Each time a family submitted receipts, they received \$10 compensation. The maximum compensation for submitting receipts was \$50 if the family submitted receipts at all four sessions and the reunion four weeks later. Thus, families submitted receipts from a maximum of eight weeks. Each week participants spent approximately ten minutes responding to questionnaires that included dietary recall.

Measures

Demographic questions. We collected demographic information at the first session. Questions included adult participants' gender, year of birth, ethnicity, marital status, level of education, income level, how many children they had, and their children's ages and gender.

Food Categories. We used the ChooseMyPlate categories: fruits (e.g. oranges, apples), vegetables (e.g. spinach, cauliflower), grains (e.g. bread, bread rolls) protein foods (e.g. ground beef, legumes), and dairy (e.g. milk, yogurt) (United States Department of Agriculture, n.d.). To provide finer distinction among purchased items, we created additional categories, including oils

(e.g. canola oil, olive oil), solid fats (e.g. butters, solid oils), combination meal (e.g. frozen dinners, food items consisting of more than one food category), empty calories (e.g. cotton candy, candy bar), sugar-sweetened drinks (e.g. soda pop, other sugar sweetened drinks), diet drinks (e.g. diet cola products, other drinks with sugar substitutes), others (e.g. spices, condiments), nonfood items (e.g. toilet paper, cleaning supplies), and unidentified items (items we could not identify because of a store's complex coding system or, in a few cases, deterioration of the receipt).

Dietary Patterns. We asked recall questions about participants' dietary patterns. Specifically, we asked, "Did you eat out this week? If so, where did you go?" We also asked two questions about efforts to improve their dietary patterns: (1) "Did you make a small change or two to help your family be healthier this week? If yes, what change(s) did you make?" and (2) "Did you try a healthy food this week that you've never eaten before? If yes, what was it?" During the intervention, the meaning of "healthy food" was discussed and included low fat foods from the ChooseMyPlate categories.

Analytic Strategy

Data entry and cleaning were completed with attention to detail. Frequent research team meetings were held to correctly categorize all items, including several cryptic items on receipts. Items on grocery store receipts were entered into an Excel 2010 spread sheet and categorized by family code, week of purchase, and item cost. Food items purchased at grocery stores were placed in the food categories described above. Sit-down and fast-food restaurant receipts were entered into an Excel 2010 spread sheet and categorized by family code, week of purchase, items purchased, and total spent.

To answer our research questions, we used descriptive statistics. To answer the fourth research question, we compared receipt data with adults' and children's responses to dietary pattern questions, described above.

Results

Sample

Our eight families consisted of 11 children and 11 adults. All participants were born in the United States and had lived in their current homes between two and nine years. The familial roles of the adults were seven mothers, three fathers, and one grandma. See table 1 for demographic information.

Table 1.

Demographic Characteristics

Characteristic	Adults (<i>n</i> = 11)	Children (<i>n</i> = 11)
Household Number of Parents		
(Family <i>n</i> = 8)		
Two Parents	7 (87.5%)	
Single Parent	1 (12.5%)	
Multi-generation	1 (12.5%)	
Household Number of Children¹		
(Family <i>n</i> = 8)		
1-child household		2 (25.0%)
2-children household		3 (37.5%)
3-children household		2 (25.0%)
4-children household		1 (12.5%)
Household Income		
(Family <i>n</i> = 8)		
Less than \$20,000	2 (25.0%)	
\$20,001 - \$39,999	3 (37.5%)	
\$40,000 - \$59,999	0 (0%)	
\$60,000 - \$79,999	1 (12.5%)	
\$80,000 or more	1 (12.5%)	
Undisclosed	1 (12.5%)	

NHPI Home Food Environment

Characteristic	Adults (<i>n</i> = 11)	Children (<i>n</i> = 11)
Age (Mean, S.D.)	36.7 (8.8)	8.3 (2.5)
Gender		
Male	3 (27.3%)	8 (72.7%)
Female	8 (72.7%)	3 (27.3%)
Marital Status		
Married	9 (81.8%)	
Single	2 (18.2%)	
Ethnicity		
Hawaiian	6 (54.5%)	
Samoan	3 (27.3%)	
Tongan	1 (9.1%)	
Tahitian	1 (9.1%)	
BMI Category ²		
Underweight	0 (0%)	2 (18.2%)
Normal	3 (27.3%)	5 (45.5%)
Overweight	1 (9.1%)	0 (0%)
Obese	4 (36.4%)	4 (36.4%)
Morbidly Obese	3 (27.3%)	0 (0%)
Education		
Some College	6 (54.5%)	
College Graduate	5 (45.5%)	

¹Children less than 5 years of age did not participate in the study but are included in the number of children in the household.

²Body mass index categories are those defined by Centers for Disease Control and Prevention (2011a & 2011b).

Two families submitted receipts for all eight weeks of data collection. One family submitted receipts for seven weeks; one family submitted receipts for five weeks; two families submitted receipts for four weeks; and two families submitted receipts for one week. See Table 2 for a summary of the receipts collected and totals spent on food items, non-food items, and unidentified items.

NHPI Home Food Environment

Table 2.

Receipt Summary

Family	Number in Household	#Weeks Submitted Receipts	Total # Receipts	Receipts per Week	Food Total	Nonfood Total	Items Not Identified	Amount Total	Food per Week	Food per Person per Week
1	2	8	41	5.1	\$416	\$42	\$24	\$482	\$52	\$26
2	6	5	16	3.2	\$907	\$115	\$124	\$1,146	\$181	\$30
3	4	4	8	2.0	\$266	\$1	\$1	\$268	\$67	\$17
4	5	8	35	4.4	\$1,116	\$177	\$13	\$1,306	\$140	\$28
5	3	1	2	2.0	\$28	\$10	\$0	\$38	\$28	\$9
6	5	1	1	1.0	\$91	\$15	\$0	\$106	\$91	\$18
7	5	7	23	3.3	\$608	\$78	\$18	\$704	\$87	\$17
8	4	4	8	2.0	\$254	\$27	\$70	\$351	\$64	\$16
Total					\$3,686	\$465	\$250	\$4,401		
Percent					83.8%	10.6%	5.7%	100.0%		

Research Question 1: Food Categories Represented in Grocery Store Receipts

All five of ChooseMyPlate categories were represented in the combined purchases of seven participant families over the eight weeks of data collection. One family purchased it only from the vegetables and protein foods categories, but not the other ChooseMyPlate categories. In addition, some families purchased foods that fit the other categories we develop to better understand their home food environments.

When analyzing the combined purchases of all participant families, the highest percentages of expenditures were on combination foods (\$876, 23.8%), protein foods (\$844, 22.9%), and empty-calorie foods and sugar-sweetened drinks (\$498, 13.5%). Families purchase a total of 1096 items; we could not identify 32 of these items. See Table 3 for grocery store expenditures by family.

NHPI Home Food Environment

Table 3.

Grocery Store Food Expenditures by Categories

Family	Fruits ¹	Vegetables ¹	Grains ¹	Protein Foods ¹	Dairy ¹	Oils	Solid Fats	Combo	Empty Calories	Sugar Drinks	Diet Drinks	Other	Total
1	\$59	\$39	\$35	\$74	\$49	\$1	\$9	\$64	\$43	\$9	\$17	\$17	\$416
2	\$77	\$67	\$82	\$57	\$60	\$2	\$7	\$330	\$145	\$15	\$30	\$35	\$907
3	\$11	\$33	\$39	\$100	\$16	\$0	\$0	\$24	\$20	\$4	\$0	\$19	\$266
4	\$122	\$105	\$137	\$418	\$113	\$0	\$3	\$142	\$38	\$16	\$7	\$15	\$1,116
5	\$0	\$1	\$0	\$17	\$0	\$0	\$2	\$6	\$0	\$2	\$0	\$0	\$28
6	\$16	\$3	\$6	\$4	\$11	\$0	\$0	\$19	\$14	\$16	\$2	\$0	\$91
7	\$71	\$45	\$18	\$157	\$29	\$0	\$7	\$171	\$90	\$7	\$12	\$1	\$608
8	\$9	\$11	\$6	\$17	\$2	\$3	\$0	\$120	\$59	\$20	\$6	\$1	\$254
Total	\$365	\$304	\$323	\$844	\$280	\$6	\$28	\$876	\$409	\$89	\$74	\$88	\$3686
Percent	9.9%	8.2%	8.8%	22.9%	7.6%	0.2%	0.8%	23.8%	11.1%	2.4%	2.0%	2.4%	100%

¹ ChooseMyPlate categories are Fruits, Vegetables, Grains, Protein Foods, and Dairy

Research Question 2: Percentage of Families Purchasing from All Food Categories

Seven participant families (87.5%) purchased food from all five ChooseMyPlate categories during the course of the intervention. Only one family (12.5%) did not purchase food items from all ChooseMyPlate categories. This family submitted receipts one week only and most of their food expenditures were on protein (60.7%) and combination meals (21.4%).

Research Question 3: Frequency of Restaurant Visits and Associated Cost

Two families who submitted receipts one week and one family who submitted receipts four weeks did not submit any restaurant receipts. The remaining five families averaged two restaurant visits a week, spending an average of \$15.40 per visit. The range was 0 to 10 restaurant visits per week.

In weekly questionnaires, we asked participants, “Did you eat out this week? If so, where did you go?” We noted inconsistencies between three participant families’ receipts and their responses to this question. In each case, at least one family member reported eating at one or more restaurants for which a receipt was not submitted.

Research Question 4: Comparison of Participants’ Dietary Pattern and Receipts

In responses to the dietary pattern question, “Did you make a small change or two to help your family be healthier this week? If yes, what change(s) did you make?” Three families reported they made no changes to their dietary pattern, yet their grocery store receipts indicated some improvement. Two families purchased two more fruits and/or vegetables than they had the previous week. One family quadrupled their fruits purchased and increased their purchase of vegetables by five times in one week.

NHPI Home Food Environment

When asked if participants had tried a new healthy food this week and if so, what it was, children and adults from four families responded affirmatively. Adults said they tried new vegetables, such as edamame, celery, asparagus, and cauliflower. Children also tried new vegetables – broccoli, spinach, and carrots.

Discussion

When public health nurses and other healthcare providers understand a particular ethnic or cultural group's typical home food environments, it helps them tailor social marketing and family and community interventions to address the group's unique strengths and challenges. Our study provides beginning insights into NHPIs' home food environments that previously have not been discussed in the literature.

Grocery Shopping Patterns

In our study, seven of eight families purchased food from all ChooseMyPlate categories over the eight weeks of data collection. The ChooseMyPlate category they spent the most on was protein foods (\$844, 22.9%). Although protein foods tend to be a high priced food item, there are low-cost options, such as peas, beans, and eggs. Additionally, protein foods have the smallest portion in the ChooseMyPlate distribution (United States Department of Agriculture, 2014). By comparison, families spent less on the ChooseMyPlate categories of fruits (\$365, 9.9%), grains (\$323, 8.8%), vegetables (\$304, 8.2%), and dairy (\$280, 7.6%). These results seem consistent with Lassetter's (2011) findings that NHPIs perceived fruits and vegetables as expensive, which was a barrier to NHPIs purchasing them. Additionally, participant families spent the highest percentage of their food expenditures on combination foods (\$876, 23.8%). Of note, they

spent 13.5% (\$498) on empty-calorie foods and sugar-sweetened drinks, which was more than they spent on individual ChooseMyPlate categories except protein foods.

Similarly, in a study with 115 participants (41% African American and 39% Hispanic) who submitted grocery store receipts for six weeks, Cullen et al. (2007) found 24% of food purchases were proteins food, 7% were fruits, 8.8% were vegetables, 9.2% were grains, and 8.3% were dairy. Their participants' second highest purchase category was sweetened beverages, water, and alcohol at 12% (Cullen et al., 2007). Dammann and Smith (2010) studied grocery shopping patterns of children. They conducted 14 focus groups with low-income children ($n = 92$) aged 9 to 13 years. When asked about their grocery shopping choices, the children explained they often chose "junk" food, such as chips, soda pop, candy, and processed fruit snacks. These food choices are comparable to our participants spending 13.5% of their grocery store expenditures on empty-calorie foods and sugar-sweetened drinks.

Results of some studies focused on purchase of fruits and vegetables. Kristal, Goldenhar, Muldoon, and Morton (1997) studied whether a point-of-purchase intervention would impact the purchase of fruits and vegetables at eight stores, which were randomized to control ($n = 4$) or intervention ($n = 4$). During the first four months of their study, shoppers at the intervention stores were given fliers identifying which fruits and vegetables were on sale and encouraging shoppers to eat more fruits and vegetables. During the next four months, the fliers also included a 50-cent coupon toward the purchase of fruits and vegetables. Data were collected at baseline and one year later by randomly selecting shoppers at all eight stores for five-minute interviews and take-home questionnaires. At the intervention stores, 36% of shoppers had used a

coupon, but there was not a significant impact on overall purchases of fruits and vegetables. Although our intervention did not focus exclusively on fruits and vegetables, most of our participants who tried a healthy new food ate a vegetable. However, only half of the families had at least one family member who reported trying a new healthy food.

Likewise, over a one-month period Sisk, Sharkey, McIntosh, and Anding (2010) conducted a series of five in-home food assessments with a 251-item tool in nine Texas households. Three families had fruits and vegetables available at each assessment, but four families had no fruits or vegetables on one to four assessments. Although we did not conduct in-home food assessments, Sisk et al.'s results might be comparable to the percentage of fruits and vegetables in our participants' grocery store expenditures.

Kegler et al. (2014) assessed the home food environments of overweight and obese women (n = 319) via a phone survey. Although most of their participants reported fruits (92.2%) and vegetables (88.7%) were placed in "easily visible" locations in their homes, they averaged 2.8 servings of fruits and vegetables per day. Additionally, two-thirds of their participants (approximately 66%) reported easy visibility of high calorie snacks in their homes. Although we did not ask about in-home visibility of fruits, vegetables, and high calorie snacks, our participants spent a higher percent of their grocery expenditures on empty calorie foods than they spent on fruits or vegetables independently.

Restaurant Visits

Five of our eight participant families (62.5%) submitted restaurant receipts. They averaged two restaurant visits per week, with weekly restaurant visits ranging from zero

to ten times over the eight weeks of data collection. Our findings are similar to Mackison, Wrieden, and Anderson's (2009) study in the United Kingdom ($n = 786$); they found nearly half (40%) of their participants ate out at least weekly. Similarly, in a study with children ($n = 6212$) ages 4 to 19 years in the U.S., nearly a third (30.3%) ate fast food the day of the survey (Bowman, Gortmaker, Ebbeling, Pereira, & Ludwig, 2004). Compared to children who did not eat fast food, children who ate fast food drank less milk and more sugar-sweetened beverages, and consumed fewer fruits and non-starchy vegetables and more total fat and carbohydrates. Bowman et al. (2004) estimated that children's fast food consumption could contribute a weight gain of 6 pounds per year. Although we did not study the relationship between children BMI z-scores and their families' frequency of eating out, this would be interesting to study longitudinally in the future. Each of these studies indicates that eating out is a ubiquitous pattern among families in United States and the United Kingdom. Because eating out is widespread, it is important to consider as a part of families' food environment.

Other researchers also found connections between fast food consumption and overweight and obesity. For example, Wilcox (2013) studied obese women ($n = 196$) ages 25 to 51 years, who were predominantly African-American (87%) and lived in financially disadvantaged neighborhoods. They found a significant positive correlation between the frequency of their participants' fast food intake and total caloric intake. Furthermore, Wilcox noted food obtained from fast food restaurants is often calorie dense and generally high in sodium, saturated fats, refined grains, and low in fruits and vegetables.

Comparison of Receipts and Dietary Recall

Our findings suggest there were some inconsistencies between our participants' recall of their dietary patterns and the receipts they submitted. Some participants reported eating out, but their family did not submit corresponding restaurant receipts. Other participants reported they had made no change in their eating habits, but their grocery store receipts indicated an increase in their purchase of vegetables and fruits. In one instance, a family quadrupled their purchase of fruits and increased their purchase of vegetables by five times. We do not know if the purchases made were just for their family or if they used the additional fruits and vegetables in another way, perhaps contributing food to an event, hosting a dinner party, or taking food to a neighbor. In hindsight, it would have been helpful to ask families if the food purchased that week was all to feed their families or if some of it was for other purposes. Nevertheless, collecting receipts and asking participants their dietary recall provided a more complete picture of their home environment than if we had used only one of these methods

Limitations

This study provides insight into the home food environments of NHPI families in Utah. No prior research was located that explored this important topic, so our results are foundational to understanding the strengths and challenges of this group's home food environments.

Nevertheless, our study has limitations. Even with a \$10 compensation for each submission of receipts, only two families submitted receipts for all eight weeks of data collection. Additionally, some participants recalled restaurant visits that were not substantiated with a receipt from the restaurant. Adult participants told us it was difficult

to remember to bring receipts when they came to the intervention sessions and reunion. Perhaps a reminder phone call, email, or text during the week and/or the day before might have improved receipt submission. Giving each family an envelope designed and designated for collection and return of receipts might also have helped participants remember to keep and submit receipts. Although we recognize our findings are limited by the inconsistencies in receipt submission from our eight participant families, our study provides a better reflection of NHPIs' home food environments than has been previously understood.

We faced other challenges related to the receipts that also limit our results. First, we had challenges with legibility of some receipts. Receipts were stored for nine months between data collection and data entry and analysis. Over this time, some of the receipts faded and were difficult to decipher. Other receipts had spills on them before the families submitted them; some spills blurred parts of receipt content. Second, despite our best efforts to identify all abbreviations or codes on receipts, we had to categorize some items as unidentified. Efforts to identify items with abbreviations or codes on receipts included internet searches as well as visits with and phone calls to grocery store managers. The growing use of emailed receipts in department stores might spread to grocery stores and restaurants. If that happens, asking participants to forward emailed receipts to the researcher might be an easier task for participants to remember and would eliminate difficulties related to spills on and fading of receipts.

Other challenges that limit our results relate to how families do their grocery shopping. We found it difficult to capture bulk food purchases over an eight week period. For example, five of eight families did not purchase items from the oil subcategory

during our study. This is likely because these items purchased infrequently and in bulk. Additionally, one family went on a vacation during the study and submitted their receipts. Although families go on vacations and these receipts reflect that, purchases made that week were likely quite different than they would have been if the family been at home.

We also recognize that a bias related social desirability could impact our results. It is possible that some families chose not to include all of their receipts, or perhaps any receipts from a given week, if they felt embarrassed about food items they purchased. One indication of this possibility is the restaurant visits some participants reported that were not corroborated with their families' submission of a receipt from the restaurant. Although we would expect this limitation to make our receipt data appear better than reality, 13.5% of the families' grocery store food expenditures were for empty-calorie foods and sugar-sweetened drinks, which was a higher percentage than they spent on the individual ChooseMyPlate categories of fruits (9.9%), grains (8.8%), vegetables (8.2%), or dairy (7.6%).

Practice Implications

When public health nurses and other healthcare providers understand a particular ethnic or cultural group's typical home food environments, it helps them tailor social marketing and family and community interventions to address that group's unique strengths and challenges. Although our sample is small, our study provides beginning insights into NHPIs' home food environments that previously have not been provided in the literature.

To help families improve their dietary patterns, nurses can explain the results of this study and foster curiosity in families about how their own food purchases would

compare to our findings. They can encourage families to track their own grocery and restaurant purchases over a couple of weeks and consider how well they are doing at purchasing healthy foods and avoiding empty calorie foods. Explaining the high cost and low nutritional value of empty calorie foods might also help people consider their own food purchases more closely. By limiting their purchase of empty calorie foods, families could spend more money on fruits and vegetables. Appealingly placed and easily accessible fruits and vegetables might help families increase their consumption of these important food items. We recommend fruits and vegetables be placed on fridge shelves at children's eye level rather than tucked away in the crisper drawer. Increased availability and visibility of fruits and vegetables can improve the home food environment and help children and adults more readily see and choose these healthy options.

Another consideration is that the quality and taste of fruits purchased on the mainland are different than fruits available in island locations. This difference might be a barrier to NHPIs eating pattern in the main land.

Research Implications

Studying home food environments is challenging. One method would be to do an inventory of the food in families' cupboard, refrigerator, freezer, and food storage. This method would provide a complete description of the home food environment at one point in time, but it would be time intensive, expensive, and intrusive of families' privacy. Compared to an exhaustive inventory of a family's kitchen, our eight-week study provided a less complete snapshot of NHPI families' home food environment. We recommend using at least a couple methods to try to get a more accurate reflection of

home food environments, such as asking dietary pattern questions and collecting grocery store and restaurant receipts.

We also recommend incorporating group discussions with participants during the intervention sessions about food purchases during the previous week. In this setting, participants could share ways they have incorporated more fruits and vegetables or reduced their purchases of empty calorie foods and drinks. By sharing ideas with each other, they might be more likely to try new healthy foods with their families and find culturally acceptable alternatives to empty calorie and calorie dense foods.

Conclusion

According to Golan and Weizman (2001), parents can positively influence their children's dietary patterns as they build and maintain healthy home food environments and model healthy dietary patterns. Although this framework is encouraging, relatively few studies have been conducted on home food environments, especially among NHPI families. Our study provides an important snapshot of NHPI families' home food environment as evidenced by their grocery and restaurant receipts and responses to recall questions about their dietary patterns. Public health nurses are uniquely positioned to help families assess and improve their home food environments. Our results can increase nurses' awareness of NHPIs' typical food purchases and dietary patterns, enabling them to more effectively educate NHPIs and help them assess and improve their home food environments.

References

- Bandura, A. (1998). Health promotion from the perspective of social cognitive theory. *Psychology & Health, 13*(4), 623-649. doi: 10.1080/08870449808407422
- Bowman, S., Gortmaker, S., Ebbeling, C., Pereira, M., & Ludwig, D. (2004). Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. *Pediatrics, 113*(1 Part 1), 112-118.
- Centers for Disease Control and Prevention. (2011a). *About BMI for adults*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
- Centers for Disease Control and Prevention. (2011b). *About BMI for children and teens*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html
- Cullen, K., Baranowski, T., Watson, K., Nicklas, T., Fisher, J., O'donnell, S., Missaghian, M. (2007). Food category purchases vary by household education and race/ethnicity: Results from grocery receipts. *Journal of the American Dietetic Association, 107*(10), 1747-1752.
- Dammann, K., & Smith, C. (2010). Food-related attitudes and behaviors at home, school, and restaurants: Perspectives from racially diverse, urban, low-income, 9- to 13-year-old children in Minnesota. *Journal of Nutrition Education & Behavior, 42*(6), 389-397.
- Golan, M., & Weizman, A. (2001). Familial approach to the treatment of childhood obesity: Conceptual model. *Journal of Nutrition Education, 33*(2), 102-107.

- Hughes, C. C., Sherman, S. N., & Whitaker, R. C. (2010). How low-income mothers with overweigh preschool children make sense of obesity. *Qualitative Health Research, 20*(4), 465-478. doi: 10.1177/1049732310361246
- Kegler, M. C., Alcantara, I., Haardörfer, R., Gazmararian, J. A., Ballard, D., & Sabbs, D. (2014). The influence of home food environments on eating behaviors of overweight and obese women. *Journal of Nutrition Education & Behavior, 46*(3), 188-196.
- Kristal, A., Goldenhar, L., Muldoon, J., & Morton, R. (1997). Evaluation of a supermarket intervention to increase consumption of fruits and vegetables. *American Journal of Health Promotion, 11*(6), 422-425.
- Kumanyika, S. K. (2006). Targeting interventions for ethnic minority and low-income population. *The Future of Children, 16*(1), 187-207.
- Lassetter, J. H., Van Tassell, K., Wisco, J., Brown, L. B., & Fitisemanu, J. (in review). A family-focused intervention to prevent obesity in Native Hawaiian and Pacific Islander children:
A pilot study.
- Lassetter, J. H. (2011). The integral role of food in Native Hawaiian migrants' perceptions of health and well-being. *Journal of Transcultural Nursing, 22*(1), 63-70. doi:10.1177/1043659610387153.
- Mackison, D., Wrieden, W., & Anderson, A. (2009). Making an informed choice in the catering environment: What do consumers want to know? *Journal of Human Nutrition & Dietetics, 22*(6), 567-573. doi:10.1111/j.1365-277X.2009.01000.x

Shabbir, S., Kwan, D., Wang, M. C., Shih, M., & Simon, P. A. (2010). Asians and Pacific Islanders and the growing childhood obesity epidemic. *Ethnicity & Disease*, 20(2), 129-135.

Sisk, C., Sharkey, J. R., McIntosh, W. A., & Anding, J. (2010). Using multiple household food inventories to measure food availability in the home over 30 days: A pilot study. *Nutrition Journal*, 919. doi:10.1186/1475-2891-9-19.

United States Department of Agriculture. (2014). *Make easy and healthy family meals*.

Retrieved from

http://www.choosemyplate.gov/downloads/MyPlateForMyFamily-ParticipantHandouts_English.pdf

United States Department of Agriculture. (n.d.). *Food groups*. Retrieved from,

<http://www.choosemyplate.gov/food-groups>