Published in final edited form as:

J Immigr Minor Health. 2012 December ; 14(6): 1014–1022. doi:10.1007/s10903-012-9575-9.

Ethnic differences in the home food environment and parental food practices among families of low-income Hispanic and African American preschoolers

Katherine Skala^{1,2}, Ru-Jye Chuang^{1,2}, Alexandra Evans^{2,3}, Ann-Marie Hedberg^{1,2}, Jayna Dave⁴, and Shreeela Sharma^{1,2}

¹University of Texas Health Science Center, School of Public Health, Houston, TX 77030

²Michael and Susan Dell Center for Healthy Living, Houston, TX 77030

³University of Texas Health Science Center, School of Public Health Austin Regional Campus, Austin, Texas

⁴USDA.ARS Children's Nutrition Research Center, Baylor College of Medicine, Houston, TX

Abstract

The family and home environment are important in shaping the dietary patterns of children, yet research among low-income, minority groups is limited. We examined ethnic differences in the home food environment and parental practices among 706 low-income, African-American and Hispanic families of preschoolers. Questionnaires measured the access and availability of various foods in the home, parental practices, and meal consumption behaviors. Mixed model logistic regression and ANCOVA were used to assess ethnic differences. Unhealthy foods were available for both groups. Hispanic families were more likely to have fresh vegetables (AOR = 2.9, P = 0.001), fruit (AOR = 2.0, P = 0.004), and soda available (AOR = 1.40, P = 0.001) compared to African-Americans. African-Americans families were more likely to restrict (AOR = 0.63, P = 0.001) and reward with dessert (AOR = 0.69, P = 0.001). Hispanic families consumed more family meals together (P = 0.003) and less meals in front of the television (P = 0.006). Health promotion interventions should consider the behavioral differences between ethnicities.

Keywords

Early childhood; family health; nutrition; obesity; minority populations

INTRODUCTION

Nearly one out of four children aged 2-5 years old in the U.S. are overweight or obese [1], with Hispanic, African American and low-income populations at an even higher risk [1-3]. Furthermore, states located in the Southern Region such as Texas exhibit an even higher prevalence of childhood obesity which disproportionately affects ethnic minorities within this region [4] and points to a critical health disparity.

Children's dietary patterns are developed at a very young age and heavily influenced by the parent and home environment [5]. Evidence supports the role of children's diet, specifically high intake of energy-dense foods and low intake of fruits, vegetables (F&V) and whole

grains, in the development of childhood obesity [6]. Although studies reveal that the availability and accessibility of F&V in the home is strongly related to F&V consumption among children [7-10], little is currently known about the availability and accessibility of healthy/unhealthy foods in the homes of preschool aged children from low-income, minority populations.

In addition to availability and accessibility of healthy foods, parents play an important role in the home and shaping children's dietary habits. Parental modeling of healthy eating is an important determinant of F&V consumption among children [10,11]. Parental feeding style is also an important predictor of dietary behaviors among children [11] and can be classified into: a) authoritarian (restricting the child's food or forcing the child to eat certain foods), b) permissive (child is allowed to eat whatever they want), and c) authoritative (child is encouraged to eat healthy foods but also given some choice) [12,13]. Authoritarian behaviors (also referred to as parental control or food rules) regarding food have been shown to increase risk for obesity in children [14,15] and be negatively associated with the availability of F&V and child's consumption of F&V [13]. Parental permissiveness has also been found to be positively associated with consumption of unhealthy foods [16]. Authoritative behaviors, the most optimal feeding style, have been positively associated with the availability and consumption of F&V [13].

Family meals offer a time for parent-child interaction that may improve healthy eating habits [14, 17]. Children who eat more meals together with their families have healthier diets [18-21], and are at a reduced risk for obesity [21-23]. Conversely, the inclusion of television within the family meal environment has been associated increased caffeine, salty snack, and soda consumption and decreased F&V intake among children [24,25].

Previous research has identified a variation between the feeding styles of African American and Hispanic parents due to cultural factors [26-28], yet limited research has examined these differences in a population of low-income families of preschoolers who are at high risk for obesity. Evaluating the home food environment in an ethnic-specific manner in low-income populations will provide useful information for the future development of culturally tailored interventions in a population that is traditionally underserved. The first objective of this paper is to describe the home food environment, food-related parental practices, and family meal behaviors in a cohort of low-income Hispanic and African American preschool-age children and their parents. Secondly, we will examine the ethnic differences in the home food environment, parental practices, and meal consumption behaviors.

METHODS

This cross-sectional study is a secondary analysis of baseline data collected during the 2008-2009 school year. Approval for the study was obtained from the Committee for the Protection of Human Subjects at the University of Texas Health Science Center at Houston and the Institutional Review Board at the Harris County Department of Education (HCDE).

Sample

Participants in this study were part of a larger cross-sectional study that evaluated the demographic characteristics, dietary intake, food related parenting practices, and home environment of children enrolled in HCDE Head Start. Data were collected from Hispanic and African American parents or guardians who had a child enrolled in one of 16 Head Start Centers from HCDE in Harris County. Out of 1,170 (93% mothers) parents/caregivers that were invited to participate, 774 consented to the study (response rate=66.2%). 381 Hispanic and 325 African Americans consented and completed surveys during the annual HCDE Head Start open enrollment. In order to examine the ethnic differences focusing on Hispanic

and African-Americans, 68 participants (non-Hispanic white, other, and missing ethnicity) were excluded. No incentives were provided for participation.

Data Collection Measures

The survey instrument used to measure the home food environment (e.g. food access/availability), parental practices (parental modeling and feeding styles), and meal consumption behaviors was a modified version of the Healthy Home Survey [29]. The Healthy Home Survey [29] is a 113 item questionnaire that measures characteristics of the home environment that are hypothesized to influence healthy weight behaviors in children including diet and physical activity. Survey items demonstrated acceptable reliability and validity using in-home observations among a sample of 85 families (see table 1) [29].

For the parent study, the Healthy Home Survey was abbreviated to 61 items to reduce parent respondent burden since preliminary focus groups with a small sample of HCDE Head Start parents revealed that the respondent burden was high due to survey length and, to reduce overlap with other questions that were included in other instruments. The items that were not included in this version were specific demographic characteristics that overlapped with a standard HCDE Nutrition Screening form and, the Health Behavior section which included questions on dieting practices, gym membership and gym-related activities, family medical history, smoking habits, and use of cable and satellite T.V. at home. For this analysis, 26 items that assessed the home environment, food-related parental practices, and meal consumption behaviors were analyzed. Table 1 presents the items, percent agreement based on the original study [29], and possible responses for each question. Responses on parental practices were collapsed into dichotomous responses/variables (rarely/never and; some of the time/all of the time) for analysis.

The survey was self-administered to the parents at the Head Start centers during the registration period and took 30-45 minutes to complete. The survey was written at the fourth grade reading level and was available in English and Spanish. The survey was translated by two independent Spanish translators and forward and backward translation from English to Spanish was conducted to ensure accuracy.

Additional demographic data and participant characteristics (e.g. language spoken at home, food assistance use, child gender, parent height and weight) were ascertained from a standard self-reported HCDE screening form which is administered to all Head Start parents during the registration period.

Data Analysis

All analyses were conducted using SPSS 16.0 (Chicago, IL) and STATA 12.0 (College Station, TX). The overall sample included 54.0% Hispanics (n=381) and 46.0% African Americans (n=325). Less than 5% of the data was missing for main variables. Mean, SD, and frequency distributions were conducted to describe the parent and child demographic characteristics, the home environment, and parental practices and stratified by ethnicity. Parental body mass index (BMI) was determined from self-reported height and weight using the formula $BMI = \text{weight (kilograms)} / \text{height(meters)}^2$ [30]. Parental weight status was further determined with BMI <18.5 as underweight, BMI 18.5 to 24.9 as normal weight, BMI 25.0 to 29.9 as overweight and BMI 30 as obese [30]. Hierarchical two-level logistic regression was used to determine the differences in the home environment and parental practices (dependent variables) by ethnicity (independent variable; comparison group=African American). Mixed models were used to account for the non-independencies between Head Start Centers because the parents and children were nested within the center they attend [31]. Demographic variables that varied significantly by ethnicity (home type,

relationship with the child, and parental employment status) were identified as covariates for the full model. Maternal BMI and participation in food assistance programs were evaluated as a potential covariates but were not found to be significant confounders and therefore omitted from the regression model. Adjusted odds ratios, 95% confidence intervals and p-values were determined. ANCOVA was used to calculate the mean difference in the number of days meals are consumed in various locations between ethnicities. Significance was considered at the P 0.05 level.

RESULTS

Sample (Table 2)

All participants in this study were at or below the poverty level (families enrolled in Head Start must meet the 2011 Federal Poverty Income Guidelines [32]) with 67.8% participating in food assistance programs. No ethnic differences were seen for participation in food assistance programs. Most respondents were mothers (92.9%). 74.0% of African Americans and 76.2% of Hispanics were overweight or obese (BMI ≥ 30). Nearly 60% of African-American participants lived in apartments whereas most Hispanics (50.9%) lived in detached homes ($P<0.001$). Significantly more African-American parents had a full-time job (39.9%) whereas more Hispanic parents stayed at home (65.0%, $P<0.001$).

Home food environment (Table 3)

Overall, most participants reported having fresh F&V available at home (F: 94.5%; V: 88.9%). Results of the logistic regression analysis showed that Hispanics were twice as likely to have fresh fruit (AOR=2.00, CI: 1.25, 3.20) and three times as likely to have fresh vegetables (AOR=2.90, CI: 1.99, 4.24) compared to African Americans. Hispanics were also more likely to have fresh fruit displayed in the open (AOR=1.81, CI: 1.46, 2.23) and ready to eat fresh vegetables available (AOR=1.23, 95% CI: 1.03, 1.48). In contrast, African Americans were more likely to have frozen vegetables (AOR=0.60, CI: 0.50, 0.73).

Hispanics were 40% more likely to have soda available in the home as compared to African Americans (AOR= 1.40, CI: 1.17, 1.68). The majority of both groups reported having unhealthy foods including salty snacks, and sweets (53.2-84.7%) Hispanics were moderately less likely to have sweet snacks available (AOR=0.76, CI: 0.61, 0.95) yet no ethnic differences were seen for candy or salty snacks.

Parental Food-Related Practices (Table 4)

Modeling healthy eating behaviors was common among both groups (African American: 91.7%, Hispanic: 94.1%). African American parents were more likely restrict (AOR=0.63, CI: 0.52, 0.77) and reward with dessert (AOR=0.69, CI: 0.57, 0.83). Additionally, two-thirds of African Americans report rarely or never allowing children to help themselves to snacks (65.9%). A high percentage of the sample report asking children to eat everything on their plate (African American: 91.4%, Hispanic: 92.2%).

Meal Consumption Behaviors (Table 5)

Overall, a higher percent of Hispanic parents reported more family-oriented patterns of meal consumption as compared to African Americans. Hispanic parents ate dinner together 1 additional day/week compared to African Americans (mean dif=0.99, P 0.001). Hispanic parents also reported their preschooler spending significantly less days consuming breakfast (mean dif=0.54, P 0.001), lunch (mean dif=0.66, $P<0.001$) and dinner (mean dif=0.85, $P<0.001$) in front of the television compared to African American parents.

DISCUSSION

Our study revealed significant ethnic differences in the home food environment of low-income preschool families. To our knowledge, this study is the first to evaluate ethnic differences in the home food environment of preschoolers from low-income, minority populations. Overall, Hispanic parents have higher availability and accessibility of fresh F&V and more family oriented meal patterns as compared to African American parents whereas African American parents are shown to be more restrictive and rewarding. Prior studies have emphasized the importance of addressing the home food environment of preschoolers [33]; however, these findings underscore the importance developing interventions targeting dietary change in an ethnic-specific manner. Our findings showed overall high availability and accessibility of F&V in the study population with Hispanics being more likely to have fresh F&V available and accessible. These results are consistent with previous studies which report that Hispanics have high access and availability to F&V in the home [34] and prefer fresh F&V to canned or frozen [35]. Studies among children and adolescents report that both availability and accessibility are correlated with consumption of F&V [8, 9, 36, 37]. The visual display of fruits is also important; prior research has demonstrated that consumption of fruits and vegetables among children may be influenced by the degree to which foods are in plain view and are ready to eat [38]. We found a relatively low accessibility of fruits and vegetables among African American families. This may be explained by previous studies which have reported that while African Americans believe fresh produce is healthier, they often purchase canned or frozen due to extended shelf life, convenience, and cost [39]. Educational programming, especially among African Americans, should emphasize the importance of accessibility to F&V especially in young children in order to promote consumption.

Our study showed a high availability of various unhealthy foods such as sweets, candy and soda across both ethnicities. Research suggests the availability of these foods is positively correlated with increased consumption of these foods which, in turn, are associated with obesity among adolescents [36, 40]. More research is needed, however, to assess these associations among the early childhood population. Since energy density of food is known to be inversely related to cost [41], high-calorie, unhealthy items may be an attractive option for low-income families. In addition to family –level interventions, policy interventions which improve access and affordability of healthy foods in low-income populations should be an important consideration for future research.

Hispanics were more likely to have soda in the home as compared to their African American counterparts. High rates of soda consumption among Mexican-American 2-year olds have been reported and found to be significantly associated with obesity [42, 43]. One possible explanation for the increased odds for soda availability among Hispanics seen in our study may be that African Americans may be more likely to purchase and drink other sweetened drinks such as fruit punch. Story et al. found that on average, African American males and females of all ages consume significantly more sweetened fruit drinks than any other ethnic group [44]. However, our study did not collect data on availability of other sugar sweetened beverages at home which is a limitation. Future studies need to explore the accessibility, availability and intake of different types of sugar-sweetened beverages and diet drinks in this preschool population.

Parental food-related practices have important implications on eating behaviors of their children. Within the African American sample, we also identified a propensity to use authoritarian practices such as restricting or rewarding dessert. This is consistent with previous research suggesting that African American families display more authoritarian characteristics related to food behaviors [27, 28]. These authoritarian behaviors have been

shown to be inversely related to consumption of F&V [15]. In contrast Hispanic families have been cited to be more permissive in their food parenting practices [45]. Given the high prevalence of overweight and obesity among African American and Hispanic children [1], it is important to take these feeding styles into account when developing effective obesity prevention strategies.

Our study also showed significant ethnic differences displayed in family meal patterns with a greater percentage of Hispanic preschoolers reportedly eating dinners with their families as compared to African Americans. Family meal consumption behaviors are important in that they have been reported to positively influence the psychosocial well-being of children [46], the consumption of F&V among children during these meals [19,21], and reduce the risk of obesity [21,23]. The ethnic differences seen in our study is consistent with the trend reported in a recent study by Anderson et al., who reported that 55% of Hispanic families eat dinner as a family 5 times per week compared to 46.1% of African Americans [23]. Studies have also shown that television watching during meal times is associated with poor dietary intake and obesity among children [22, 25]. African American families in our study displayed a greater percentage of all meals consumed in front of the television compared to Hispanics. Coon et al reported that the dietary patterns of children from families that watch television during meals consumed more unhealthy foods and less F&V [24]. Additional research is needed among these ethnic groups to further explore the causes of disparity observed for the meal consumption practices. Since the inclusion of television during meal time is known to be associated with unhealthy dietary patterns, strategies to reduce TV time during meals and promote eating meals together with the family should be specifically targeted.

In summary, our study reveals several factors related to the home food environment and parental food-related practices that are ethnically distinct for low-income Hispanic and African American families of preschoolers. These results indicate that ethnicity should be a critical consideration in developing interventions that target the home food environment and parental food-related practices. While some behaviors such as asking children to eat everything on their plate were common among both groups and should be addressed in nutrition education interventions, programs targeted towards African American families should place specific emphasis on reducing television watching during meal time and increasing the number of family meals consumed together. Additionally, strategies for African American families to increase fresh fruits and vegetables in the home should be integrated into nutrition programming. For Hispanics, nutrition education programming should specifically target the consequences of high soda consumption and teach strategies to replace soda with more nutritionally beneficial alternatives such as 100% fruit juice.

Strengths and Limitations

This study expands our understanding of the home food environment and food-related behaviors in a sample of low-income minority families of preschoolers. The relatively high response rate compared to previous studies among this population [47] and large sample adds to the strength of the study. The study specifically examines the differences between Hispanic and African American parents in order to elucidate specific behavioral factors in a population of all low-income families of preschoolers which has not previously been examined. Understanding these behaviors from an ethnic perspective in a population at highest risk for obesity will allow practitioners to better tailor future interventions to accommodate these groups in addressing this disease epidemic.

This study is limited in that it is cross-sectional and therefore, causality cannot be examined. Secondly, our data were obtained using a convenience sample and may present selection bias. While the original Healthy Home Survey has been validated amongst a sample of mostly Caucasian and African American families, we did not further validate the modified

Healthy Home survey. However, efforts are currently underway to validate this instrument in a low-income minority population. Additionally, social desirability may affect the extent to which families report (un)healthy behaviors in the home. This method, however, was most feasible among this mobile population because they were less receptive to more objective methods such as home visits for direct observation. Finally, we did not collect data on parental education level which could be a potential confounder of the differences observed between ethnicities.

The findings presented in this study indicate the implicit ethnic differences that exist in the food related behaviors among families of preschoolers from minority groups. To date, there is limited data in understanding the food-related behaviors of specific ethnic groups which allow practitioners to better tailor their interventions. Future research should investigate the associations between these parental practices and preschooler's dietary intake behaviors and their weight status by ethnicity.

Acknowledgments

We would like to recognize the authors and developers of the original Healthy Home Survey, Maria J. Bryant, Dianne Ward, Derek Hales, Amber Vaughn, Rachael Tabak, and June Stevens. This survey was modified for use in this study.

We would also like to acknowledge the Michael & Susan Dell Center for Healthy Living, HCDE Head Start director Ms Venetia Peacock, HCDE Head Start Health Services Manager Ms. Gulshan Rahman and all HCDE Head Start center managers and staff for their support. We would also like to acknowledge the data collectors and data entry staff who made this manuscript possible.

This work was supported by funding from the Michael and Susan Dell Center for Healthy Living, the University of Texas, School of Public Health; and the Pre-doctoral Fellowship, University of Texas School of Public Health Cancer Education and Career Development Program-National Cancer Institute/NIH [Grant #2 R25 CA57712]

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Cancer Institute of the National Institutes of Health.

REFERENCES

1. Ogden C, Carroll M, Curtin L, et al. Prevalence of high body mass index in US children and adolescents: 2007-2008. *J Am Med Assoc.* 2010; 303:242-249.
2. Wang Y, Beydoun MA. The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiol Rev.* 2007; 29:6-28. [PubMed: 17510091]
3. Lutfiyya MN, Garcia R, Dankwa CM, et al. Overweight and obese prevalence rates in African American and Hispanic children: An analysis of data from the 2003-2004 national survey of children's health. *J Am Board Fam Med.* 2008; 21:191-199. [PubMed: 18467530]
4. Hoelscher D, Day S, Lee E, et al. Measuring the prevalence of overweight in Texas schoolchildren. *Am J Public Health.* 2004; 94:1002-1008. [PubMed: 15249306]
5. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. *Pediatrics.* 1998; 101:539-549. [PubMed: 12224660]
6. Davis MM, Gance-Cleveland B, Hassink S, et al. Recommendations for prevention of childhood obesity. *Pediatrics.* 2007; 120:S229-S253. [PubMed: 18055653]
7. O'Connor TM, Hughes SO, Watson KB, et al. Parenting practices are associated with fruit and vegetable consumption in pre-school children. *Public Health Nutr.* 2010; 13:91-101. [PubMed: 19490734]
8. Hearn MD, Baranowski T, Baranowski J, et al. Environmental influences on dietary behavior among children: Availability and accessibility of fruits and vegetables enable consumption. *J Health Educ.* 1998; 29:26-32.

9. Baranowski T, Cullen KW, Baranowski J. Psychosocial correlates of dietary intake: Advancing dietary intervention. *Annu Rev Nutr.* 1999; 19:17–40. [PubMed: 10448515]
10. Cooke LJ, Wardle J, Gibson EL, et al. Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. *Public Health Nutr.* 2004; 7:295–302. [PubMed: 15003137]
11. Dave JM, Evans AE, Pfeiffer KA, et al. Correlates of availability and accessibility of fruits and vegetables in homes of low-income Hispanic families. *Health Educ Res.* 2009; 25:97–108. [PubMed: 19654221]
12. Birch, LL.; Fisher, JO. Appetite and eating behavior in children. In: Gaull, GE., editor. *The Pediatric Clinics of North America: Pediatric Nutrition.* W.B. Saunders; Philadelphia, PA: 1995. p. 931-953.
13. Patrick H, Nicklas TA, Hughes SO, Morales M. The benefits of authoritative feeding style: Caregiver feeding styles and children's food consumption patterns. *Appetite.* 2005; 44:243–249. [PubMed: 15808898]
14. Birch LL, Fisher JO, Davison KK. Learning to overeat: Maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr.* 2003; 78:215–220. [PubMed: 12885700]
15. Wardle J, Carnell S, Cooke L. Parental control over feeding and children's fruit and vegetable intake: How are they related? *J Am Diet Assoc.* 2005; 105:227–232. [PubMed: 15668680]
16. De Bourdeaudhuij I. Family food rules and healthy eating in adolescents. *J Health Psycho.* 1997; 2:45–56.
17. Spruijt-Metz D, Lindquist CH, Birch LL, et al. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr.* 2002; 75:581–586. [PubMed: 11864866]
18. Gillman MW, Rifas-Shiman SL, Frazier AL, et al. Family dinner and diet quality among older children and adolescents. *Arch Fam Med.* 2000; 9:235–240. [PubMed: 10728109]
19. Videon TM, Manning CK. Influences on adolescent eating patterns: The importance of family meals. *J Adolescent health.* 2003; 32:365–373.
20. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr.* 2005; 24:83–92. [PubMed: 15798074]
21. Hammons AJ, Fiese BH. Is Frequency of Shared Family Meals Related to the Nutritional Health of Children and Adolescents? *Pediatrics.* 2011; 127:e1565. [PubMed: 21536618]
22. Gable S, Chang Y, Krull JL. Television watching and frequency of family meals are predictive of overweight onset and persistence in a national sample of school-aged children. *J Am Diet Assoc.* 2007; 107:53–61. [PubMed: 17197271]
23. Anderson SE, Whitaker RC. Household routines and obesity in US preschool-aged children. *Pediatrics.* 2010; 125:420–428. [PubMed: 20142280]
24. Coon KA, Goldberg J, Rogers BL, Tucker KL. Relationships between use of television during meals and children's food consumption patterns. *Pediatrics.* 2001; 107:e7. [PubMed: 11134471]
25. Feldman S, Eisenberg ME, Neumark-Sztainer D, Story M. Associations between watching TV during family meals and dietary intake among adolescents. *J Nutr Educ Behav.* 2007; 39:257–263. [PubMed: 17826345]
26. Hughes SO, Anderson CB, Power TG, et al. Measuring feeding in low-income African-American and Hispanic parents. *Appetite.* 2006; 46:215–223. [PubMed: 16504340]
27. Baumrind, D. The development of instrumental competence through socialization. In: Pick, A., editor. *Minnesota Symposium on Child Psychology.* University of Minnesota Press; Minneapolis: 1973.
28. Iannotti RJ, O'Brien RW, Spillman DM. Parental and peer influences on food consumption of preschool African-American children. *Percept Mot Skills.* 1994; 79:747–752. [PubMed: 7870497]
29. Bryant MJ, Ward DS, Hales D, et al. Reliability and validity of the healthy home survey: A tool to measure factors within homes hypothesized to relate to overweight in children. *Int J Behav Nutr Phys Act.* 2008; 5:23. [PubMed: 18442392]
30. Centers for Disease Control and Prevention (CDC). [accessed Feb 9, 2008] Defining Overweight and Obesity. <http://www.cdc.gov/nccdphp/dnpa/obesity/defining.htm>

31. Murray, DM. Design and analysis of group-randomized trials. Oxford University Press; USA: 1998.
32. U.S. Department of Health and Human Services. [accessed May 26, 2011] The 2011 HHS Poverty Guidelines. <http://aspe.hhs.gov/poverty/11poverty.shtml>
33. Strauss RS, Knight J. Influence of the home environment on the development of obesity in children. *Pediatrics*. 1999; 103(6):e85. [PubMed: 10353982]
34. Thompson B, Coronado GD, Solomon CC, et al. Cancer prevention behaviors and socioeconomic status among Hispanics and non-Hispanic whites in a rural population in the United States. *Cancer Cause Control*. 2002; 13:719–728.
35. Yeh MC, Ickes SB, Lowenstein LM, et al. Understanding barriers and facilitators of fruit and vegetable consumption among a diverse multi-ethnic population in the USA. *Health Promot Internation*. 2008; 23:42–51.
36. Haerens L, Craeynest M, Deforche B, et al. The contribution of psychosocial and home environmental factors in explaining eating behaviours in adolescents. *Eur J Clin Nutr*. 2007; 62:51–59. [PubMed: 17299461]
37. Cullen KW, Baranowski T, Owens E, et al. Availability, accessibility, and preferences for fruit, 100% fruit juice, and vegetables influence children's dietary behavior. *Health Educ Behav*. 2003; 30:615–626. [PubMed: 14582601]
38. Befort C, Kaur H, Nollen N, et al. Fruit, vegetable, and fat intake among non-Hispanic black and non-Hispanic white adolescents: Associations with home availability and food consumption settings. *J Am Diet Assoc*. 2006; 106:367–373. [PubMed: 16503225]
39. Hildebrand DA, Shriver LH. A quantitative and qualitative approach to understanding fruit and vegetable availability in low-income African-American families with children enrolled in an urban head start program. *J Am Diet Assoc*. 2010; 110:710–718. [PubMed: 20430132]
40. Campbell KJ, Crawford DA, Salmon J, et al. Associations between the home food environment and obesity-promoting eating behaviors in Adolescence. *Obesity*. 2007; 15:719–730. [PubMed: 17372323]
41. Drewnowski A. Obesity and the food environment: Dietary energy density and diet costs. *Am J Prev Med*. 2004; 27:154–162. [PubMed: 15450626]
42. Warner ML, Harley K, Bradman A, et al. Soda consumption and overweight status of 2-year-old Mexican-American children in California. *Obesity*. 2006; 14:1966–1974. [PubMed: 17135613]
43. Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity: A prospective, observational analysis. *Lancet*. 2001; 357:505–508. [PubMed: 11229668]
44. Storey ML, Forshee RA, Anderson PA. Beverage consumption in the US population. *J Am Diet Assoc*. 2006; 106:1992–2000. [PubMed: 17126630]
45. Garcia SE, Kaiser LL, Dewey KG. The relationship of eating frequency and caloric density to energy intake among rural Mexican preschool children. *Eur J Clin Nutr*. 1990; 44:381–387. [PubMed: 2387272]
46. Eisenberg ME, Olson RE, Neumark-Sztainer D, et al. Correlations between family meals and psychosocial well-being among adolescents. *Arch Pediatr Adol Med*. 2004; 158:792–796.
47. Vargas CM, Monajemy N, Khurana P, Tinanoff N. Oral health status of preschool children attending head start in Maryland, 2000. *Pediatr Dent*. 2002; 24:257–263. [PubMed: 12064502]

Table 1

Selected items measuring self-reported availability and accessibility, parental practices, and meal consumption behaviors from the Healthy Home Survey and their reproducibility

Item	% Agreement	Possible responses
Availability ^a		
In your home, do you have....		Yes, No, I don't know
Fresh fruit?	93.2	
Canned fruit?	86.7	
Frozen Fruit?	93.3	
Fresh vegetables?	93.3	
Canned vegetables?	95.6	
Frozen vegetables?	95.6	
Salty Snacks?	95.6	
Sweet Snacks?	95.6	
Candy?	88.6	
Soda?	84.4	
Accessibility ^b		
Can you see fresh fruit in your home now; displayed out in the open?	81.8	Never, Rarely, Sometimes, Mostly, Always
Do you have any ready to eat fresh vegetables on a shelf in the refrigerator or on the kitchen counter now?	79.1	
Restriction ^b		
Do you restrict dessert if your child does not eat the food on their plate at dinner	53.3	Never, Rarely, Sometimes, Mostly, Always
Rewarding ^b		
Do you reward your child with desserts, snacks or candy if they finish foods from their plate at dinner?	55.6	Never, Rarely, Sometimes, Mostly, Always
Food Rules ^b		
Do you ask your child to eat everything on their plate at dinner?	75.5	Never, Rarely, Sometimes, Mostly, Always
Do you allow your child to help themselves to snacks, including salty and sweet snacks, or candy when they are at home?	68.9	
Modeling ^b		
Do you ever avoid eating savory or sweet snacks, candy or soda in front of your child?	57.8	Never, Rarely, Sometimes, Mostly, Always
When eating in front of your child, do you try to eat healthy?	66.7	
Meal Location/Behavior ^b		

Item	% Agreement	Possible responses
How many days a week does your child...		0-7 days
Eat a family dinner together at home?	75.6	
Eat dinner outside the home?	65.9	
Eat breakfast at school?	77.8	
Eat breakfast at home?	88.9	
Eat breakfast in front of the TV?	64.4	
Eat lunch in front of the TV	77.8	
Eat dinner in front of the TV?	73.3	
Eat snacks in front of the TV?	60.0	

^aBryant et al. [29]; percent agreement based on in home observations among 81 families

^bBryant et al [29]; percent agreement based on test-retest reliability among 45 families (14 days after initial survey)

Table 2

Demographic characteristics of the sample

	N	%	African American		Hispanic		P
			N	%	n	%	
Ethnicity	706						
African American	325	46.03					
Hispanic	381	53.97					
Child's gender	704						0.229
Male	351	49.86	170	52.31	181	47.76	
Female	353	50.14	155	47.69	198	52.24	
Relationship with Child	638	--	302	--	336	--	0.006
Mother	593	92.9	271	89.7	322	95.8	--
Father	17	2.7	8	2.6	9	2.7	--
Grandmother	14	2.2	12	4.0	2	0.6	--
Grandfather	3	0.5	2	0.7	1	0.3	--
Other (aunt, legal guardian, foster parent)	11	1.7	9	3.0	2	0.6	--
Home Type	693						<0.001*
Apartment	313	45.17	191	59.69	122	32.71	
Mobile Home/Duplex	107	15.44	46	14.37	61	16.35	
Detached Home	273	39.39	83	25.94	190	50.94	
Occupation	682						<0.001*
Full Time	186	27.27	125	39.87	61	16.71	
Part Time	90	13.20	22	7.07	68	18.33	
Stay at Home	406	59.53	165	53.05	241	64.96	

	N	%	African American		Hispanic		<i>P</i>
			N	%	n	%	
Parent Weight Status ^a	445						0.066
Under to Normal weight (BMI 24.9)	111	24.94	60	25.97	51	23.83	
Overweight (BMI: 25-29.9)	155	34.83	69	29.87	86	40.19	
Obese (BMI ≥ 30)	179	40.23	102	44.16	77	35.98	
Parent Mean BMI ^a	N	Mean	n	Mean	n	Mean	<i>P</i>
	445	30.0	231	31.0	214	29.0	0.016*

* Statistically significant at *P* = 0.05 using Pearson's chi-square test.

^a Parental weight status based upon BMI cut points for adults by the Centers for Disease Control and Prevention [30].

Table 3

Frequency and adjusted odds ratios of the availability and accessibility of healthy and unhealthy foods in the homes for African American and Hispanic families of preschoolers

	Ethnicity				Adjusted OR ^c (95% CI)	P
	Total N ^a	n ^b (% ^c)	African American	Hispanic		
Have fresh fruit in the home	688	285(91.1)	363(97.3)	2.00 (1.25, 3.20)	0.004 *	
Have fresh fruit displayed in the open	681	190(61.3)	311(85.7)	1.81 (1.46, 2.23)	<0.001 *	
Have canned fruit in the home	687	228(72.8)	238(64.3)	0.86 (0.71, 1.04)	0.117	
Have frozen fruit in the home	694	43(13.5)	44(11.8)	1.01 (0.78, 1.30)	0.947	
Have fresh vegetables in the home	696	251(78.9)	363(97.3)	2.90 (1.99, 4.24)	<0.001 *	
Have ready to eat fresh vegetables in the refrigerator or displayed in the open	685	168(53.5)	243(66.9)	1.23 (1.03, 1.48)	0.023 *	
Have canned vegetables in the home	686	271(86.0)	270(73.4)	0.71 (0.56, 0.89)	0.003 *	
Have frozen vegetables in the home	672	194(63.4)	142(38.9)	0.60 (0.50, 0.73)	<0.001 *	
Have salty snacks available	684	221(70.4)	249(67.8)	0.98 (0.81, 1.18)	0.802	
Have sweets available	678	263(85.1)	275(75.8)	0.76 (0.61, 0.95)	0.017 *	
Have candy available	691	164(52.2)	206(56.1)	0.98 (0.81, 1.20)	0.874	
Have soda available	694	163(50.9)	252(67.6)	1.40 (1.17, 1.68)	0.001 *	

^{*} statistically significant at the *P* 0.05

^aValues represented are the total number of respondents

^bValues represented are the total number of respondents that answered "yes" to having that food item in the home

^cValues represented are the percent that responded yes within ethnicity Adjusted OR's and Adjusted Coefficient are calculated using hierarchical logistic regression model and controlling home type, parental employment status, and relationship with child as covariates and, with center as random effect. Yes=1, No=0; African American=0, Hispanic=1

Table 4

Frequency and adjusted odds ratios of food-related parental practices for African American and Hispanic families of preschoolers

	African American	Hispanic	Adjusted OR* (95% CI)	P
	n (%)	n (%)		
Frequency children asked to eat everything on plate	324 (46.6)	372 (53.2)	1.01 (0.74, 1.40)	0.906
Never or rarely	28 (8.6)	29 (7.8)		
Some to all of the time	296 (91.4)	343 (92.2)		
Frequency dessert restricted if children don't eat the food on their plate	321 (46.7)	367 (53.3)	0.63 (0.52, 0.77)	<0.001 ^I
Never or rarely	62 (19.3)	156 (42.5)		
Some to all of the time	259 (80.7)	211 (57.5)		
Frequency children are rewarded with dessert if they finish the food on their plate	324 (46.6)	372 (53.4)	0.69 (0.57, 0.83)	<0.001 ^I
Never or rarely	101 (31.2)	166 (44.6)		
Some to all of the time	223 (68.8)	206 (55.4)		
How often do you allow your child to help themselves to snacks	323 (46.8)	367 (53.2)	1.17 (0.98, 1.40)	0.088
Never or rarely	213 (65.9)	204 (55.6)		
Some to all of the time	110 (34.1)	163 (44.4)		
How often do you avoid eating junk food in front of your child	318 (46.2)	370 (53.8)	0.67 (0.52, 0.86)	0.002 ^I
Never or rarely	38 (11.9)	78 (21.1)		
Some to all of the time	280 (88.1)	292 (78.9)		
How often do you eat healthy in front of your child	324 (46.4)	374 (53.6)	1.15 (0.80, 1.66)	0.439
Never or rarely	27 (8.3)	22 (5.9)		
Some to all of the time	297 (91.7)	352 (94.1)		

* statistically significant at the $P = 0.05$

^I Adjusted OR's and Adjusted Coefficient are calculated using hierarchical logistic regression model and controlling for home type, parental employment status, and relationship with child as covariates and, with center as random effect. Some to all of the time=1, Never/Rarely=0; African American=0, Hispanic=1

Table 5
Analysis of covariance for differences in meal locations between African American and Hispanic families of preschoolers

	African American			Hispanic			F	Df	P
	n	Mean # of days per week	SE	n	Mean # of days per week	SE			
Breakfast is eaten at home	283	4.17	0.13	310	3.67	0.13	7.25	5	0.007 *
Breakfast is eaten at school	281	4.27	0.12	315	3.88	0.11	5.45	5	0.020 *
Family eats dinner together at dinner table	278	4.83	0.12	314	5.82	0.11	35.62	5	<0.001 *
Family eats dinner outside the home	278	1.34	0.09	315	1.03	0.09	5.46	5	0.020 *
Breakfast is eaten in front of the TV	284	1.50	0.11	315	0.96	0.10	12.57	5	<0.001 *
Lunch is eaten in front of the TV	283	1.58	0.11	313	0.92	0.10	17.52	5	<0.001 *
Dinner is eaten in front of the TV	281	2.22	0.14	314	1.37	0.14	17.29	5	<0.001 *
Snacks are eaten in front of the TV	279	3.61	0.14	311	2.56	0.14	26.20	5	<0.001 *

* statistically significant at the $p = 0.05$

[†] Covariates include: home type, parental employment status, relationship with child, and Head Start Center