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Racial and Ethnic Disparities in Dietary Intake among California Children

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Abstract

Background—The prevalence of childhood obesity among racial and ethnic minority groups is high. Multiple factors affect the development of childhood obesity including dietary practices.

Objective—To examine the racial and ethnic differences in reported dietary practices among the largest minority groups of California children.

Methods—Data from the 2007 and 2009 California Health Interview Survey were analyzed using multivariate regression with survey weights to examine how race, ethnicity, socio-demographics, and child factors were associated with specific dietary practices.

Results—The sample included 15,902 children ages 2-11. In multivariate regressions, substantial differences in fruit juice, fruit, vegetable, sugar-sweetened beverages, sweets, and fast food consumption were found among the major racial and ethnic groups of children. Asians regardless of interview language were more likely than Whites to have low vegetable intake (Asians English interview OR, 1.20; 95% CI, 1.01-1.43; Asians non-English-interview OR, 2.09; 95% CI, 1.23-3.57) and low fruit (Asians English interview OR, 1.69; 95% CI, 1.41-2.03; Asians non-English interview OR, 3.04; 95% CI, 2.00-4.62) consumption. Latinos regardless of interview language were also more likely than Whites to have high fruit juice (Latinos English interview OR, 1.54; 95% CI and 1.28-1.84; Latinos non-English interview OR, 1.29; 95% 1.02-1.62) and fast food (Latinos English interview OR 1.74; 95% CI, 1.46-2.08 2.16; Latinos non-English

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CONFLICT OF INTEREST DISCLOSURE
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interview OR 1.48; 95% CI, 1.16-1.91) consumption; but Latinos were less likely than Whites to consume sweets (Latinos English interview OR, 0.81; 95% CI, 0.66-0.99; Latinos non-English interview OR, 0.56; 95% CI 1.16-1.91).

Conclusions—Significant racial and ethnic differences exist in the dietary practices of California children. Increased fruit and vegetable consumption appears to be associated with parental education but not income. Our findings suggest that anticipatory guidance and dietary counseling might benefit from tailoring to specific ethnic groups to potentially address disparities in overweight and obesity.

Keywords

racial/ethnic disparities; dietary practices; fast food; sweets; fruits; vegetables

INTRODUCTION

The prevalence of childhood obesity among racial and ethnic minority groups is high. Approximately 21% of Latino children and adolescents and 24% of African-American children and adolescents are obese compared to 14% of white children and adolescents.[1] Multiple factors contribute to the development of childhood obesity including dietary behaviors.[2-5] Health professional guidelines on the prevention and treatment of child overweight and obesity include specific dietary behaviors such as no consumption of sugar-sweetened beverages, limiting fruit juice to 4 ounces a day, limiting high energy density foods such as sweets, consuming greater than or equal to five servings of fruits and vegetables per day, and limiting the consumption of fast food or eating out (food consumed away from home).[6] African-American and Latino children compared to their white counterparts have been shown to have dietary practices that increase the risk of obesity such as higher intake of sugar-sweetened beverages (SSB) and fast food and, lower intake of fruits and vegetables.[7-9] Few studies, however, have examined and compared the dietary practices among minority and/or low-income pediatric populations as they pertain to the professionally recommended guidelines and fewer have extended examination to the third major minority group in the United States (US)--Asian populations.[10]

In order for health practitioners and registered dietitians to support families in the prevention and treatment of childhood obesity, a general understanding of the dietary patterns among young children is necessary as well as an understanding of the similarities and differences across races and ethnicities. Such information can help identify suboptimal dietary patterns that may contribute to disparities in childhood obesity. Challenges like language barriers and/or specific cultural health-seeking behaviors, however, may prevent healthcare providers from effectively caring for children among diverse communities.[11,12] Language barriers are important to consider because they can affect the quality of provider-patient communication and care. In addition, language can be an indicator of acculturation which providers may need to consider in dietary counseling as English-language proficiency negatively impacts dietary practices among Latino immigrant populations.[13,14]. For these reasons English-language proficiency is an important factor to consider in parent-provider interactions about a child's nutrition and dietary practices but they can be overlooked due to the increasing pace and number of recommended topics to discuss during pediatric visits.[15]

Therefore, understanding the dietary patterns, similarities, and differences across racial, ethnic and linguistic groups of children can help health practitioners and registered dietitians efficiently target suboptimal dietary patterns for intervention.

The purpose of this study was to focus on minority children living in California and examine a set of well-described dietary practices known to contribute to unhealthy weight development, to explore the associated socio-demographic factors with these dietary practices, and ultimately provide a starting point for practitioners to tailor nutritional guidance for diverse populations.

METHODS

The data source for this study comes from the 2007 and 2009 California Health Interview Survey (CHIS). CHIS is the nation's largest state health survey sponsored by a network of public agencies and private organizations. CHIS is a population-based telephone survey designed to estimate a variety of physical, emotional, and behavioral child and adult health and healthcare indicators and is representative of California's diverse population. CHIS uses a landline and cell-phone random-digit dial approach and an oversampling of specific populations to provide statewide population estimates. A total of 9,913 children from 0-11 years of age in 2007 were sampled by the University of California, Los Angeles Center for Health Policy Research (UCLA CHPR), and another 8,945 children in 2009. Verbal parental consent and adolescent agreement are obtained by the UCLA CHPR before families participate in the CHIS survey. Interviews were conducted in five languages: English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, and Korean and the translation process involved several professional translators, and multiple reviews and revisions of survey items until a consensus was achieved by both internal and external experts and translators. The translation was ultimately overseen and approved by the UCLA CHPR. Households were sampled from within 44 geographic sampling strata, each comprised of either a single county or multiple counties. Sampling weights are calculated by the UCLA CHPR to appropriately weight participants and includes a complex and iterative process that accounts for geographic strata, household level data such as ethnicity, race, age, gender, household size, and education. Details about the 2007 and 2009 CHIS methodology are described elsewhere.[16,17] The public use data files from CHIS 2007 and 2009 were merged and yielded a total of 18,858 completed interviews for children. Similar strategies of pooling data across survey years have been used to look at dietary behaviors and other health behaviors and outcomes.[18,19]

The study sample included children two to eleven years old. Given the relationship between weight and dietary practices, we intended to control for Body Mass Index (BMI) in our analyses. A total of 2,956 children younger than two years of age were excluded, as BMI norms are not established for children under two. To retain as many children in the analysis and because BMI was not a primary outcome, we kept children in the sample that had missing weight or height data, using a “missing” indicator, but had complete data on all other outcome measures of interest in our *a priori* model. Children with missing height or weight were categorized into a “missing weight” category and included in all analyses of this study. This study was approved by the University of California, Los Angeles Institutional Review Board.

Measures

The dependent variables of this study were the reported dietary practices of young children provided by the interviewed adult caregiver. The caregiver was the adult most knowledgeable about the child's health and completed the interview. Caregivers were asked about the child's fruit and vegetable intake: “Yesterday, how many servings of fruit, such as an apple or banana, did (he/she) eat?” Servings were self-defined by caregivers and considered to be the children's regular portion of this food. Caregivers were also asked about drinking patterns: “Yesterday how many glasses of or boxes of 100% fruit juice, such as orange or apple juice, did (he/she) drink?” and “Yesterday, how many glasses or cans of soda, such as Coke or other sweetened drinks, such as fruit punch or sports drinks did (he/she) drink?” Caregivers were also asked to estimate children's consumption of sweets: “Yesterday, how many servings of sweets such as cookies, candy, doughnuts, pastries, cake or popsicles did (he/she) have?” Responses for these items included the number of servings, glasses, boxes, or cans reported by the caregiver. The servings, glasses, boxes, or cans were defined by each caregiver and servings for children were not specified by the interviewer. Lastly, caregivers were asked about child's fast food consumption: “Now think about the past week. In the past 7 days, how many times did (he/she) eat fast food? Include fast food meals eaten at school or at home, or at fast food restaurants, carryout or drive thru?” [If needed interviewers would also add “such as food you get at McDonalds, KFC, Panda Express, or Taco Bell.] Responses for this item included the number of times parents reported eating out or fast food. The items of the CHIS Diet Screener have undergone validation research and are useful for estimating mean intakes, to discriminate among individuals or populations with regard to higher versus lower intakes, to track dietary changes in individuals or populations over time, and to allow examination of interrelationships between diet and other variables.[20,21] Categories for all outcomes were collapsed to approximate the dietary practices recommended by the 2007 Expert Committee Recommendations regarding childhood prevention of overweight and obesity, ease of interpretation, and the literature on fast food intake.[6,22,23]

The independent variables for this study include socio-demographic characteristics related to dietary practices that have been well described in the literature.[6,24-35] They include: child's race/ethnicity, sex, BMI, and age; the caregiver's level of educational attainment, age, and sex; household configuration, size, and income; geographic region of residence; language of survey interview; and assessment of a child's nutrition by a healthcare provider at a child's last routine physical exam as a proxy for healthcare access. We used the CHIS UCLA CHPR categories of race and ethnicity (Latino, Asian, American Indian/Alaska Native, African-American, White, Other/Pacific Islander/Multiple race) to categorize children's race and ethnicity. The American Indian/Alaska Native group of children was too small for analysis and was incorporated into the UCLA CHPR's “other” which includes Pacific Islanders and children of multiple races. Asian and Latino children were further subdivided by whether the interview was completed in English or a non-English language which we used as a proxy for acculturation that captures the cultural distance between the culture of origin and the US culture.[36,37]. Children's BMI was calculated and the Centers of Disease Control and Prevention (CDC) national growth charts, that provide age- and sex-specific BMI cutoffs, were used to determine children's weight status. Categories of BMI included normal weight (BMI<85th percentile), overweight (BMI 85th-94th percentile), obese (BMI≥95th percentile), and missing. Because we intended to control for BMI in our analyses, categories of BMI included healthy weight, overweight, obesity, or missing weight to include children in the analysis who had missing weight or height information.

The Department of Health and Human Services poverty guidelines were used to establish household size-dependent federal poverty thresholds in 2007 and 2009, and household income was categorized as 0-99%, 100-199%, 200-299%, 300-399%, 400-499%, and ≥500% of the federal poverty threshold. Household configuration included whether the child lived in a single or married household and household size included the total number of adults and children living in the household. The CHIS UCLA CHPR's four categories of geography are based on Claritas Corporation clusters and zip codes to create urban, suburban, and rural geographic locations of residence. CHIS is conducted in five languages and the language of the survey interview was dichotomized as English or a language other than English. The survey year was also an independent variable for this analysis. Lastly, to control for whether access to a healthcare provider may influence children's dietary practices, the following variable was included, "When (child) had (his/her) last routine physical exam, did you and a doctor talk about (his/her) nutrition or healthy eating?" All of the sociodemographic variables selected for the final multivariate model have been shown in the literature to have strong associations with dietary practices.[38]

ANALYSIS

Analyses were performed using Stata 12 (Stata Corp., College Station, TX) and the replicate weights provided by UCLA CHPR to account for the complex survey design of CHIS and to yield state estimates. The 2007 data and weights provided by CHIS were merged with the data and weights from 2009. This pooled data was used for all of the analyses of this study. All dietary outcomes were dichotomized based on professional dietary guidelines or evidence supported by the literature on dietary behaviors associated with unhealthy weight status development. Descriptive statistics of the independent variables were completed using the sample population and then by each racial/ethnic and linguistic group. Chi-square tests were completed to examine the bivariate associations between dietary behaviors and children's racial/ethnic and linguistic group and children's weight status. Separate multivariable logistic regression models of each dietary outcome were used to examine factors significantly associated with each dietary behavior after adjustment for relevant covariates.

RESULTS

Sample

The analytic sample included 15,902 children ages 2-11. Most children were White and the mean age was six years (Table 1). Approximately half of the children were female with a lower percentage of females (40%) in the Asian families interviewed in non-English.

Approximately a third of all children were overweight or obese, while approximately 40% of African-American and Latino children whose parents completed an English survey were overweight or obese. A large percentage of non-English interviews of Latinos and Asians had missing height and/or weight data (Table 1). Approximately two-thirds of children came from homes with parents who had at least some college education. About one third of African-American children lived in households with caregivers who had a high-school degree or lower of educational attainment. One in five children lived under the federal poverty threshold, with a higher proportion found among minority groups of children. Over one third of Latino children with a Spanish interview lived in homes that included six or more household members.

Bivariate Analyses

Table 2 shows the bivariate association between dietary practices and race and ethnicity. Each dietary practice varied significantly across all racial and ethnic groups. When dietary practices were stratified by race, ethnicity, and language, 34% of White children consumed less than two servings of fruit in the previous day compared to 67% of Asian children. Children who consumed less than two servings of vegetables ranged from a low of 56% found among White children to as high as 78% found among Asian children. Fast food intake in the previous week ranged from a low of 61% among Asian children to as high as 78% among Latinos interviewed in English.

Greater than 40% of Asian children consumed less than two servings of a vegetable in the previous day while greater than 60% consumed less than two servings of fruit. Approximately 40% of Latino and African-American children in the study sample consumed two or more glasses or boxes of fruit juice in the previous day. The highest percentage of children who consumed one or more servings of sweets in the previous day was found among White children, and Asian children were found to have the lowest percentage of fast food consumption in the prior week.

Multivariable Analysis

Significant differences in the frequency of daily fruit, vegetable, sugar-sweetened beverage, fruit juice, sweets, and weekly fast food consumption were found among the major racial and ethnic groups after adjustment for relevant covariates (Table 3). For example, Latino children and Asians interviewed in English had significantly higher odds of consuming fast food in the last week than Whites. Children of Latino and African-American parents interviewed in English were also found to have 1.54 and 1.61 times the odds of consuming two or more daily glasses or boxes of fruit juice respectively, as compared to White children. In addition, all minority children were less likely to consume sweets than Whites, with significantly lower odds among Latinos than Whites.

Trends emerged in examining the relationship between family income and caregiver education and dietary practices. Consumption of fruits and vegetables were found to be associated with caregiver education, and primarily in an inverse relationship as higher levels of education were associated with lower odds of consuming less than two servings of fruit and vegetables. Family income was found to be significantly associated with fruit juice, sugar sweetened beverages and fast food consumption. For sugar sweetened beverage consumption, children living in households with incomes less than 300% of the FPL had a higher odds of consumption compared to children in the highest income group, however once income rose above 300% of FPL, there was no difference. On the other hand, children living in households with a lower income compared to children living in households with the highest income groups, were associated with a reduced odds of consuming two or more servings of sweets a day with significance found among the lower income groups (<100%FPL and 200-299%FPL). In addition, interview language was significantly associated with dietary practices among Latino and Asian children. More specifically, Asians interviewed in a non-English language had almost 3.04 times the odds of consuming less than two servings of fruit in the previous day as Whites after multivariate adjustment. In comparison, Asians interviewed in English had only 1.69 times the odds of consuming less than two servings of fruit as Whites after multivariate adjustment. Finally, a healthcare provider assessment of nutrition at a child's last routine physical was not associated with the majority of obesogenic dietary practices but appeared to have an association with fruit and vegetable consumption.

Sensitivity Analysis

A sensitivity analysis was completed excluding children who had outliers of weight and height. The distribution of height and weight revealed a group of outliers that were likely due to self-report error as they represented clinically implausible responses. Thus, children with height and/or weight greater than two standard deviations above or below the means were excluded. A separate multivariable analysis was completed excluding children who had these outliers but had complete data on all other outcome measures of interest. The primary differences when outliers were excluded from our findings are likely explained by the sample size differences (14,623 versus 15,902) and larger standard errors. The sensitivity analysis primarily generated changes on those outcomes that were approaching non-significance in the full sample size analysis. Thus, there were no longer differences compared to White children on the following outcomes: (1) Asian non-English speaking parents of young children and vegetable servings (OR, 1.17; 95% CI, 0.97-1.39); (2) Latino non-English speaking and African-American parents of young children and sugary-sweetened beverage consumption in the previous day (OR, 1.27; 95% CI, 0.95-1.66; OR, 1.24; 95% CI, 0.94-1.64, respectively); (3) Latino non-English speaking parents of young children and two or more servings of fruit juice in the previous day (OR, 1.28; 95% CI, 0.99-1.63); and (4) Asian English speaking parents of young children and the consumption of fast food in the previous week (OR, 1.37; 95% CI, 1.05-1.78). For African-American children consumption of fast food in the previous week was found to be significant in the sensitivity analysis (OR, 1.38: 95% CI, 1.06-1.38).

DISCUSSION

This study highlights the racial and ethnic differences in dietary behaviors among California children as well as several sociodemographic factors related to specific dietary behaviors. In multivariate regressions, substantial differences in fruit juice, fruit, vegetable, sugar-sweetened beverages, sweets, and fast food consumption were found among the major racial and ethnic groups of children. This is the first study to our knowledge that examines a comprehensive set of dietary practices, known to be important determinants of healthy weight development for white children and the general pediatric population[6], among the three major minority groups of California. Several dietary practices are worth noting as they have not previously been well described and may serve as a starting point for practitioners and registered dietitians to explore dietary practices with families as well as guide researchers who work with diverse populations.

Children of Asian families interviewed in non-English, suggestive of households with lower levels of US acculturation, were not found to have higher odds of consuming fast food than Whites, while most other minority groups had significantly higher odds of fast food consumption. One other study has shown an association of increased fast food intake with higher levels of acculturation among Asian children.[39] Thus, it appears that lower intake of fast food consumption among Asian-American children may be more likely in less acculturated households. There is a scarcity of research on Asian-American families to explain how this healthy dietary practice is attained. Beliefs about the ills of fast food among Asian-Americans seem to be similar to those of other minority groups.[40] The higher parental educational attainment and income brackets of Asian families do not explain these differences—in fact, fast food consumption tends to be greater in some higher educational and income brackets in our sample, suggesting a more complex process. Additional research is needed to explore what factors may be contributing to this healthy dietary practice. All other minority children in this study, however, had significantly higher odds of fast food consumption than Whites and over half of all California children, regardless of racial or ethnic group, reported eating fast food at least once a week. This high prevalence of fast food consumption among children mirrors national estimates[9] and highlights the need to address this dietary practice across all groups of young children.

Children of Asian families interviewed in both English and non-English, however, were also found to have higher odds of consuming less than two vegetable servings in the previous day compared to Whites. There were higher odds of consuming less than two fruit and vegetables servings among Asians interviewed in a non-English language. The findings of lower vegetable and fruit consumption among Asians may be somewhat counterintuitive, as several Asian cultures have native food patterns that are high in vegetables, [41,42] however, contributing factors may include the acculturation effect of a high-fat and low fruit and vegetable American diet on Asian dietary practices,[10,43,44] difficulty finding traditional fruits and vegetables that are native to Asian countries, and cultural and native patterns where low fruit consumption may be typical.[40] Because Asian-American children have been understudied in obesity prevention and management, it is difficult to determine whether this finding holds true for Asian-American children outside of California and the extent to which traditional beliefs may be at the root of fruit and vegetable consumption patterns. Our findings, however, suggest that one potential mechanism to address the lower fruit and vegetable consumption among Asian children might be for physicians to talk to families about nutrition and healthy eating. In our study, children had lower odds of consuming less than two fruit and vegetables servings if parents reported that their child's physician had discussed nutrition during their child's last routine physical exam visit. These findings are consistent with the literature that indicates parents welcome counseling on healthy foods from physicians, and that healthcare professionals in general play an important role in counseling and changing lifestyle behaviors.[45-48] Additional studies are needed, though, to evaluate whether healthcare professional nutrition counseling has a differential effect on children from ethnically diverse backgrounds.

Latino and African-American children had higher odds of consuming more than the recommended amount of daily fruit juice and sugar-sweetened beverages than Whites. These unhealthy dietary practices have been well described in the literature.[7,30,49] Latino children, however, had lower odds of consuming sweets than Whites. Several national studies show an overall increase in the consumption of energy-dense, nutrient-poor foods such as sweets among children,[50,51] but it is unclear whether all groups of children are increasing their consumption of sweets at similar rates. Our results suggest that the documented increase in consumption of sweets over the last several years may not be driven by Latino children, and relative avoidance of sweets in fact may be a common healthy weight behavior among Latino families. This possibility is supported by many qualitative studies that illustrate that Latino parents overwhelmingly describe limiting junk food such as chips and candy as important for the prevention of childhood obesity, but are less likely to mention non-carbonated sweetened drinks and high fat snacks, that can also lead to unhealthy weight development.[52,53] Whether Latino children consume lower rates of sweets compared to other groups of children, however, is an important area for future research particularly because protective factors that can buffer against childhood obesity among Latinos are less described or absent from the literature.

White children have been shown to have lower rates of sugar-sweetened beverage, fruit juice and fast food consumption, and higher rates of fruit and vegetable intake when compared to minority groups of children. Many of these patterns were also found in this analysis. The consumption of sweets, however, did not follow this healthy dietary pattern. Instead, we found higher odds of consumption of sweets among whites when compared to Latino children. In addition, unlike many of the other unhealthy dietary practices, the consumption of sweets was positively related to family income and did not vary by parental educational attainment.

This finding indicates that parents in general may consider sweets to be qualitatively different from sugar-sweetened beverages and fruit juices. This dietary practice requires further study, particularly the context in which sweets are provided to children—sweets given as reward, for instance, can increase a child's risk of overweight due to poor self-regulation of appetite, problematic eating attitudes, and an increased preference for and consumption of sweet food.[54-56]

This study had several limitations. First, the study sample was created from 2007 and 2009 data, and we may not have captured variation between years. This approach however was necessary to have adequate sample size for the comparison of the major racial and ethnic groups of California children. Analyses of each individual year (albeit underpowered) only showed secular trends of a decrease in sugar-sweetened beverage consumption which has been supported by other publications.[57] No other secular trends were noted. Second, dietary practices were collected using caregiver report with caregivers defining the specific foods and servings, and did not include direct observations of dietary intake or specifications from the interviewer related to age-specific serving sizes. As a result, there may be reporting bias and under or over estimation of each food item. The survey is also administered in 5 different languages and although rigorous steps and strategies are incorporated by CHLA CHPR to ensure optimal translation of each question, there is always the possibility that caregivers incorrectly understood the specific food related questions thereby introducing bias into our results. It should also be noted that Asians and Latinos are not homogenous groups and therefore aggregating each of them into one group may have biased the findings. In addition, height and weight were based on caregiver report, which may bias our estimates; however, many national studies continue to use this method of survey data collection.[58] There was a significant amount of missing height and weight data particularly for non-English interviewed Latinos and Asians that could have biased our estimates. The large amount of missing data for these populations may be due to low health literacy levels or confusion regarding height and weight metrics as many Latin American and Asian countries use the International System of Units (i.e. meters and kilograms). Children with missing weight or height data, however, were flagged with an indicator and not omitted from the analysis, in order to avoid exclusion bias. Lastly, time spent in the US was not included in this analysis, which can play an important role in dietary practices; however, English language fluency (interview language) was included which is often also used as a proxy for acculturation.

CONCLUSION

There are significant racial and ethnic differences in dietary practices among California children, and each group has practices that are protective and risk factors of unhealthy weight development; our study, in particular, provides new information on Asian children. Thus, all groups of children exhibit different problematic dietary practices and additional variations may exist within specific ethnic groups based on linguistic preferences. Healthcare providers, and more specifically registered dietitians, can use these results for broad guidance regarding dietary screening and as starting points for more tailored assessments and counseling for specific ethnic and racial groups.

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Table 1

Characteristics of California Children 2 to 11 Years Old and Their Parents by Race/Ethnicity: California Health Interview Survey 2007 and 2009

	All	**White**	**Latino (English Interview)**	**Latino (Spanish Interview)**	**African-American**	**Asian (English Interview)**	**Asian (Non-English Interview)**
	(n=15,902)[¥]	**(n=7,906)**	**(n=1,853)**	**(n=2,332)**	**(n=629)**	**(n=1,559)**	**(n=484)**
Characteristic							
Child age (mean yrs)	6.4	6.5	6.3	6.2	6.8	6.5	7.0
Child sex (%)							
Female	49.2	48.4	49.5	50.1	49.7	51.9	40.6
Child weight status[*] (%)							
Non-overweight (BMI<85th percentile)	42.6	57.3	37.5	15.8	44.5	54.8	25.9
Overweight (BMI 85th -94th percentile)	10.4	12.5	12.5	4.4	11.1	11.1	2.9
Obese (BMI≥95th percentile)	21.2	18.7	30.3	16.7	28.6	19.9	12.3
Missing (missing height or weight)	25.7	11.5	19.7	63.1	15.8	14.1	58.8
Caregiver educational attainment[*] (%)							
Not a high-school graduate	18.8	3.0	13.8	64.7	6.5	1.1	29.2
High-school graduate	19.4	14.5	28.8	21.0	22.4	7.8	31.9
At least some college	24.0	26.5	34.4	8.8	36.5	14.1	15.2
Bachelor's degree	22.9	32.5	15.1	4.6	23.2	43.2	20.4
Master's degree or higher	14.9	23.5	7.9	0.9	11.4	33.8	3.3
Income[*] (%)							
<100% FPT	21.7	6.0	19.7	59.1	26.1	4.3	28.1
100-199 % FPT	20.7	12.0	26.1	31.7	23.1	11.2	35.9
200-299 % FPT	13.6	14.5	20.0	5.7	16.6	10.4	12.9
300-399 % FPT	10.5	14.6	11.1	2.1	11.3	12.1	7.8
400-499 % FPT	9.8	13.5	9.9	0.6	8.8	17.3	7.6
≥500% FPT	23.7	39.4	13.2	0.8	14.1	44.7	7.6
Family type[*] (%)							
Married with kids	78.7	83.8	73.8	80.1	46.5	91.1	91.3

	All	White	Latino (English Interview)	Latino (Spanish Interview)	African-American	Asian (English Interview)	Asian (Non-English Interview)
	(n=15,902)[¥]	**(n=7,906)**	**(n=1,853)**	**(n=2,332)**	**(n=629)**	**(n=1,559)**	**(n=484)**
Household size (children & adults)* (%)							
<3	16.4	20.6	13.6	7.0	28.9	18.2	13.7
4	33.2	40.3	28.3	22.4	27.5	44.5	27.5
5	26.7	24.2	29.1	32.7	22.0	22.0	30.1
>6	23.7	14.9	29.0	37.9	21.6	15.3	28.7
Caregiver age* (%)							
<30 yrs	14.1	8.6	23.0	19.9	20.5	4.4	3.1
30-39 yrs	43.6	39.9	51.3	48.2	29.7	44.4	33.9
40-49 yrs	33.6	41.6	19.5	26.2	30.4	43.6	49.8
>50 yrs	8.7	9.9	6.2	5.8	19.4	7.6	13.2
Caregiver sex* (%)							
Female	63.3	61.2	63.1	64.5	75.2	56.5	50.5
Geographic residence* (%)							
Rural	11.2	15.5	9.2	9.8	4.0	6.5	1.5
Suburban	46.5	56.7	42.7	36.6	40.6	45.9	22.8
Urban	42.3	27.8	48.1	53.6	55.4	47.6	75.7
MD assessed nutrition at last routine physical							
Yes (%)	69.4	68.3	70.4	71.0	73.9	67.1	60.1

FPT: federal poverty threshold

¥ Denotes total sample size of study which includes “other” racial/ethnic group comprised of Pacific Islander/Multiple race/Other (n=1,139) that were included in study but omitted from the table

* Denotes variables that differed significantly ($p<0.05$) across the racial/ethnic groups determined by χ^2 test or *t test* for continuous variables

Table 2

Bivariate Analysis of Dietary Practices by Race and Ethnicity of Children 2-11 Years Old: California Health Interview Survey 2007 and 2009

	White (Referent)	Latino (English Interview)	Latino (Spanish Interview)	African-American	Asian (English Interview	Asian (non-English Interview)	p*
Dietary Practice	**(n=7,906)**	**(1,853)**	**(n=2,332)**	**(n=629)**	**(n=1,559)**	**(n=484)**	
Fruit (<2 servings yesterday) %	34.0	36.2	38.9	39.1	44.5	67.1	**<0.05***
Vegetables (<2 servings yesterday) %	55.9	67.2	71.0	62.1	60.63	77.9	**<0.05***
Fruit Juice (≥2 servings yesterday) %	25.3	42.8	45.3	42.8	23.0	27.3	**<0.05***
Sweets (≥1 servings yesterday) %	75.1	67.4	55.2	66.5	72.6	69.8	**<0.05***
Sugar sweetened beverages % (≥1 servings yesterday)	22.8	37.8	34.1	34.9	23.7	23.6	**<0.05***
Fast food (≥1 servings last week) %	65.3	78.2	67.6	69.2	68.4	61.3	**<0.05***

* p-value that differed significantly ($p<0.05$) across the racial/ethnic groups determined by χ^2 test

Table 3

Adjusted Odds Ratios (95%CI) of Child Dietary Practices by Race/Ethnicity and Language of Children 2-11 Years Old: California Health Interview Survey 2007 and 2009 (Total Sample Size n=15,902)

Characteristic	Fruit (<2 servings yesterday)		Vegetables (<2 servings yesterday)		Sugar-sweetened Beverages (≥1 servings yesterday)		Fruit juice (≥2 servings yesterday)		Sweets (≥1 servings yesterday)		Fast food (≥1 servings last week)	
Child race/ethnicity (Referent White)												
Latino (English interview)	1.00	0.85-1.19	1.51	1.28-1.79*	1.75	1.47-2.09*	1.54	1.28-1.84*	0.81	0.66-0.99*	1.74	1.46-2.08*
Latino (non-English interview)	0.95	0.77-1.19	1.47	1.17-1.86*	1.34	1.03-1.75*	1.29	1.02-1.62*	0.56	0.44-0.72*	1.48	1.16-1.91*
African-American	1.11	0.86-1.43	1.26	0.99-1.61	1.48	1.13-1.93*	1.61	1.25-2.08*	0.82	0.63-1.07	1.15	0.89-1.48
Asian (English interview)	1.69	1.41-2.03*	1.20	1.01-1.43*	1.14	0.96-1.38	0.99	0.80-1.24	0.85	0.69-1.02	1.22	1.03-1.46*
Asian (non-English interview)	3.04	2.00-4.62*	2.09	1.23-3.57*	0.69	0.39-1.21	0.77	0.48-1.24	0.91	0.56-1.47	0.91	0.45-1.81
Caregiver education (Referent <high school degree)												
High school graduate	0.81	0.63-1.05	0.85	0.67-1.07	1.12	0.87-1.47	1.01	0.82-1.26	1.23	0.97-1.55	1.63	1.31-2.00*
At least some college	0.71	0.54-0.93*	0.68	0.54-0.87*	0.87	0.65-1.14	0.93	0.75-1.15	1.26	0.99-1.59	1.63	1.27-2.08*
Bachelor's degree	0.72	0.53-0.95*	0.69	0.55-0.87*	0.85	0.65-1.16	0.71	0.56-0.89*	1.25	0.97-1.63	1.51	1.21-1.89*
Master's degree or higher	0.49	0.36-0.67*	0.56	0.44-0.72*	0.68	0.50-0.93*	0.63	0.48-0.83*	1.28	0.97-1.70	1.10	0.87-1.39
Income (Referent ≥500% FPT)												
0-99% FPT	1.02	0.81-1.27	1.00	0.78-1.28	1.32	1.06-1.65*	1.76	1.42-2.19*	0.78	0.63-0.97*	0.88	0.69-1.10
100-199% FPT	1.06	0.88-1.29	0.88	0.75-1.06	1.41	1.15-1.70*	1.47	1.21-1.77*	0.98	0.79-1.19	1.06	0.87-1.28
200-299% FPT	1.14	0.95-1.37	0.90	0.75-1.08	1.38	1.16-1.65*	1.17	0.94-1.46	0.83	0.70-0.99*	1.29	1.08-1.56*
300-399% FPT	1.16	0.97-1.38	0.99	0.85-1.15	1.04	0.86-1.24	1.28	1.03-1.59*	0.92	0.76-1.09	1.43	1.19-1.72*
400-499% FPT	1.13	0.93-1.37	0.99	0.78-1.28	1.14	0.97-1.34	1.07	0.86-1.32	0.89	0.75-1.07	1.34	1.12-1.61*
MD assessed child's nutrition at last visit												
Yes	0.85	0.75-0.95*	0.80	0.68-0.92*	0.87	0.76-1.01	0.97	0.84-1.12	1.04	0.92-1.18	0.97	0.87-1.09

Analyses adjusted for child age, child sex, child BMI, single-parent household status, household size, geography, caregiver age, and caregiver sex, and survey year

FPT: federal poverty threshold

*p-value less than 0.05