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Dietary disparities of urban Chinese American children in New York City: Results from a pilot study

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Abstract

Obesity has been identified as an emerging health concern for Chinese American children; however, very little is known about diets in Asian American children. The objective of our paper was to describe the dietary intakes of urban Chinese American schoolchildren using a state-of-the-art approach for dietary assessment. Data for this analysis come from the Food Journal Project 2017, a pilot and feasibility study conducted by a multi-sector collaboration. Children aged 8-12 (n=83) completed two dietary assessments using a food diary from January-June 2017. Children were then interviewed using the food diary as a guide and dietary data were entered into the online ASA24 system by study staff. Chinese American children were identified using surname, and were compared to non-Chinese peers with respect to nutrient intake and the Healthy Eating Index 2010 (HEI-2010). Chinese American children consumed more sodium dense diets, more protein, and less sugar compared to non-Chinese children. With regards to the HEI-2010, Chinese American children had less favorable whole grains and sodium scores; and more favorable seafood protein and empty calories scores compared to non-Chinese children. Sodium reduction and increasing whole grain intakes may be warranted in this group, but should be verified with additional studies.

Key words: Asian Americans; child; diet; eating; feeding behavior; sodium, dietary

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Introduction

Very little is known about the diets of Asian American children. A literature review on dietary practices in Asian American children identified 13 articles of varying methodological quality.[1] About half of studies were conducted by one research team, and only 4 included validated diet measurement. More recently, an analysis demonstrated that Asian American children in California consumed less fruits and vegetables compared to Non-Hispanic white peers.[2] Analyses of dietary recall data from the National Health and Nutrition Examination Survey (NHANES) 2011-12 wave – the first to include an oversample of Asian Americans documented lower consumption of sugary drinks.[3] Lower consumption of sugary drinks and unhealthy items (i.e., fried potatoes, fruit juice, fast food) in children were corroborated in another analysis, though patterns tended to differ by Asian subgroup (e.g., Chinese, Indian) – highlighting the necessity for disaggregated analyses by Asian subgroup.[4] Beyond these examples, understanding of the diets in Asian American children, let alone specific Asian American subgroups is extremely limited.

Obesity has been identified as an emerging health concern for Chinese American children, particularly boys. One in four (24.6%) low income, urban Chinese American children are overweight or obese.[5] New Chinese American immigrant families are particularly vulnerable for two reasons: higher overweight/obesity prevalence in Chinese American children is associated with lower parental levels of acculturation;[6] and obesity prevalence in China is increasingly becoming a health concern.[7] Eating habits established during childhood persist through the life course, highlighting the need to promote healthy eating behaviors in young children.[8]

Our objective was to describe the diets of urban, immigrant Chinese American schoolchildren in underserved neighborhoods using a validated method for dietary data collection. We compare their

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intakes to intakes of their racially/ethnically diverse peer group from their schools. We hypothesized that unique nutrient intakes would be identified for Chinese American children.

Materials and Methods

Data for this analysis come from the Food Journal Project (FJP) 2017, a pilot and feasibility study conducted in collaboration between the NYU School of Medicine (NYU SOM), 2 New York City (NYC) elementary schools, and Common Threads – a national, nonprofit provider of cooking and nutrition education in low income schoolchildren. The primary objective of the FJP was to determine the feasibility of measuring dietary intake in schoolchildren using a validated method for dietary assessment: food diary-assisted 24 hour dietary recall.[9] The FJP was conducted in 2 schools with cooking and nutrition education programming provided by Common Threads, which provides programs to schools where >80% of children receive free or reduced price lunch. From publicly available data on schools at the NYC Department of Education website, we know that 100% of the children attending our partner schools live in poverty.[10] All children participating in Common Threads' programming were invited to participate; any child with parental consent and who provided simple written assent were allowed to participate. Prior to implementation of the FJP, NYU SOM study staff contacted and met with school coordinators. Connection to the schools was facilitated by the Common Threads NYC coordinator: Common Threads provided referrals for schools and school contact person, and chose 2 highly responsive schools. NYU SOM study staff introduced the FJP to the coordinators and walked them through the food diary and planned study procedures.

Study materials and procedures development

NYU SOM study staff developed key study materials and procedures, including the IRB protocol and materials for the children and parents based on prior examples and published literature where possible.

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The food diary was developed to be friendly and easy to follow by children in the target age group. Data collected included the time of day, where the food was consumed (e.g., home, school), with whom (e.g., mother, friend), where the food was prepared (e.g., home, restaurant), and the food and drink items and amounts. Key materials were developed and grouped as follows: 1) Initial parent packets (consent forms, recruitment letters); 2) Child assent form; 3) In-class example of the food diary; 4) Take-home packet (Parent introduction, food diary, food diary instructions); 5) Interviewer materials (Interviewer protocol, paper instrument); 6) School coordinator material (exit interview). Study materials were printed on a distinctive colored paper (lavender) to differentiate these from other school papers. Interviewer paper materials including a script for performing multiple passes,[11] were accompanied by visual guides to aid children's recall. We used measuring cups and measuring spoons to probe amounts of food if child didn't offer/couldn't remember amounts. We also used two different sets of pictures from the ASA24 to probe drink sizes.

The ASA24 is a validated, publicly available, online 24-hour dietary recall tool developed by the National Cancer Institute. While the ASA24 was designed to be self-administered on a computer, we opted to collect the 24-hour dietary recall data from students by interview and have study staff input the data into the ASA24. We chose this approach because the ASA24 can be time consuming and would require wireless internet, which was not available in the schools we were working in. Thus to maximize participation (i.e., maintaining brevity of interview) and validity of data, we opted for a three step process where children collected the food diary, were interviewed by study staff, then data were entered into the ASA24 system by study staff. Study staff were trained on how to use the paper-based instrument in the schools, on interviewing, and on ASA24 data entry. Nutrient information was assessed using the Nutrition Data System for Research (NDSR). Additional data collected (e.g., demographics,

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grade, overall diet quality, oral health) were entered and managed using REDCap electronic data capture tools hosted at the NYU-Health and Hospitals Corporation Clinical and Translational Science Institute.

Parent materials were translated into Spanish and Simplified Chinese as per request of the school coordinators. All study procedures and materials (English and translated) were approved by the NYU SOM Institutional Review Board (IRB) and the NYC Department of Education IRB.

Data Collection Procedures

All children were asked to complete a short survey and a detailed dietary assessment at two timepoints, spaced approximately 6 months apart. In both dietary assessments, we asked children to complete a written food diary and an interview with NYU SOM study staff. School coordinators distributed food diaries to students with a sample of one filled out and a small introduction for parents, and explained the purpose and use of the diary. Diaries were collected the next day and children were interviewed by NYU SOM study staff during school hours as approved by the school principal. During the interview, children were asked to recall what they ate in the last 24 hours in the interview, using the diary as a guide. Each interview was approximately 20 minutes in length. Children received small fruit-shaped erasers on the completion of their dietary assessment interviews. Race/ethnicity was assessed by the interviewer.

Data Management and Statistical Analyses

Data were pulled from REDCap and the ASA24 systems. We combined the two dietary recalls per child which were conducted between the months of January through June 2017. Only those who performed two dietary recalls were included in the analysis. To identify Chinese American students from our sample, we utilized published lists of Chinese surnames.[12] We stratified all analyses by race/ethnicity

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and by Chinese/non-Chinese. We utilize non-Chinese as the referent group (combining all others who are not Chinese including other Asian children) to maximize power for comparisons. However, because this may be viewed as a non-traditional approach for comparisons, we also ran data stratified by race/ethnicity. The results comparing Asian to non-Asian groups were similar to results comparing Chinese to non-Chinese groups, demonstrating the combined non-Chinese referent group was acceptable.

Demographic and other characteristics assessed at the first visit were summarized and compared between Chinese American and Non-Chinese children using chi-squared tests. The means of key nutrients and key nutrients per 1000 calories were assessed overall and by Chinese American ethnicity; differences in means were assessed using t-tests. The normalization to calories allows for a clearer understanding of nutrient intake differences since some nutrient intakes are highly correlated with caloric intake (e.g., sodium). The Healthy Eating Index (HEI), most recently updated in 2010, is a scale to measure diet quality relative to the 2010 Dietary Guidelines for Americans. This standardized tool has been determined to be a valid and reliable instrument for nutrition researchers. The HEI-2010 includes 12 components that sum to a possible maximum of 100 points. FJP participants' HEI-2010 component and total scores and corresponding standard errors and 95% confidence intervals were calculated using macros created by the National Cancer Institute. All data were analyzed using STATA (v.12.1, College Station, TX). Statistical significance was set at $p < 0.05$.

Results

A total of 94 children participated in the FJP. Three children did not perform a second dietary recall, and 8 children had race/ethnicity missing. The final analytic sample size for our analysis was n=83. Twenty-two children were identified as Chinese American, and 61 children were Non-Chinese: Hispanic (n=36),

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white (n=3), black (n=12) or Other Asian (n=10) (Table 1). Chinese American children did not differ from Non-Chinese children with respect to age, sex or grade.

Mean values of key nutrients and key nutrients per 1000 calories are displayed in Table 2. Chinese American children consumed less sugars (29.6 less grams per day; p=0.01) compared to Non-Chinese children. When normalized per calories consumed, significant associations for higher protein and lower sugars consumption persisted (p=0.001; p=0.004, respectively). Sodium intake per 1000 calories (i.e., sodium density) was significantly higher in Chinese American vs. Non-Chinese children (p<0.001).

The total HEI-201 score for all children was 60.7, and did not differ significantly between Chinese American and Non-Chinese children (61.2 vs. 60.6, p=0.83; Table 3). The components of the HEI-2010, however, revealed interesting patterns. Chinese American children had less favorable whole grain (p=0.03) and sodium scores (p=0.004); and more favorable seafood and plant protein (p<0.001) and empty calories (p=0.02) scores compared to Non-Chinese children.

Chinese American children reported more of the food they ate was sourced at school (27.5%) compared to Non-Chinese children (21.8%; p<0.01), although there was no difference in location that food was consumed.

Discussion

We described the diets of urban, immigrant Chinese American schoolchildren in underserved areas aged 8-12 years using food diary-assisted 24-hour dietary recalls and compared them to their peers. To our knowledge, this is the first comprehensive characterization of diets in Chinese American children in the United States using a validated method. We found that Chinese American children in our sample

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consumed more sodium dense (mg per 1000 calories) diets and less sugar compared to Non-Chinese children. We also identified that Chinese American children had less favorable whole grain intakes, and more favorable seafood and plant protein and empty calories intake compared to Non-Chinese children. The sodium and sugar findings are consistent with prior literature using less comprehensive measures; while the differences in protein sources and lower whole grain intakes have not been previously characterized. In Asian American (not Chinese specifically) adults, sodium density has also been shown to be higher compared to other racial/ethnic groups.[13, 14] The higher seafood consumption is reflective of prior U.S. data on Asian Americans 6 years and older,[15] an aspect of diet which is both positive and negative. Higher seafood consumption offers favorable fatty acid benefits, but is also associated with high exposure to neurotoxic heavy metals and higher sodium intake in Asian Americans.[16] Both high sodium intake and heavy metals increase the risk of subsequent health conditions, and are therefore of concern.

Chinese American immigrants are an underserved population. National and local data demonstrates a stark income disparity for Chinese Americans. In the U.S., the poverty rate among Chinese American, non-citizen immigrants was 25.9%, compared to 11%, 26% and 24% in white, black and Latino populations.[17] In New York City (NYC), the poverty rate among Chinese Americans is 21%,[18] compared to 14%, 22% and 25% in white, black and Latino populations.[19]

Broad racial stereotypes both societally and in the research community that this community suffers from few health disparities[20] have contributed to limited knowledge of dietary behaviors[21] and a lack of nutrition-related interventions in this group. This lack of data is troubling given that the Asian American adults and children are increasingly at risk for development of cardio-metabolic disorders –

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including diabetes,[22, 23] prediabetes[24] and non-alcoholic fatty liver disease[25-27] – despite lower estimates of overweight and obesity compared to other racial/ethnic groups.[28]

Chinese American families face unique dietary challenges upon immigration to the U.S.[29] First, because of a lack of familiarity with the American diet and ingredients, Chinese immigrant parents may be less able to provide nutritious meals and health information to their children compared to U.S. born parents.[29] After attending school, many children of Chinese immigrants tend to develop preferences for American food, driven in part by peer influence, and these preferences may lead to familial (intergenerational) conflict when the children requests unfamiliar American food that is disliked by the parents.[29] When dietary accommodations are made to appease the children (a common approach in Chinese culture),[6] the American foods incorporated are often convenience foods that are unhealthy (e.g., desserts, salty snacks, high-fat meat).[30] Second, many Chinese American immigrants reside in low income, urban enclaves, where cheaply made, traditional foods high in fat and sodium are readily available.[31] Asian foods, even unhealthy versions, are perceived to be healthier than American foods and are often chosen.[32] Third, dietary acculturation practices tend to involve the incorporation of unhealthy vs. healthy American foods (e.g., convenience foods, salty snacks).[30] Due to acculturative stress, consumption of 'festival foods' (high in carbohydrates, animal protein, sugar and fat) among immigrants may increase and be an explanatory factor in increased cardio-metabolic risk in these populations.[32] Fourth, unhealthy dietary practices are introduced by grandparents.[29, 33] Grandparents are often the primary caregiver of Chinese American immigrant children and have a tendency to express love through food.[29] Chinese grandparents introduce belief systems of appropriate body size (plumpness) in children, and may have potentially experienced early life deprivation leading to overindulgence with food for their grandchildren.[29, 33] A study in China found that children raised by their grandparents vs. parents were twice as likely to be obese (adjusted odds

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ratio: 2.03, 95% CI: 1.19-3.47), and consumed more sugary drinks and unhealthy snacks.[33] Lastly, owing to the model minority stereotype and low community and provider awareness about the nature of obesity risk for Asian American populations, Chinese American parents and caregivers may perceive their risk to be low and be less likely to seek help or clinical interventions.[29]

A strength of the current analysis is the presentation of analyses focused on a specific subgroup of Asian Americans using a validated and comprehensive method for assessing diet. Asian Americans are often not included in national or regional surveys, and were only recently added to NHANES in the 2011-12 survey wave, therefore very little is known about diet in Asian American adults or children. We also use two rather than one dietary recall, strengthening both the validity and reliability of our results. The limitations of this analysis include that data were collected from the children themselves, which may be influenced by social desirability, intrusion, or forgetfulness. We note that this may be the case particularly for empty calories, as our study participants seemed to anchor their recall around meals (breakfast, lunch and dinner). We specifically prompted for recalls of treats or snacks, but we would caution the interpretation of the empty calories score for this reason. Lastly, results may not be generalizable to all Chinese American immigrants as Chinese regional and/or country variation in immigration patterns exist across the U.S., with those settling in the NYC area differing from those settling in other parts of the country.

The results of our analysis provide a preliminary understanding of diets among Chinese American children, and highlight the need for larger cross-sectional and longitudinal descriptive studies as well as potential avenues for future intervention work. Specific interventions focusing on sodium reduction, increasing whole grain and decreasing protein consumptions may be warranted. A deeper understanding of other dietary behaviors, particularly around sugar intake and specific ethnic products

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may be key. Interventions to educate Chinese American immigrant parents about the significance of overweight and obesity in their community and healthy dietary habits may also be critical in improving diets amongst these children.

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References

1. Diep, C.S., et al., *What are Asian-American youth consuming? A systematic literature review*. J Immigr Minor Health, 2015. **17**(2): p. 591-604.
2. Guerrero, A.D. and P.J. Chung, *Racial and Ethnic Disparities in Dietary Intake among California Children.* J Acad Nutr Diet, 2016. **116**(3): p. 439-48.
3. Haughton, C.F., M.L. Wang, and S.C. Lemon, *Racial/Ethnic Disparities in Meeting 5-2-1-0 Recommendations among Children and Adolescents in the United States.* J Pediatr, 2016.
4. Guerrero, A.D., N.A. Ponce, and P.J. Chung, *Obesogenic Dietary Practices of Latino and Asian Subgroups of Children in California: An Analysis of the California Health Interview Survey, 2007-2012.* Am J Public Health, 2015. **105**(8): p. e105-12.
5. Au, L., et al., *Prevalence of overweight and obesity in Chinese American children in New York City.* J Immigr Minor Health, 2009. **11**(5): p. 337-41.
6. Zhou, N., et al., *A cultural understanding of Chinese immigrant mothers' feeding practices. A qualitative study*. Appetite, 2015. **87**: p. 160-7.
7. Ng, M., et al., *Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013.* Lancet, 2014. **384**(9945): p. 766-81.
8. Wang, Y., et al., *Tracking of dietary intake patterns of Chinese from childhood to adolescence over a six-year follow-up period.* J Nutr, 2002. **132**(3): p. 430-8.
9. Lytle, L.A., et al., *Validation of 24-hour recalls assisted by food records in third-grade children. The CATCH Collaborative Group.* J Am Diet Assoc, 1993. **93**(12): p. 1431-6.
10. *NYC Department of Education, Data About Schools, Demographic Snapshots*. August 9, 2017]; Available from: http://schools.nyc.gov/AboutUs/schools/data/default.htm.
11. Baxter, S.D., et al., *Fourth-grade children's dietary recall accuracy is influenced by retention interval (target period and interview time).* J Am Diet Assoc, 2009. **109**(5): p. 846-56.
12. Lauderdale, D.S. and B. Kestenbaum, *Asian American ethnic identification by surname.* Population Research and Policy Review, 2000. **19**: p. 283-300.
13. Bailey, R.L., et al., *Estimating Sodium and Potassium Intakes and Their Ratio in the American Diet: Data from the 2011-2012 NHANES.* J Nutr, 2016.
14. Firestone, M.J., et al., *Asian American dietary sources of sodium and salt behaviors compared with other racial/ethnic groups, NHANES 2011-12.* Ethnicity & Disease, In press.
15. Awata, H., et al., *Association of Dietary Intake and Biomarker Levels of Arsenic, Cadmium, Lead, and Mercury among Asian Populations in the United States: NHANES 2011-2012.* Environ Health Perspect, 2017. **125**(3): p. 314-323.
16. Awata, H., et al., *Biomarker Levels of Toxic Metals among Asian Populations in the United States: NHANES 2011-2012.* Environ Health Perspect, 2017. **125**(3): p. 306-313.
17. *United States Department of Labor, The Economic Status of Asian Americans and Pacific Islanders*. 2016 October 10, 2016]; Available from: https://www.dol.gov/_sec/media/reports/AsianLaborForce/2016AsianLaborForce.pdf.
18. *Asian American Federation, Profile of New York City's Chinese Americans: 2013 Edition. Available at http://www.aafny.org/cic/briefs/chinese2013.pdf*.
19. *The Center for Economic Opportunity (CEO) Poverty Measure, 2005 - 2012. An Annual Report from the Office of the Mayor. http://www.nyc.gov/html/ceo/downloads/pdf/ceo_poverty_measure_2005_2012.pdf*.
20. Yi, S.S., et al., *Commentary: Persistence and Health-Related Consequences of the Model Minority Stereotype for Asian Americans.* Ethn Dis, 2016. **26**(1): p. 133-8.

21. Palaniappan, L.P., et al., *Call to action: cardiovascular disease in Asian Americans: a science advisory from the American Heart Association.* Circulation, 2010. **122**(12): p. 1242-52.
22. Gupta, L.S., et al., *Prevalence of diabetes in New York City, 2002-2008: comparing foreign-born South Asians and other Asians with U.S.-born whites, blacks, and Hispanics.* Diabetes Care, 2011. **34**(8): p. 1791-3.
23. Shih, M., et al., *Stemming the tide: rising diabetes prevalence and ethnic subgroup variation among Asians in Los Angeles County.* Prev Med, 2014. **63**: p. 90-5.
24. Rajpathak, S.N. and J. Wylie-Rosett, *High prevalence of diabetes and impaired fasting glucose among Chinese immigrants in New York City.* J Immigr Minor Health, 2011. **13**(1): p. 181-3.
25. Schwimmer, J.B., et al., *Prevalence of fatty liver in children and adolescents.* Pediatrics, 2006. **118**(4): p. 1388-93.
26. Malespin, M., et al., *Prevalence and correlates of suspected nonalcoholic fatty liver disease in Chinese American children.* J Clin Gastroenterol, 2015. **49**(4): p. 345-9.
27. Anderson, E.L., et al., *The Prevalence of Non-Alcoholic Fatty Liver Disease in Children and Adolescents: A Systematic Review and Meta-Analysis.* PLoS One, 2015. **10**(10): p. e0140908.
28. Ogden, C.L., et al., *Prevalence of childhood and adult obesity in the United States, 2011-2012.* JAMA, 2014. **311**(8): p. 806-14.
29. Zhou, N. and C.S. Cheah, *Ecological risk model of childhood obesity in Chinese immigrant children.* Appetite, 2015. **90**: p. 99-107.
30. Satia, J.A., et al., *Use of qualitative methods to study diet, acculturation, and health in Chinese-American women.* J Am Diet Assoc, 2000. **100**(8): p. 934-40.
31. *Planting Seeds of Change. Strategies for Engaging Asian Pacific Americans in Healthy Eating and Active Living Initiatives.* 2012; Available from: http://www.cacf.org/documents/Planting%20Seeds%20of%20Change.pdf.
32. Azar, K.M., et al., *Festival foods in the immigrant diet.* J Immigr Minor Health, 2013. **15**(5): p. 953-60.
33. Li, B., P. Adab, and K.K. Cheng, *The role of grandparents in childhood obesity in China - evidence from a mixed methods study.* Int J Behav Nutr Phys Act, 2015. **12**(1): p. 91.

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Table 1. Demographics, Food Journal Project 2017, n=83

	Overall		Chinese American		Non-Chinese		p-value*
	n	%	n	%	n	%	
Age							
8 years	13	15.7	2	9.1	11	18.0	0.57
9 years	21	25.3	4	18.2	17	27.9	
10 years	39	47.0	13	59.1	26	42.6	
11 years	9	10.8	3	13.6	6	9.8	
12 years	1	1.2	0	0	1	1.6	
Sex							
Male	33	40.0	10	45.5	23	37.7	0.52
Female	50	60.0	12	54.6	38	62.3	
Grade							
3rd	16	19.3	3	13.6	13	21.3	0.09
4th	27	32.5	4	18.2	23	37.7	
5th	40	48.2	15	68.2	25	41.0	
Race/Ethnicity							
Hispanic	36	43.4	0	0	36	59.0	<0.001
White	3	3.6	0	0	3	4.9	
Black	12	14.5	0	0	12	19.7	
Asian	32	38.6	22	100	10	16.4	

*Chi-squared tests comparing Chinese American vs. Non-Chinese children

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Table 2. Mean Values of Key Nutrients and Key Nutrients Per 1000 Calories, Food Journal Project 2017 n=83

	Overall (n=83)		**Chinese (n=22)**	**American**	**Non-Chinese (n=61)**		**p-value***
KEY NUTRIENTS	**mean**	**SD**	**mean**	**SD**	**mean**	**SD**	
Energy (kcal)	1694.8	57.5	1641.6	111.2	1714.0	67.6	0.48
Protein (g)	69.5	2.9	78.3	6.6	66.3	3.1	0.07
Total Fat (g)	57.5	2.5	56.2	6.3	58.0	2.6	0.76
Carbohydrate (g)	229.3	8.3	208.6	13.3	236.8	10.1	0.13
Water (g)	1591.2	58.0	1510.2	113.6	1620.5	67.7	0.41
Sugars, total (g)	99.9	5.0	78.1	5.7	107.7	6.3	**0.01**
Fiber, total dietary (g)	15.6	0.7	14.1	1.4	16.1	0.8	0.24
Calcium (mg)	976.8	44.1	900.2	71.5	1004.4	54.0	0.3
Iron (mg)	13.7	0.7	13.3	1.1	13.9	0.8	0.67
Potassium (mg)	2369.6	95.2	2350.7	157.1	2376.4	117.2	0.91
Sodium (mg)	2765.3	111.5	3051.8	241.9	2661.9	122.6	0.12
Vitamin C (mg)	101.7	7.4	83.5	13.1	108.3	8.8	0.14
KEY NUTRIENTS per 1000 kcal							
Protein (g)	41.1	1.1	47.2	2.2	39.0	1.1	**0.001**
Total Fat (g)	33.7	0.8	33.3	1.7	33.9	0.8	0.75

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Carbohydrate (g)	135.8	2.2	129.9	5.0	137.9	2.4	0.12
Water (g)	972.2	30.2	955.1	60.8	978.4	35.1	0.74
Sugars, total (g)	58.5	2.0	48.9	3.7	61.9	2.3	**0.004**
Fiber, total dietary (g)	9.4	0.4	8.8	0.9	9.6	0.4	0.38
Calcium (mg)	577.5	21.4	558.2	45.2	584.5	24.3	0.59
Iron (mg)	8.2	0.3	8.3	0.6	8.2	0.4	0.89
Potassium (mg)	1401.0	34.5	1455.8	72.1	1381.2	39.2	0.34
Sodium (mg)	1637.2	39.5	1862.7	89.2	1555.9	38.4	**<0.001**
Vitamin C (mg)	61.7	4.6	53.5	9.0	64.7	5.4	0.29

*t-tests comparing Chinese American vs. Non-Chinese children

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Table 3. Healthy Eating Index 2010, Food Journal Project 2017 n=83

	Maximum score possible	**Overall (n=83)**		**Chinese American (n=22)**		**Non-Chinese (n=61)**		**p-value***
		mean	**SD**	**mean**	**SD**	**mean**	**SD**	
Adequacy (higher score, higher consumption)								
HEI-2010 COMPONENT 1 TOTAL VEGETABLES	*5.0*	2.4	0.2	2.8	0.4	2.3	0.2	0.19
HEI-2010 COMPONENT 2 GREENS AND BEANS	*5.0*	2.2	0.2	2.3	0.4	2.1	0.3	0.70
HEI-2010 COMPONENT 3 TOTAL FRUIT	*5.0*	4.1	0.2	3.6	0.4	4.3	0.2	0.06
HEI-2010 COMPONENT 4 WHOLE FRUIT	*5.0*	4.1	0.2	3.8	0.4	4.3	0.2	0.30
HEI-2010 COMPONENT 5 WHOLE GRAINS	*10.0*	3.6	0.4	2.3	0.5	4.1	0.5	**0.03**
HEI-2010 COMPONENT 6 DAIRY	*10.0*	7.4	0.3	7.4	0.6	7.4	0.4	0.95
HEI-2010 COMPONENT 7 TOTAL PROTEIN FOODS	*5.0*	4.2	0.1	4.5	0.2	4.1	0.1	0.15
HEI-2010 COMPONENT 8 SEAFOOD AND PLANT PROTEINS	*5.0*	2.4	0.2	3.8	0.4	1.9	0.3	**<0.001**
HEI-2010 COMPONENT 9 FATTY ACID RATIO	*10.0*	4.6	0.4	5.7	0.7	4.2	0.4	0.07
Moderation (higher score, lower consumption)								

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HEI-2010 COMPONENT 10 SODIUM	*10.0*	4.4	0.4	2.7	0.7	5.0	0.4	**0.004**
HEI-2010 COMPONENT 11 REFINED GRAINS	*10.0*	5.2	0.3	4.4	0.7	5.5	0.4	0.15
HEI-2010 COMPONENT 12 EMPTY CALORIES	*20.0*	16.0	0.5	17.9	0.8	15.4	0.6	**0.02**
Total HEI-2010 Score	*100.0*	60.7	1.3	61.2	2.4	60.6	1.5	0.83

*t-tests comparing Chinese American vs. Non-Chinese children