



Published in final edited form as:

J Nutr Educ Behav. 2011 ; 43(5): 308–315. doi:10.1016/j.jneb.2009.11.005.

The association between family meals, TV viewing during meals, and fruit and vegetables and soda and chips intake among Latino children

Abegail A. Andaya, MPH,

a) Position title and organization: 1) Epidemiological Research Assistant at the National Cancer Institute/NIH

Elva M. Arredondo, Ph.D.,

Position title and organization: 1) Assistant Professor of Health Promotion and Behavioral Sciences at San Diego State University (SDSU), Graduate School of Public Health (GSPH); 2) Co-Investigator, Center for Behavioral and Community Health Studies (BACH) at SDSU, GSPH

John E. Alcaraz, Ph.D.,

Position title and organization: 1) Associate Professor of Epidemiology and Biostatistics at SDSU, GSPH

Suzanne P. Lindsay, Ph.D. , MSW, MPH, and

Position title and organization: 1) Assistant Professor of Epidemiology and Biostatistics at SDSU, GSPH; 2) Executive Director, Institute for Public Health (IPH) SDSU, GSPH

John P. Elder, Ph.D., MPH

Position title and organization: 1) Professor of Health Promotion and Behavioral Sciences at SDSU, GSPH; 2) Principal Investigator, BACH at SDSU, GSPH

Abstract

Objective—Examine the relationship of family meals to children’s consumption of fruit and vegetables as well as soda and chips. Additionally, to assess the relationship between viewing TV during family meals and children’s diet.

Design—Cross-sectional study that used a questionnaire completed by parents.

Setting—Thirteen schools in San Diego, CA.

Participants—Seven hundred ninety-four children and their parents.

Analysis—Ordinal regression assessed associations between children’s intake of fruit, vegetables, soda, and chips with family meal frequency and TV viewing during family meals.

Results—Children who consumed breakfast, lunch, or dinner with their family at least 4 days per week ate fruit and vegetables 5 or more times a week 84%, 85%, and 80%, respectively. Of those

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Abegail A. Andaya, MPH, National Cancer Institute, 6120 Executive Blvd., EPS/5009, Rockville, MD 20852, Telephone: (301) 451-4895, Fax: (301) 402-0916, abegail.andaya@gmail.com .

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This study was conducted at San Diego State University’s Graduate School of Public Health: San Diego State University, Graduate School of Public Health, 5000 Campanile Dr., San Diego, CA 92182-4162

children who ate breakfast, lunch, or dinner with their family at least 4 days per week, 40%, 44%, and 43% consumed soda and chips 5 or more times a week, respectively. Children who ate breakfast with their families at least 4 times a week were more likely to consume fruit and vegetables, and children whose TV was never or rarely on during family meals were less likely to consume soda and chips ($P = 0.04$ and $P < 0.001$, respectively).

Conclusions—Interventions geared at increasing the frequency of eating breakfast as a family and decreasing the amount of TV watched during family meals are needed, especially among acculturating Latino families.

INTRODUCTION

Since the 1970's, the prevalence of overweight and obese children and adolescence in the United States has more than tripled.¹⁻³ When compared to non-Latino black and non-Latino white children, Latino children, especially those of Mexican-American descent, tend to be more overweight.³ Data collected from the NHANES 1999-2002 survey revealed that the prevalence of overweight/at risk for overweight Mexican American children and adolescents were 26% for 2-5 year olds, 39% for old children aged 6-11 years, and 41% for 12-19 year olds.⁴ Despite that healthy eating habits, such as a diet high in fruit and vegetables, have been shown to have a protective effect on the development of obesity, children's consumption of fruit and vegetables remains low, while snacks and soft-drinks high in fat and/or sugar are increasing.⁵⁻¹² Among Hispanic children, one study found that at least 50% consumed at least 1 soft-drink and/or non-healthy snack (candy, cookies, chips, etc.) a day, while another study reported only 7% consumed an average of 5/more servings of fruit and vegetables per day.^{10,13} The Hispanic population in the United States comprises 16% (48 million) of the total population and is expected to increase 5-fold by 2010 (compared to 1970 data).¹⁴ Because acculturation plays a large role in the eating habits of Latinos, with studies showing that acculturated Latinos often adopt unhealthy eating habits, it is important to determine what is contributing to the obesity epidemic in this population.¹⁵⁻¹⁷

Aspects of the family meal environment (e.g., characteristics of the family during mealtimes: frequency, atmosphere, and structure) play a crucial role in molding food-related behaviors of youth.¹⁸⁻²¹ Consuming dinner as a family is associated with improved dietary intake in children, and higher frequency of family meals is associated with healthier eating habits, including increased intakes of fruit and vegetables and decreased consumption of soft drinks among children.^{20, 22} Additionally, not only have studies found improved dietary intake with the consumption of more than 3 family meals/week, they have also found that as the frequency of family dinners increased, its beneficial effects becomes more evident, further increasing the consumption of healthier food such as fruit and vegetables.^{20, 23-24} For example, in one study that examined the association of consuming family dinners and dietary intake of 9 to 14 year olds, the odds of eating the recommended amounts of fruit and vegetables increased 45% with a 1 category increase in family dinner frequency, i.e. most days versus never/some days or every day versus most days, while there was a 30% decrease in the odds of eating fried food and drinking soda.²⁰ Similarly, teens participating in The National Longitudinal Study of Adolescent Health (Add Health) who ate 6 or 7 meals as a family per week were less likely to report the consumption of fewer fruit and vegetables when compared to those eating 3/fewer meals as a family per week.²³

Despite the potential benefits of consuming family dinners, some studies found that watching TV during meals is associated with insufficient consumption of fruit and vegetables and increased intake of obesogenic food.^{18-19, 25-27} Furthermore, the frequency of family meals, particularly the consumption of family dinners, has been declining over time, with about 50% of adults and adolescents reporting they consumed meals as a family

more than 4 times a week.²⁸ Although studies have linked family dinners and/or TV viewing during family meals to dietary intake in children/adolescents, research is limited in that studies have primarily focused on adolescents,^{18, 22, 26, 29} are not generalizable to ethnic minorities because participants were largely white,^{20, 30} only assessed the frequency of family dinners,^{18, 20, 25, 30} only examined the association of TV viewing during family dinners,²⁵⁻²⁶ and have not examined the association between watching TV during family meals and dietary intake.^{19, 29-33}

To address these gaps, the first objective of the present study was to determine whether an association between eating breakfast, lunch (after school, around 2pm), or dinner as a family and children's dietary intake exists. It was hypothesized that children who eat dinner with their families at least 4 times a week were more likely to consume fruit and vegetables, and less likely to consume soda and chips, compared to children who eat dinner with their families less than 4 times a week. The second objective was to examine the relationship between watching TV during the consumption of family meals and children's fruit and vegetables and soda and chips intake. It was hypothesized that children whose TV was never/rarely on during family meals were more likely to eat fruit and vegetables, and less likely to consume soda and chips, than those children whose TV was sometimes and often/always on during family meals.

METHODS

Study Sample

The study population included 812 children (10% did not identify as Latinos) who attended 1 of 13 public elementary schools in South Bay, San Diego, CA. A criteria for school participation included having a Latino student population of at least 70%. Parents were informed about the study through: (i) flyers sent home with their children; (ii) phone calls; (iii) face-to-face contact at the schools; (iv) presentations at back-to-school night/other events. Eligible children: (i) were enrolled in K-2nd grade for the 2003-2004 school year; (ii) lived within school attendance boundaries; (iii) had no major health problems; (iv) their family had no intention of moving from the area within a year of enrollment. Participants were excluded from analyses if they were missing data for 1 of the 2 main outcomes - frequency of consuming fruit and vegetables and soda and chips within the past month - leaving 794 (out of 812) children and their parents.

Study Design

This cross-sectional study used baseline data (collected August 2003- January 2004) obtained from *Aventuras para Niños*, a community trial aimed at preventing overweight/obesity among Latino children in K-2nd grade. A self-administered questionnaire (available in English/Spanish) was given to the parent of each eligible child. Bilingual evaluation assistants (EAs) were available to individually assist with the questionnaire. San Diego State University's Institutional Review Board reviewed and verified this study as exempt in accordance with the University's Assurance and federal requirements pertaining to human subjects.

Measurements

Measurements assessed included: 1) demographics-responder's age, ethnicity, family monthly income, marital status, employment status, years of formal education, number of children under age 18 in the household, and number of adults living in the household; 2) acculturation-assessed in multiple ways: (i) use of the second Acculturation Rating Scale for Mexican-Americans, which included 30 questions with a 5-point Likert scale.³⁴ Answers, which ranged from "not at all" to "often/almost always", were then used to assign an

acculturation score to each respondent, with a higher score signifying that they assimilated more with the Anglo culture compared to their own Mexican culture; (ii) questions asking whether the respondent was born in the United States, length in the United States, and length in their current location; 3) child characteristics-age, gender, and food preference which was assessed by asking “Which food does your child prefer?”. Responses included three choices: American food (hamburgers, hot dogs), Mexican food (quesadillas), or preferring both American and Mexican food equally; 4) physical activity of the child-during a typical week, respondents were asked how many days they encouraged their child to exercise/be physically active, how many days they (or another adult in the household) engaged in physical activity with the child, and how many days they (or another adult in the household) drove their child to a location where they could be physically active/play sports; 5) past/current health of the respondent; 6) family history of diabetes; 7) knowledge of the prevalence of obesity; and 8) eating habits of the child/family-responsibility for feeding, deciding a child’s portion size, and deciding whether a child has eaten the right food.

Height/weight (which were each measured three times by the EAs) were used to calculate the child’s BMI, which was based on the Centers for Disease Control and Prevention’s categorizations that are both age and gender specific.³⁵

Child diet was assessed using a modified version of the Block Food Frequency survey, which has a scaling system similar to other food frequency questionnaires that have been validated in previous studies where parents served as a proxy on the questionnaire for their children.³⁶⁻³⁹ Food items used in the questionnaire were identified from previous studies with this target population and were categorized by 3 independent reviewers as to their contribution to becoming obese.⁴⁰ Parents were asked to rate how often their child consumed each food item on a scale of 1 to 10 through the following question: “In the past month, about how often did your child eat/drink each of the following items?”. Answers ranged from (1) never consuming these food items to (5) consuming these food items 5-6 times/week to (10) consuming these food items 5/more times a day. Before collapsing the responses into 3 categories (2 times a week/less, 3-4 times a week, and 5/more times a week), each response was assigned a score based on the number of times a child consumed a food item within a week. For response choices that included a range (1-3 times a month, 1-2 times a week, 3-4 times a week, and 5-6 times a week), the midpoint value of the range was taken. Consumption of fruit and vegetables were then integrated by adding the assigned scores from each food group to each other. Consumption of soda and chips were combined using the same strategy. The child’s eating habit was then categorized into 1 of 3 categories: 2 times a week/less, 3-4 times a week, and 5/more times a week. Child consumption of vegetables (not potatoes and salad), fruit (not juices), regular soda (Coke®, Sprite®, orange soda), and chips (potato chips, corn chips, tortilla chips, and Cheetos®) were assessed in this study since many health promotion programs attempt to target these behaviors due to their association with obesity risk.⁴¹⁻⁴³

Frequency of eating breakfast, lunch, and dinner as a family was assessed through the following: “Which of the following meals does your family eat together at least 4/more days per week?”. Respondents were asked this question for breakfast, lunch, and dinner and answered “yes/no”.

The frequency that a family watched TV during their meals together was assessed through the following: “How often does your family watch TV during dinner and other meals?”. Original responses ranged from never (1) to always (5), and then were collapsed into 3 categories: never/rarely, sometimes, and often/always.

Statistical Analysis

Data were analyzed using Statistical Analysis System (SAS) software (version 9.1.3, SAS Institute, Inc., Cary, NC, 2005). Ordinal regression was used to perform univariate analysis and multivariate analysis. Collinearity and confounding amongst the independent variables were assessed, and in the case of the ordinal regression models, the proportional odds assumption was tested. All tests of significance were performed at an alpha of 0.05.

Separate ordinal regression models were constructed to assess factors associated with the 2 primary outcome variables, frequency of consuming fruit and vegetables and soda and chips within the past week. Univariate analysis was first used to examine the relationship of each independent variable to each outcome of interest. A variable univariately associated with an outcome was added to the preliminary multivariate model for that outcome. For comparability, the variable was also added to the preliminary multivariate model of the other outcome. Thus, both preliminary models included the same independent variables. Regardless of their significance, the 4 main exposures of interest (consuming breakfast, lunch, and dinner as a family at least 4 times a week and watching TV during family meals) were also included in the preliminary models.

Non-significant variables in both preliminary models were evaluated for confounding. If the removal of a non-significant variable from either model changed the odds ratio of at least 1 exposure of interest by more than 10%, the non-significant variable was a confounder and was left in the final models for both outcomes. Otherwise, the variable was dropped from both models. Thus, both final models included the same adjustment variables. Regardless of their significance, the 4 main exposures of interest remained in both final models.

RESULTS

Participant Characteristics

Table 1 illustrates the demographic characteristics of participants enrolled in the study. The mean age of children who participated in this study was 6.4 years (range: 4-10 years). The proportions of enrolled boys and girls were similar and over half (52%) of the children had a normal BMI.

The average age of parents in this study was 34 years, with approximately 70% of the parents being married and 62% being unemployed. Only 6% were college graduates, while 67% completed high school/less. More than half of the respondents (60%) reported a monthly family income of less than/equal to \$2,000.

A majority of the respondents considered themselves to be Latino (90%) and less than a third (28%) were born in the United States. Although the average length of time respondents have lived in the United States was 16.3 years, and the mean acculturation score was -1.36 (range: -4.00 to 2.94), indicating primary identification with the Mexican culture.

Fruit And Vegetables Intake

80% of respondents indicated their child consumed fruit and vegetables 5/more times per week, while 9% reported consumption of these foods by their child 3-4 times a week and 11% consumed fruit and vegetables at most 2 times per week. Of those children who consumed breakfast, lunch, or dinner with their family at least 4 days per week, 84%, 85%, and 80% ate fruit and vegetables 5/more times a week, respectively.

The final model for fruit and vegetables consumption is shown in Table 2. Although non-significant, parent/primary caregiver participation in physical activity with their child and length of time in the United States were retained for comparability with the final model for

soda and chips consumption. After adjustment, consumption of breakfast as a family at least 4 times per week, sex of the child, age of the child, respondent employment status, food preference of the child, and encouragement by the respondent for the child to exercise were significantly related to consuming fruit and vegetables (p -value: 0.04, <0.001, 0.01, 0.05, 0.04, and <0.001, respectively).

Soda And Chips Intake

More than a third of respondents (35%) indicated their child consumed either soda and chips up to 2 times per week and 43% of respondents have children that consumed these food 5/ more times a week. Of those children who consumed breakfast, lunch, or dinner with their family at least 4 days per week, 40%, 44%, and 43% ate soda and chips 5/more times a week, respectively. More than half (56%) of children who often/always watch TV as family during meals consumed soda and chips 5/more times a week, while 42% of those who never/rarely watched TV as a family at mealtimes consumed soda and chips never to 2 times a week.

Table 3 illustrates the final multivariate model for soda and chips consumption, with a number of non-significant variables retained for comparability with the final model for fruit and vegetables consumption. After adjusting for all other variables in the model, watching TV during the consumption of family meals was significantly associated to eating soda and chips (p -value: <0.001).

DISCUSSION

Studies found that consuming family dinners was associated with improved dietary intake among youth.^{20, 22-23} However, this study found that consuming breakfast as a family played a greater role in healthier eating habits among Latino children compared to the consumption of other family meals. Consistent with previous studies, never/rarely watching TV during the consumption of family meals was shown to have a positive impact on the dietary intake of children.^{18, 25-26} Although no other associations were found between eating family meals together, watching TV during family meals, and/or improved dietary consumption, other predictors of dietary intake were found. In particular, the consumption of fruit and vegetables was higher among girls, younger children, children who prefer to eat both American and Mexican food, children whose parents encourage them to exercise 5 days/week or more, and children with an unemployed parent.

In this low-aculturated, predominantly Latino population, breakfast played an important role in improved dietary intake despite consuming dinner more frequently as a family, compared to breakfast or lunch. Although family dinners were consumed more often than breakfast or lunch, as in other U.S. households, it is possible that this study population follows the traditional eating habits of their own culture, which is supported by the mean acculturation score of participants in this study and possibly the close proximity to the United States/Mexican border. Thus, more nutritional emphasis is placed on breakfast and lunch, which traditionally are significant meals for Latino families compared to dinner.⁴⁴ Factors like children attending school and family members working during the day make it difficult for the family to join together during lunch time, placing more importance on consuming breakfast as a family. Thus, health promotion programs should encourage acculturating Latino families to maintain their traditional eating patterns to potentially avoid adopting unhealthy eating habits of the American culture.

Eating breakfast as a family may encourage healthy eating among children through parental role modeling, where children learn through imitation and the parent essentially becomes a model of healthy eating. Studies have found that parental consumption is related to fruit/

vegetable intake among youth.^{30, 45-47} By observing their parents take pleasure in consuming fruit and vegetables, children are likely to learn to prefer them as well. Additionally, parents who engage in physical activity with their children have been shown to have a positive impact on their child's fruit/vegetable intake, which is further supported by this study-children whose parents encouraged them to exercise 5 days/week or more was associated with increased consumption of fruit and vegetables.⁴⁸ Furthermore, studies have shown that parental employment status impacts family meal consumption, with unemployed parents having family meals more frequently.²⁴ Because many children in this study have an unemployed parent, it is possible that many family meals are home cooked meals, thereby allowing parents to directly have more influence on what their child is eating. Studies have found that children are more likely to consume ready-made meals, which is likely to include fewer fruit and vegetables compared to meals prepared at home, when not consuming meals as a family.^{21, 29} Thus, this study supports the importance of family meals through the ability of the parent to create a healthy lifestyle environment.

Watching TV during family meals could also impact the dietary intake of children due to the influential effects of advertisements. Studies have shown that a majority of TV commercials advertise high caloric food, leading to overconsumption and an increased desire for these items compared to healthier food choices, such as fruit and vegetables, which are rarely advertised.⁴⁹⁻⁵⁰ Additionally, watching TV during family meals could disrupt any discussion about healthy eating that studies found occur during these meals, thereby possibly contributing to the increased consumption of obesogenic food.⁵¹

The present study had several limitations. In particular, the questionnaire did not take into account serving size, but rather the number of times the child ate a certain food item. Additionally, because parents may not know what their child is eating outside of the home, their report is likely to be an underestimation/overestimation of food consumed. Poor recall or social desirability may have led to over-reporting fruit and vegetables and under-reporting soda and chips consumption. Furthermore, this sample is not generalizable to the majority of the Latino population who were born and are living in the United States, who have a monthly household income greater than \$2000 and are married/not married in equal proportions.⁵² Finally, the cross-sectional nature of this analysis precludes finding a causal association between the consumption of fruit and vegetables or soda and chips with eating meals as a family and/or viewing TV during family meals.

Despite limitations, several strengths of the study are present as well. They include a large, community based sample size drawn from a border community with a diverse population (San Diego's population of approximately 3.1 million is distributed as follows: 51% white (non-Latino), 29% Latino, 10% Asian and other Pacific Islanders, and 5% African American)⁵³; the assessment of the relationship between all family meals, not just dinner, to dietary intake among children; and use of dietary questionnaire that was not only validated among Latina women and geared towards families who had children, but that also provided a detailed description of food being assessed.

CONCLUSION

The present findings add to the growing understanding of how the environment can influence one's dietary choices. This study emphasized the importance of families eating meals together, as well as consuming these meals without any distractions such as watching TV. Longitudinal studies are needed to examine the possible long-term benefits of consuming breakfast as a family and decreasing the amount of TV watched during family meals. Additionally, nutrition education programs should take into account age and gender

when trying to impact the consumption of fruit, vegetables, soda, and chips, especially among families that are acculturating.

Acknowledgments

This effort was funded by the National Heart Lung and Blood Institute (RO1 HL073776) and the American Cancer Society (PFT-04-156-01).

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Table 1

Demographic information at baseline (N=794), Aventuras Para Niños Study, August 2003-January 2004

<i>Parent characteristics</i>	<i>n (%)</i>
Acculturation score	-1.3 (1.2) ^a
Age, years	34.4 (7.7) ^a
Country family was born	
United States	221 (28%)
Mexico/another country	564 (71%)
Ethnicity	
Neither Mexican/Hispanic	58 (10%)
Mexican/Mexican-American	244 (45%)
Hispanic/Latino	243 (45%)
Education	
High school/less	535 (67%)
Some college/higher	259 (33%)
Employment status	
Unemployed	490 (62%)
Employed	304 (38%)
Length in U.S., years	16.3 (12.2) ^a
Marital status	
Not Married	238 (30%)
Married	556 (70%)
Monthly income	
≤ \$2,000	451 (60%)
≥ \$2,001	303 (40%)
<i>Child characteristics</i>	<i>n (%)</i>
Age, years	6.4 (0.9) ^a
Body mass index	
Underweight	14 (2%)
Normal	416 (52%)
At risk for overweight	137 (17%)
Overweight	227 (29%)
Sex	
Male	403 (51%)
Female	391 (49%)

^aMean (Standard deviation).

Table 2

Final model assessing the relationship of decreasing frequency of fruit/vegetables consumption^a, Aventuras Para Niños, San Diego, CA (N=794)

Characteristic	Category	Odds ratio	95% confidence interval	p-value
Sex of child				<0.001
	Male	1.00	reference	
	Female	0.50	0.33, 0.74	
Age of child, 1 year intervals	--	1.30	1.07, 1.59	0.010
Employment status				0.049
	Unemployed	1.00	reference	
	Employed	1.48	1.00, 2.19	
Length in United States, 1 year intervals		1.00	0.98, 1.02	0.939
Food preference of child				0.040
	American food	1.00	reference	
	Mexican food	0.60	0.31, 1.18	
	Both equally	0.52	0.31, 0.86	
Parent encouragement of child to exercise				<0.001
	4 days/week or less	1.00	reference	
	5/more days/week	0.42	0.27, 0.67	
Parent participation in physical activity with child				0.335
	4 days/week or less	1.00	reference	
	5/more days/week	0.73	0.38, 1.39	
TV viewing during family meals				0.338
	Never/rarely	1.00	reference	
	Sometimes	1.41	0.89, 2.25	
	Often/Always	1.26	0.79, 2.02	
Breakfast as a family, 4 times/week				0.040
	No	1.00	reference	
	Yes	0.64	0.42, 0.98	
Lunch as a family, 4 times/week				0.256
	No	1.00	reference	
	Yes	0.77	0.49, 1.21	
Dinner as a family, 4 times/week				0.411
	No	1.00	reference	
	Yes	0.78	0.43 1.42	

^aDependent variable is categorized as never to 2 times/week, 3-4 times/week, and 5/more times/week.

Table 3

Final model assessing the relationship of decreasing frequency of soda/chips consumption^a, Aventuras Para Niños, San Diego, CA (N=794)

Characteristic	Category	Odds ratio	95% confidence interval	p-value
Sex of child				0.084
	Male	1.00	reference	
	Female	1.28	0.97, 1.70	
Age of child, 1 year intervals	--	0.87	0.75, 1.01	0.068
Employment status				0.659
	Unemployed	1.00	reference	
	Employed	1.07	0.79, 1.44	
Length in United States, 1 year interval		0.989	0.98, 1.00	0.053
Food preference of child				0.706
	American food	1.00	reference	
	Mexican food	1.01	0.59, 1.73	
	Both equally	0.88	0.58, 1.34	
Parent encouragement of child to exercise				0.441
	4 days/week or less	1.00	reference	
	5/more days/week	0.88	0.64, 1.21	
Parent participation in physical activity with child				0.226
	4 days/week or less	1.00	reference	
	5/more days/week	1.27	0.86, 1.88	
TV viewing during family meals				<0.001
	Never/rarely	1.00	reference	
	Sometimes	0.67	0.48, 0.93	
	Often/Always	0.46	0.32, 0.65	
Breakfast as a family, 4 times/week				0.308
	No	1.00	reference	
	Yes	1.17	0.87, 1.57	
Lunch as a family, 4 times/week				0.376
	No	1.00	reference	
	Yes	0.87	0.63, 1.19	
Dinner as a family, 4 times/week				0.427
	No	1.00	reference	
	Yes	1.201	0.76, 1.91	

^aDependent variable is categorized as never to 2 times/week, 3-4 times/week, and 5/more times/week.