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The Association Of Acculturation And Poor Nutritional Behavior Among Latinos In The Los Angeles County Health Survey 2007

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Latinos in the Los Angeles County Health Survey 2007.

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Abstract

Objective

This study aimed to explore the associations between acculturation and nutritional behaviors among Latino adults living in Los Angeles County.

Methods

We studied 2562 Latinos aged 18 years and older who responded to the 2007 Los Angeles County Health Survey. Using a modified acculturation scale incorporating language(s) spoken at home, nativity/birthplace, and years lived in the United States, the study population was categorized into low, medium, or high acculturation levels. Two key nutritional behaviors were assessed: whether the individual did not consume five or more servings of fruits/vegetables in the past day and whether the individual ate fast food more than once in the past month. A summary score of nutritional behavior ranging from 0 (healthy) to 2 (poor) behaviors was created. Multivariable ordered logistic regression was used to examine the associations between acculturation and nutritional behaviors, controlling for sociodemographic characteristics. All analyses employed population weights to account for the complex sample survey design.

Results

Overall, 88.0% reported not consuming five or more servings of fruits/vegetables, 73.0% reported eating fast food more frequently than once a month, and 64.9% reported both poor behaviors. In multivariable analyses, poorer nutritional behaviors were associated with higher levels of acculturation, including speaking English only vs. Spanish only at home (adjusted odds ratio [AOR]=1.83; 95% confidence interval [CI]=1.30-2.58) and, although not significantly so, being US born vs. foreign born and in the US <10 years

(AOR=1.30; 95% CI=0.88-1.93). Adjusted for all other variables in the model, speaking only English was independently associated with exhibiting poor nutritional behavior. With respect to the composite measure of acculturation, individuals in the high acculturation group were significantly more likely to engage in poorer nutritional behaviors than were those in the low acculturation group (AOR=1.42; 95% CI=1.01-2.02).

Conclusion

Latinos on the high end of acculturation exhibited less healthy nutritional behaviors compared with the low acculturation group. Greater efforts are needed to understand and counteract potentially adverse changes in diet that accompany greater acculturation.

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Characteristic	Low (n = 602)	Medium (n = 1126)	High (n = 914)	p[†]
Age (years), mean ± SE	32.1 ± 0.4	44.0 ± 0.5	39.0 ± 0.7	<0.001
Female, n (%)	352 (49.9)	615 (51.2)	473 (47.7)	0.400
Education, n (%)				<0.001
Less than high school	407 (66.6)	630 (55.7)	153 (18.6)	
High school graduate	102 (19.4)	206 (19.0)	257 (29.0)	
At least some college	84 (13.9)	273 (25.3)	500 (52.5)	
Married, n (%)	318 (13.1)	641 (21.4)	416 (13.7)	<0.001
Health Insurance, n (%)	268 (44.8)	779 (69.3)	777 (84.5)	<0.001
Mexican American, n(%)	446 (76.2)	776 (70.4)	914 (79.2)	<0.001
Federal Poverty Level, n (%)				<0.001
0-99% FPL	389 (66.8)	515 (47.6)	174 (20.9)	
100%-199% FPL	164 (25.7)	365 (30.1)	232 (28.5)	
200%-299% FPL	34 (5.4)	132 (11.6)	149 (15.7)	
300% or above FPL	15 (2.2)	128 (10.8)	359 (34.9)	
Fast Food Consumption				
More than 1x a Month	401 (73.7)	693 (66.2)	695 (80.4)	<0.001
Fruits And Vegetables				
Did not meet Rec. Servings	494 (88.9)	935 (87.0)	785 (88.7)	0.527

* Numbers may not sum to 2562 due to missing data, and percentages may not sum to 100% due to rounding. All sample sizes are unweighted, and all means, standard errors (SEs), and percentages are weighted.

[†] P-value for analysis of variance F-test (continuous variable) or χ^2 test (categorical variable).

Table 2. Description of the Sample by Nutritional Behavior and Acculturation Level* (n=2562)

Characteristic	Fruits and Vegetable Servings Not Met	p	Fast Food Frequency More than 1x/Month	p	Both Behaviors	p
Acculturation		0.527		<0.001		<0.001
Low, n (%)	494 (88.8)		401 (73.7)		356 (65.8)	
Medium, n (%)	935 (87.0)		693 (66.2)		606 (58.2)	
High, n (%)	785 (88.7)		695 (80.4)		630 (71.9)	
Total, n (%)	2214 (88.0)	<0.001	1789 (73.0)	<0.001	1582 (64.9)	<0.001

* Numbers may not sum to 2562 due to missing data, and percentages may not sum to 100% due to rounding. All sample sizes are unweighted, and all means, standard errors (SEs), and percentages are weighted.

Table 3. Ordered logistic regression analyses of associations between acculturation measures and poor nutrition behavior (N=2532)

Characteristic	Unadjusted OR (95%C I)	p	Age and Sex Adjusted OR (95%C I)	p	Fully Adjusted* OR (95%C I)	p
Language Spoken at Home						
Spanish Only	1.00	---	1.00	---	1.00	---
Spanish and English	1.30 (1.06, 1.62)	0.013	1.30 (1.05, 1.61)	0.019	1.19 (0.94, 1.51)	0.15
English Only	1.81 (1.37, 2.40)	<0.001	2.13 (1.59, 2.9)	<0.001	1.83 (1.30, 2.58)	<0.001
Nativity						
Foreign-born, in US <10 years	1.00	---	1.00	---	1.00	---
Foreign-born, in US 10-19 years	0.74 (0.52, 1.04)	0.081	0.90 (0.63, 1.27)	0.540	0.88 (0.60, 1.22)	0.38
Foreign-born, in US 20+ years	0.62 (0.45, 0.84)	0.002	1.08 (0.77, 1.53)	0.650	0.99 (0.69, 1.43)	0.98o
US-born	1.17 (0.85, 1.61)	0.352	1.55 (1.10, 1.48)	0.010	1.30 (0.88, 1.93)	0.19
Acculturation Level						
Low	1.00	---	1.00	---	1.00	---
Medium	0.72 (0.56, 0.92)	0.008	0.98 (0.76, 1.27)	0.890	0.93 (0.71, 1.22)	0.58
High	1.32 (1.01, 1.73)	0.042	1.64 (1.23, 2.19)	<0.001	1.42 (1.01, 2.02)	0.047

*Adjusted for age, sex, education, marriage status, health insurance status, Mexican American status, FPL level.

Introduction

The role of acculturation on health behaviors and outcomes in Latino populations in the United States is complex and much remains to be understood (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2012). Acculturation is defined as the assimilation of an individual to the language, values, and culture of another group (LaFromboise, Coleman, & Gerton, 1993), and is a complex socio-psychological process that impacts Latinos at both the individual and family levels (Miranda, Bilot, Peluso, Berman, & Van Meek, 2006). Despite the existence of the "Latino Health Paradox," which argues that immigrants are generally healthier and have lower mortality compared with the US-born population, adoption of acculturated "Americanized" health behaviors and subsequent worse health outcomes diminish any buffering by immigration status alone (Carter-Pokras et al., 2008). Compared with their less acculturated counterparts, more acculturated Latinos have increased cancer rates, infant mortality, indicators of poor physical and mental health, and risky behaviors such as illicit drug use, alcohol abuse, and smoking (Abraido-Lanza, Chao, & Florez, 2005) (Vega & Amaro, 1994).

Assimilation of food choices and patterns of the host country plays a particularly important role in dietary behaviors and, consequently, chronic disease outcomes (Himmelgreen et al., 2004). Latinos who are more acculturated to US culture may fare better in terms of access to care and socioeconomic status, but have been found to have poorer diets than less acculturated Latinos (Fitzgerald, Damio, Segura-Perez, & Perez-Escamilla, 2008; Kandula et al., 2008). More acculturated Latinos report lower fiber intake, higher fat intake, higher cholesterol, and high salt intake, compared with the less acculturated group (Mainous, Diaz, & Geesey, 2008) (Lin, Bermudez, & Tucker,

2003). Latinos who have been living longer in the United States or are US-born are less likely to meet the five servings of fruits and vegetables requirement, and more likely consume fast food and sugary drinks than recent immigrants (Galvez et al., 2008) (Batis, Hernandez-Barrera, Barquera, Rivera, & Popkin, 2011). Other factors, such as income and education may also determine level of access to an American lifestyle (Gordon-Larsen, Harris, Ward, & Popkin, 2003).

Adolescents of immigrant Latino families develop a preference for obesity-related "Westernized" activities and foods, including sedentary activities such as watching TV, and eating fast foods (Unger et al., 2004). Poor dietary behavior leads to higher morbidity and mortality from lifestyle-related diseases in the more acculturated group. Obesity rates are notably higher within first and second generation immigrants, and up to a fourfold increase risk of obesity in those who have lived in the US for 15 years or more (Sussner, Lindsay, Greaney, & Peterson, 2008).

In this study, we compared dietary behaviors of self-identified Latino adults 18 years and older in Los Angeles County by acculturation level, taking into consideration appropriate demographic characteristics and socioeconomic factors. Los Angeles County has the largest Hispanic population of any county in the nation, totaling at around 4.7 million, and one of the largest increases in the population at 43% between 2000 and 2010 (Abraido-Lanza, Armbrister, Florez, & Aguirre, 2006). The findings of this study have important implications in the design of future public health programs and nutritional interventions taliored to each cultural level for the Latino American population.

Methods

Data Source

The data for this study come from the 2007 Los Angeles County Health Survey (LACHS). The LACHS is a population-based biennial telephone survey, based upon the Behavioral Risk Factor Surveillance System (BRFSS), which is used for county health monitoring purposes to provide cross-sectional data concerning the health of Los Angeles County residents. One random adult respondent from each household was selected for an interview, which was administered in one of six languages: English, Spanish, Cantonese, Mandarin, Korean, or Vietnamese. The survey took place from April to December 2007. Response and cooperation rates were 18% and 40%, respectively. A total of 7,200 housed, non-institutionalized adult respondents aged 18 years or older participated in the survey. Further details of the LACHS methodology are described elsewhere (Simon et al., 2001).

We looked at dietary behavior by determining if an adult had the recommended 5+ servings of fruits and vegetables by a one day food recall and by the number of times they ate fast food in a given period, and the relationship of these behaviors to the acculturation status of Latino adults.

Dependent Variables

The main outcome of interest was unhealthy food behaviors, which was assessed by (1) one day recall of fruits and vegetable servings and (2) frequency of fast food consumption. Information about fruits and vegetable servings was collected from the answer to the question, "How many total servings of fruits and vegetables did you eat yesterday?" If necessary, interviewers gave examples and quantities of a serving of

fruits and vegetables. One point was assigned if the participant did not meet the required 5 servings of fruits and vegetables a day. Fast food frequency was assessed using the following categories: 4 or more times per week; 1-3 times per week; less than once a week but more than once a month; less than once a month; or never. The variables w dichotomized and a point was given for presence of poor nutritional behavior, which was determined to be eating fast food more than once a month. A total tally of poor food behaviors was then calculated (ranging from 0 to 2).

Independent Variables

The acculturation scale used in this analysis was based upon the Multi-Ethnic Study of Atherosclerosis (MESA) acculturation study of Latinos and Chinese-Americans, with minimal modifications. (Kandula et al., 2008). Each individual was assigned an acculturation score from 0 to 5 based upon three proxy markers. A subscore ranging from 0 to 2 was assigned to participants based on their answer to mentioning which language(s) is spoken at home (0 = Spanish only, 1 = English and Spanish, and 2 = English only). A second subscore of 0 to 3 was assigned to participants based upon birthplace and, if foreign-born, years spent in the United States (0 = foreign born and lived in the US <10 years, 1 = foreign born and lived in the US 10-19 years, 2 = foreign born and lived in the US ≥20 years, and 3 = US born,). These two subscores were summed to obtain the acculturation score with 0 (least acculturated) to 5 (most acculturated). Acculturation level was then categorized as low (0-1), medium (2-3) or high (4-5).

Covariates

The data for covariates were obtained as follows. Age and sex were self-reported. Education was determined by highest level of education received by the respondent. Health insurance was categorized by having any type of health insurance at all (private, public, Medicare) or none. Mexican American status was determined by self-identification of Mexican heritage. Federal Poverty Level (FPL) was determined as a percentage of FPL by 2007 FPL standards and used as a proxy for income.

Statistical Analysis

The analysis for this study proceeded in the following steps. First, characteristics of the sample were described according to level of acculturation. Sociodemographic differences across levels were assessed using the PROC SURVEY procedures were employed for descriptive analysis, and the corresponding LOGISTIC procedure was used to calculate odds ratios. Next the prevalence of poor nutritional behaviors was calculated by each acculturation measure (language, nativity, and composite measure). Bivariate analyses were performed using analysis of variance F-tests (for continuous variables) and χ2 tests (for categorical variables). Finally, ordered logistic regression was used to examine the associations between acculturation and the composite measure of poor nutritional behaviors. Three sets of models were fitted: unadjusted, age- and sex-adjusted, and fully adjusted for all sociodemographic characteristics. Odds ratios (ORs) and 95% confidence intervals (CIs) are presented. All analyses were performed with SAS Version 9.2 (SAS Institute, Cary, NC). The SURVEY procedures were used to account for the weighting and complex survey design.

Results

For the purpose of the analysis, the sample was limited to Latino respondents aged 18+ years who had complete data on the food behavior questions, the acculturation questions, and the sociodemographic characteristics.

Description of the Sample

The sample for this study was set to 2562 participants. The sample characteristics are summarized in Table 1. On average, the medium and high acculturation level groups were older than the low acculturation group (mean age 44.0, 39.0 vs. 32.1, P <0.001). Highest education level achieved differed greatly among the acculturation groups. The majority of low and medium acculturated Latinos had received less than a high school education (66.6%, 55.7%), while the majority of high acculturation Latinos had at least some college education (52.5%, P <0.001). The proportion of people with some form of health insurance increased significantly with level of acculturation (44.8%, 69.3%, and 84.5%, respectively, P <0.001). The proportion of Mexican Americans in each group was fairly consistent at around 70-80%. There was a strong positive association between level of acculturation and household income. Two-thirds (66.8%) of the low acculturation group reported as being in the 0-99% FPL category. In this same FPL category, this proportion dropped almost 20% with the medium acculturation group compared with the low group, and dropped more than 20% in the high acculturation group compared with the medium group.

Prevalence of Poor Nutritional Behaviors

Overall, 88.0% reported not consuming the recommended 5+ servings of fruits and vegetables on a one-day recall, 73.0% reported eating fast food more frequently than once a month, and 64.9% reported both poor nutritional behaviors (Table 2). Not meeting recommended 5+ servings of fruits and vegetables in one day was high across all groups, and fast food consumption was greatest among those of high acculturation levels (80.4%). Surprisingly, fast food consumption frequency was lowest in the medium acculturation group (66.2%). Overall, the high acculturation group showed the highest proportion in the prevalence of both poor nutritional behaviors (71.9%).

Associations between Acculturation Measures and Poor Nutritional Behaviors

The ordered logistic regression results are summarized in Table 3 below. In age- and sex-adjusted analyses, the increasing odds of poorer nutritional behaviors were still seen among Spanish and English speakers (OR=1.30; 95% CI=1.05-1.61) and among English only speakers (OR= 2.13; 95% CI=1.59-2.9) compared with Spanish only speakers. The association of speaking only English and was consistently significant throughout the models (P <0.001) and indicative of worse nutritional behavior. Adjusted for all other variables in the model, speaking only English was highly independently associated with having poor nutritional behavior.

US Born Latinos remained at a higher likelihood of having worse dietary behavior, although this was not significant throughout the models. Adjusted for age and sex, US born participants were found to be 1.55 times as likely to exhibit poor nutritional

behavior (95% CI=1.10-1.48) and 1.33 times as likely. No real significant association was found between nativity/place of birth in the unadjusted model.

Low and medium acculturation levels (AOR=0.93; 95% CI=0.71-1.22) seemed to show more or less the same level of risk for poor nutritional behavior. In the unadjusted model, high acculturation Latinos were 1.64 times as likely as Low acculturation Latinos to exhibit poor nutritional behavior (95% CI=1.23-2.19). In the multivariable analyses that controlled for all of the sociodemographic characteristics, English only (OR=1.83; 95% CI=1.30-2.58) and high acculturation level (OR=1.42 95% CI=1.01-2.02) continued to be associated with higher odds of poor nutritional behaviors.

Discussion

Overall, this study found that a high proportion of Latino adults in Los Angeles County reported not eating the recommended 5+ servings of fruits and vegetables in the past day and reported eating fast food more than once a week. In addition, 64.9% reported both poor food behaviors. Poor food behaviors were significantly associated with English language only and high overall acculturation level, even after controlling for sociodemographic characteristics. Age appeared to be negative confounder in that adjusting for age resulted in generally larger ORs further away from the null. This likely reflects the relationship that as people grow older they may be more conscious about their diet and nutrition, and thus may engage in healthier behavior.

The analyses of poor nutritional behavior in our study also speaks volumes about the food environment for Latinos living in California. Indicators of fast food consumption frequency is particularly important in California, where the average Retail Food Environment Index (RFEI) for adults is 4.5, which means that the average Californian

adult has more than four times as many fast-food restaurants and convenience stores near to home as the number of grocery stores and produce vendors (Babey, Diamant, Hastert, Goldstein, & al, 2008). In addition, a high percentage of Latinos who did not meet the recommended servings per day indicated that the quality of the fruits and vegetables that they could procure was of high quality (data not shown). A subsample of 353 respondents answered additional questions about nutritional knowledge and policy. In this subsample, more people with worse nutritional behavior reported drinking soda at least once or more a day, and this was found to be significant (p=0.002). This suggests that a broader range of poor nutritional behaviors is likely to cluster together and adversely affect health status.

Unfortunately, there were a limited number of diet-related questions in the core survey and no biomarkers to reference the accuracy of self-reported answers. In addition, there were potential social desirability biases and other confounders inherent in self-report surveys, which may not necessarily have been accounted for in our analysis. The cross-sectional nature of this survey also only made association studies, not causation studies, possible between covariates of interest.

Some of the limitations in this study highlight an ongoing concern about the difficulty in measuring acculturation accurately and fairly. Current models utilize the bidimensional theory of acculturation to explain health differences. The bidimensional theory of acculturation is a well known model which is scored upon two dimensional behavioral changes of (1) gaining behaviors, beliefs, and practices of the host country and (2) losing behaviors, beliefs, and practices specific to their home culture. However, this model is descriptive in nature, and cannot answer questions or offer predictions

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about health behaviors. This was evident in our study by the null effects from the people in the medium acculturation group. This group contained the greatest number of Latinos compared to the low and high groups, and contained the most variations in terms of composite scores, especially in the nativity/birthplace subscale, the years spent in United States seems to suggest a protective factor, but this directional relationship does not hold true for all models. Many studies debate the point at which "acculturation" begins and ends, and the categories of less than 10, 10-19, and 20+ years may not necessarily be standard of everyone in this group. Given the limited number of questions that we could use in this study as a proxy for acculturation, the different effects of acculturation were much more evident in the extreme ends of the process. The complexity of acculturation strongly contends that the relationship between health and acculturation may not be straightforward (LaVeist, 2002).

In summary, we found that a substantial proportion of Latino adults in Los Angeles County engage in poor food behaviors and that the likelihood of poor food behaviors was significantly more likely among those who spoke English only in the home and were overall more acculturated. We found important sociodemographic differences between Latinos of different acculturation levels, which may explain some of the differences in dietary habits between the groups. The incorporation of language used at home, birthplace/nativity, and years lived in the US allowed for a more detailed analysis of what factors within this measurement contributed to the odds ratios and a better understanding of criteria that would be useful to target in future interventions. These findings highlight the need for dietary interventions tailored at the level of acculturation. For example, younger Latino women who more closely identify with the

Anglo culture and/or those who report living in the United States for a longer period of time may benefit from targeted information on healthy restaurant behavior, while traditional Latino women could benefit from support interventions such as tours to large supermarkets (Ayala, Mueller, Lopez-Madurga, Campbell, & Elder, 2005).

To better measure traditional dietary patterns, indicator foods, behaviors associated with an acculturated or Western diet, it may be worth developing a specific dietary acculturation assessment, which includes the options to choose both traditional and host country choices to account for biculturalism (Satiaabouta, Patterson, Neuhouser, & Elder, 2002). If at all possible biomarkers should also be included as a reference for self-reported survey to better quantify the link between acculturation and food patterns among Latinos (Perez-Escamilla, 2009). Future studies could also utilize a new operant model of acculturation in better predicting minority health behaviors *a priori* (Landrine & Klonoff, 2004). This would especially be useful in discerning why acculturation may not be so clear within the "bicultural" middle group. Surprisingly, this operant model argues that the people with the highest prevalence of healthy behaviors who should be the one who need interventions immediately as they are at risk for the behaviors extinguishing over time.

Our results may potentially indicate that the people who were the most acculturated to US culture and could speak English are the target population for healthy nutritional education intervention. However, the people of the low acculturation group currently exhibit healthy behaviors relative to their more acculturated counterparts, they may be at the greatest risk of losing the health behaviors as they become more accustomed to Western culture. It is important that healthcare providers take into

account the complexities and environments that greatly impact Latino health in

providing culturally sensitive treatments and effective interventions.

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