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Place of Residence Modifies the Association Between Acculturation and Dietary Tools Knowledge Among Latina WIC Participants: A Multi-State Study

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Abstract

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This cross-sectional study assessed: (a) awareness and knowledge of federal dietary tools (MyPyramid, Food Guide Pyramid (FGP), and food labels (FL)), and (b) the influence of acculturation and state of residence on FGP knowledge (FGPK) indicators among low-income Latina WIC participants (N = 479) living in Connecticut, Ohio, Texas, and California. Participants were familiar with FGP but only 37% recognized MyPyramid. FGPK was highest for fruits (71%) and lowest for the 'breads and cereals' group (12%). Less than half (47%) used FL's when grocery shopping. Living in OH, was associated with the lowest FGPK. Multivariate analyses showed that more acculturated individuals living in CT/CA had better FGPK than participants living in TX and their less acculturated counterparts in CT/CA. The forthcoming revised federal dietary tools need to be adequately disseminated among Latinos, with special emphasis on those with lower acculturation levels, living in rapid emerging Latino communities or in the US–Mexico border.

Keywords

Dietary Guidelines; Hispanic; Latino; Food Guide Pyramid; Food label; Nutrition education/ knowledge; WIC

Introduction

Latinos are the largest minority group representing 15% of the US population and it is projected that by 2050 they will represent 25% of the population [1,2]. In 2007–2008, obesity rates for Latinas were 43% compared to 33% among their white counterparts [3]. Behavior change theories posit that even though dietary informational and applied (instrumental) knowledge are not a sufficient condition, they are necessary for addressing the obesity epidemic [4,5]. Very few studies have examined food labels (FL), the FGP, and Dietary Guidelines knowledge [6–17] among Latinos.

Latinos share a common language, however, different subgroups differ substantially in dietary and other lifestyle behaviors as well as in poverty levels and disease risks [1,18]. Accordingly, effective family nutrition education efforts targeting Latinos need to take into account acculturation [19] and geographic area of residence.

Federal Dietary Tools

The Federal government issued the current Dietary Guidelines for Americans in 2005. These guidelines provide the scientific basis for the development of tools that can assist the general population with the adoption of healthier dietary practices that can help curb the obesity and chronic disease epidemic facing the nation [20]. Two key dietary tools available to consumers to translate the guidelines into improved practices are food labels (FL) [21] and MyPyramid [22]. Pérez-Escamilla and Haldeman [10] showed that FL use buffers against the negative impact of poverty on dietary quality. They also showed that hands-on FL education improves FL knowledge and self-efficacy among Latinas [13]. MyPyramid is the current official government visual tool that is intended to be used together with the MyPyramid.gov website, a "one-stop shopping" internet site with the goal of personalizing information regarding nutrition and physical activity according to the 2005 Dietary Guidelines for Americans [22].

Objectives

The objectives of our study were to examine: (a) awareness and knowledge of federal dietary tools (MyPyramid, Food Guide Pyramid (FGP), and Food labels (FL)), and (b) the influence of acculturation and state of residence on FGP knowledge indicators among low-income Latina WIC participants (N = 479) living in Connecticut, Ohio, Texas, and

California. This is a very timely topic as the 2005 Dietary Guidelines for Americans are currently being revised and will be released in 2010.

Methods

This was a cross-sectional, multi-state study conducted from March to August 2006 that included 479 participants. Participants were non-pregnant Latinas 16 years or older who were receiving WIC benefits recruited in CT (n = 101), OH (n = 100), TX (n = 174) and CA (n = 104). Recruitment took place at: (1) WIC offices, local supermarkets, community agencies (CT); (2) community-based agencies working with Latino families (OH); (3) hospital where majority of women were WIC clients (TX); and (4) WIC Clinic (CA). The research protocol was approved by the human subjects Institutional Review Board (IRB) in all research centers (University of Connecticut, The Ohio State University, The University of Texas at El Paso, and Loma Linda University).

The 24-item survey developed for this study was organized into 3 domains: (1) dietary tools (2) socio-demographics, and (3) family cohesiveness and acculturation. The time needed to complete the questionnaire was 10–20 min. These domains were chosen because both theory and empirical evidence indicated that collecting data on these constructs was essential for understanding federal nutrition awareness tools and knowledge among Latinos. The questionnaire was tested for construct validity by the authors of this work with expertise in the fields of Latino acculturation, nutrition, and health. The survey was applied in either Spanish (65%) or English (35%). The survey was first developed in English, then translated into Spanish and finally back translated into English by the study PI (RPE) to ensure that both versions had equivalent meanings. No discrepanies were found between English and Spanish versions. This was not surprising as the questionnaire was brief and very simple, and most importantly most items were drawn from instruments used previously by the study PI and co-PIs in the target communities.

The survey was then pre-tested with 10 WIC Latina clients in CA to assess readability and required level of literacy (i.e., less than high school education). In all sites, the questionnaire was intially applied/responded in front of the field work supervisors to find out if there were any items that were not properly understood in the final questionnaire. Results of this “qualitative” verification showed that all questionnaire items were properly understood across sites. Participants were asked if they recognized the dietary tools (FGP, MyPyramid, and FL) and whether they knew what the FGP is intended for and the recommended daily serving ranges per food group included in FGP and MyPyramid.

Data were collected on participant’s age, education, household size, monthly food expenditures, and country of birth. Birth place and time living in the US were included as acculturation proxies. The acculturation scale included: reading/speaking language preferences, country where respondent grew up, ethnicity of friends, and ethnic pride. Family cohesiveness was measured by asking if family members: (a) do things together; (b) discuss problems together; (c) feel close to each other. Consistent with Balcazar et al. [23–25] the Cronbach’s alpha coefficients in our study were acceptable; 0.90 for the acculturation scale and 0.71 for the family cohesiveness scale.

In CT interviews were conducted by three community interviewers. In CA, TX and OH interviews were self-administered under the supervision of community outreach workers.

Statistical Analyses

Once data were entered and cleaned at each site they were sent in electronic form to the study headquarters at the University of Connecticut where a pooled data set was created and

analyzed with SPSS for Windows version 17.0. Bivariate analyses were conducted to compare across sites: awareness and knowledge of federal dietary tools as well as socio-economic, cultural, and demographic characteristics. One-way ANOVA was used to compare continuous variables and the chi-square test to compare categorical variables.

Backward stepwise logistic multivariate regressions were conducted to examine if: (a) the association between acculturation and FGP awareness/knowledge was modified by state, and (b) the association between state and FGP awareness/knowledge was modified by acculturation level. These analyses adjusted for respondent's age, family size and monthly food expenditure. Three regressions were run each using a different measure or proxy of acculturation: (a) acculturation scale (reflecting language preferences, ethnicity of friends and country where respondent grew) (b) birth place and (c) time living in the US. Statistical significance in the bivariate analyses was based on a P value ≤0.05. Multivariate logistic regression results were expressed as odds ratios (OR) and corresponding 95% Confidence Intervals (95% CI). Associations were considered to be significant if the 95% CI excluded the value of 1.

Variable Definitions

Respondents were classified as having either a 'lower' or 'higher' level of acculturation using a score of 12 as the cutoff (scale score range 0–20). The Food Guide Pyramid score and MyPyramid score were computed based on whether the respondents could correctly recognize what was the dietary tool and whether they could correctly describe the purpose of the FGP and MyPyramid and the recommended daily servings of different food groups. The knowledge score ranged from 0 to 7 for FGP and 0 to 6 for MyPyramid. Those with a score of 4 or higher were considered to have a 'high' FGP or MyPyramid knowledge score.

For the regression analyses testing the association of acculturation score or birth place with recognition of dietary tools, respondents from CT and CA were pooled into one group and jointly compared with respondents from Texas. This post-hoc decision allowed us to increase the statistical power of our analysesand wasbased on exploratory analyses showing that the association between acculturation score or birth place with dietary tools outcomes among respondents from CT and CA behaved similarly. Likewise, when analyzing the association of time living in the US with recognition of dietary tools, respondents from CT, CA, and OH were pooled in a single group and compared against respondents from TX. Respondents from OH could only be included in the regression model examining time living in the US as 96% had 'lower' acculturation and none of them were born in the continental US.

Results

Sample Characteristics

The average age of participants ranged from 26 to 33 years. In all locations the participants had less than a high school education. Household size ranged from around 4 in CT to 5 in CA. The percentage of participants born in the continental US ranged from 0% in OH to 41.3% in CA. As expected among those born outside of the US, participants from CT were more likely to have been born in Puerto Rico and their counterparts from OH, CA and TX were more likely to have been born in Mexico. The percentage of participants living in the US for at least 10 years ranged from 19% in OH to 65% in CA (Table 1).

Awareness and Knowledge of Federal Dietary Tools

Food Guide Pyramid—The percentage of participants familiar with the FGP ranged from 76% in OH to 98% in CT and TX. The proportion responding that the FGP is a 'guide for

healthy eating' ranged from 74% in OH to 95% in CT. The percentage knowing the correct daily recommended servings of fruit fluctuated between 49% in OH and 86% in CT. Correct knowledge of vegetable servings ranged from 41% in OH to 66% in CA. The corresponding figures for 'grains and cereals' servings ranged from 6% in OH to 19% in CA. The correct answer for dairy group servings fluctuated between 42% in OH and 60% in CT. The corresponding figure for 'meat and meat alternates' servings ranged from 41% in OH to 58% in CT. Consistent with these findings, the proportion with a high overall FGP knowledge score was lowest in OH and highest in CT and CA (Table 2).

My Pyramid—As expected, MyPyramid recognition was significantly lower than for FGP in the pooled sample (37 vs. 92%). MyPyramid recognition ranged from 28% in OH to 49% in CA. The percentage who knew the daily recommended fruit servings fluctuated between 10% in OH and 21% in CA. Likewise, whereas only 10% of participants from OH knew the recommended vegetable servings, this was true for 29% of CA respondents. Knowledge of 'grain and cereals' recommended servings was uniformly low with only 6% of the pooled sample answering correctly. The percentage knowing the correct dairy servings ranged from 10% in CT and OH to 18% in TX. Only 5% answered correctly the recommended servings of 'meat and meat alternates' and this knowledge was uniformly low across states. The proportion of the sample with a high MyPyramid score ranged from 5% in CT to 13% in TX (Table 2).

Food Labels—The overwhelming majority of respondents (92%) recognized the nutrition facts panel of the FL. However, only 20% used PL's 'often' or 'quite often' when purchasing foods with this figure ranging from 13% in TX to 27% in OH (Table 2).

Acculturation and FGP Awareness and Knowledge: Multivariate Analyses

Multivariate regression results examining the interaction between study site and acculturation indicators are presented in Tables 3, 4 and 5. In these tables the reference groups were the TX respondents with the higher acculturation score (Table 3), born outside the US (Table 4), and living in the US for >10 years (Table 5). Results from analyses that used a different reference group presented below (but not shown in tables) are marked with an asterisk.

Acculturation Score—Multivariate analyses identified an interaction between state and acculturation score on diverse FGP knowledge indicators (Table 3). Specifically, the odds of knowing the daily recommended servings of fruits were significantly higher among respondents living in CT and CA who had a high acculturation score (OR = 3.4) as well as among those living in TX who had a low acculturation score (OR = 2.7) compared with TX participants with a high acculturation score.

Compared with respondents living in TX who had a high level of acculturation, participants from CT and CA with a high level of acculturation tended to have higher odds of knowing the recommended daily servings of grains and cereals (OR = 2.8). The odds for knowing the grains and cereals servings were also higher among those from CT and CA with a high acculturation score (OR = 2.3; 95% CI: 1.1–5.0)* and among those from TX with a low acculturation score (OR = 1.8; 95% CI: 0.9–3.6)* compared with participants from CT and CA with a low acculturation score.

Respondents from CT and CA who had a high acculturation score also had higher odds of having a higher FGP knowledge score (OR = 4.0) compared with their counterparts from TX who also had a high acculturation score (Table 3). Respondents from CT and CA who had a high acculturation score also had higher odds of having a higher FGP knowledge score

compared with their state counterparts with a low acculturation score (OR = 2.3; 95% CI: 1.0–5.2)* and participants from TX also with a low acculturation score (OR = 2.6; 95% CI: 1.2–5.9)*.

Birth Place—Significant interactions were also found between respondent's state and place of birth on diverse FGP knowledge indicators (Table 4). Respondents from CT and CA who were born in the US had higher odds of knowing the daily fruit recommended servings in relationship to: respondents from TX born outside the US (OR = 2.4 Table 4), participants from CT and CA born outside the US (OR = 3.6; 95% CI: 1.4–9.1)* and respondents from TX born in the US (OR = 4.5; 95% CI: 1.4–14.6)*.

Respondents from CT and CA who were born outside the US had lower odds of knowing the daily grains and cereals recommended servings (OR = 0.4) compared with respondents from TX born outside the US. They also had lower odds in relationship to participants from CT and CA (OR = 0.2; 95% CI: 0.1–0.5)*, and TX (OR = 0.3; 95% CI: 0.1–1.1)* born in the US.

Respondents from CT and CA who were born in the US had higher odds of having a higher FGP knowledge score compared with respondents from TX born outside the US (OR = 2.7) and also with respondents from TX born in the US (OR = 5.3; 95% CI: 1.8–16.0)*.

Time Living in US—Significant interactions were also identified between respondent's state and time living in the US on diverse FGP knowledge indicators (Table 5). Participants from CT, OH and CA who had lived for <10 years in the US had lower odds of being aware about the purpose of the FGP compared with respondents from TX that had lived in the US for >10 years (OR = 0.4) or <10 years (OR = 0.4; 95% CI: 0.2–1.1)*. Participants from CT, OH and CA who had lived for <10 years in the US had lower odds of knowing the daily recommended servings of fruits compared with their counterparts from the same states that had lived in the US for >10 years (OR = 0.4; 95% CI: 0.2– 0.7)*, as well as their counterparts from TX who had lived in the US for <10 years (OR = 0.4; 95% CI: 0.2–0.8)* or for >10 years (OR = 0.5).

Participants from CT, OH and CA who had lived for <10 years in the US had lower odds of knowing the recommended daily 'grains and cereals' servings compared with respondents from TX who had lived in the US for <10 years (OR = 0.2; 95% CI: 0.1–0.6)* or for > 10 years (OR = 0.4).

Respondents from CT, OH and CA who had lived for >10 years in the US had higher odds of having a higher FGP score compared with their counterparts from TX that had lived for >10 years in the US (OR = 2.1), or compared with participants from Texas who had lived in the US for <10 years (OR = 1.8; 95% CI: 0.9–3.8)* or in CT, OH and CA but who had lived in the US for <10 years (OR = 2.8; 95% CI: 1.6–5.1)*.

Discussion

To our knowledge, this is the first study to examine awareness and knowledge of federal dietary tools in a multi-sate sample of Latina WIC participants. Overall, the dietary tools knowledge score was low for both MyPyramid and FGP. As expected, given national trends of the growth of Latino communities in different regions of the US [1], our findings showed that participants from OH had immigrated much more recently than participants from CA, CT, and TX. The fact that respondents from OH had substantially lower FGP knowledge scores indicates the need for additional culturally appropriate nutrition education efforts in the rapid emerging Latino communities in the US [1,26]. It is unfortunate that even though

researchers have called for major improvements in the development of nutrition guidance to the public including the Food Guide Pyramid their recommendations have not specifically addressed the needs of the culturally diverse low-income groups in the country [27].

This study confirms that even though Latinas are quite familiar with food labels very few are actually using them often to help with food selections. This finding contrasts with the fact that in the general US population the percent that 'often' reads food labels increased from 44% in 2002 to 54% in 2008 [28]. This finding, together with evidence showing that food label reading is associated with better nutrition knowledge among Latinos [29] and dietary quality among low-income groups in general [10] calls for reconsidering the way food labels are designed and the way low-literacy individuals are taught how to use them [30].

Only about one-third of participants had seen MyPyramid about 1 year after it was released. This calls for reconsidering the overall communication approaches that will be used to disseminate the forthcoming revised dietary tools among Latinos. Because MyPyramid is a visual tool that is intended to be jointly used with a computer and the MyPyramid.gov internet site [22] this effort will require addressing low computer access and literacy among Latinos and other socio-economically disadvantaged groups.

In our study, the relationship between acculturation and dietary tools knowledge was context specific. For example, more acculturated individuals living in CT or CA had a higher FGP knowledge score compared with their less acculturated counterparts. However, in TX acculturation score did not influence FGP knowledge. It is possible that in El Paso acculturation may have a different influence given its location right at the US-Mexico border.

Overall, our findings suggest that participants residing in CA or CT with higher levels of acculturation (either high acculturation score, being born in US or living in US for longer) had better FGP knowledge scores than their less acculturated counterparts in their own states or participants residing in TX (with either low or high acculturation levels Tables 3, 4, 5). It is possible that more acculturated individuals in CT or CA have had more access to timely FGP information as a result of being more fluent in English and more likely to include non-Latinos in their social networks. This finding supports the need to improve access to timely and sound culturally appropriate nutrition education and dietary tools among Latinos with lower levels of acculturation or living in the US–Mexico border.

Our study had several limitations. Firstly, because of the logistic complexity of conducting this type of multi-state projects involving partnerships between academic and community/WIC agencies, recruitment strategies varied by site. However, differences in key socioeconomic, demographic, and acculturation factors were consistent with expectations according to respondents' geographic area of residence. Secondly, the survey was applied by community interviewers in CT but self-applied in the remaining states. However, we do not expect that a bias occurred as a result because our bilingual instrument was very short, simple and self-explanatory, and even when self-applied there were trained community outreach workers overseeing the process. Thirdly, our study did not use a multi dimensional scale to measure acculturation as previously recommended [19]. However, it is encouraging that our findings were highly consistent across acculturation indicators.

Policy Implications

Our findings call for the development, testing, and implementation of low-literacy, culturally appropriate nutrition education tools and curriculums; and facilitating access to them in schools and diverse community settings including the use of community outreach models like community health workers/promotores de salud [31,32] and social marketing

campaigns such as SALUD! [33]. This is of special relevance now as the US government is in the process of revising the Dietary Guidelines for Americans and the federal nutrition tools derived from them. This effort will require community based participatory research (CBPR) approaches based on focus groups to determine culture-specific issues regarding nutrition, as well as cognitive interviews to better understand how to effectively address the needs of culturally diverse low-literacy audiences.

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Table 1

Socioeconomic and demographic characteristics among Latina WIC participants by site

	All	CT	OH	CA	TX	P^a
Number of respondents	*n* = 479	*n* = 101	*n* = 100	*n* = 104	*n* = 174	
Age (years)	27.8 ± 7.5	26.3 ± 5.7	33.4 ± 9.9	26.5 ± 6.8	26.3 ± 5.7	.000
Education (years)	10.1 ± 3.4	9.7 ± 3.2	9.5 ± 4.2	10.4 ± 3.4	10.4 ± 3.0	.087
Family size (No.)	4.6 ± 1.8	4.2 ± 1.5	4.6 ± 1.6	5.2 ± 2.3	4.5 ± 1.8	.002
Food expenditure per month						.033
≤$200	122 (26.6%)	23 (23.0%)	17 (17.7%)	28 (27.2%)	54 (33.8%)	
>$200	337 (73.4%)	77 (77.0%)	79 (82.3%)	75 (72.8%)	106 (66.3%)	
Birth place						.000
Mexico	294 (61.6%)	27 (26.7%)	76 (76.0%)	51 (49.0%)	140 (81.4%)	
Continental US	104 (21.8%)	29 (28.7%)	0 (0%)	43 (41.3%)	32 (18.6%)	
Puerto Rico	37 (7.8%)	33 (32.7%)	3 (3%)	1 (1.0%)	0 (0%)	
Central America	21 (4.4%)	6 (5.9%)	8 (8.0%)	7 (6.7%)	0 (0%)	
South America	11 (2.3%)	0 (0%)	11 (11%)	0 (0%)	0 (0%)	
Other	10 (2.1%)	6 (5.9%)	2 (2.0%)	2 (1.9%)	0 (0%)	
Years living in the US						.000
<10 years	247 (53.8%)	52 (53.6%)	79 (80.6%)	36 (34.6%)	80 (50.0%)	
≥10 years	212 (46.2%)	45 (46.4%)	19 (19.4%)	68 (65.4%)	80 (50.0%)	
Acculturation[b]						.000
Low	333 (72.4%)	61 (62.2%)	95 (96.9%)	50 (51.5%)	127 (76%)	
High	127 (27.6%)	37 (37.8%)	3 (3.1%)	47 (48.5%)	40 (24%)	
Family cohesion[c]						.484
Low	40 (8.4%)	9 (8.9%)	12 (12.0%)	7 (6.7%)	12 (7.1%)	
High	434 (91.6%)	92 (91.1%)	88 (88.0%)	97 (93.3%)	157 (92.9%)	

[a] χ^2 for categorical variables, one-way ANOVA for continuous variables

[b] Acculturation score based on whether the respondent: (a) speaks, read mainly English or Spanish (b) friends are mainly Americans from the United States or Hispanic (c) spent early life in the United States or Latin America

[c] Family cohesion based on whether the respondent's family do things or discuss problems together, and feel close to each other

Table 2

Familiarity and knowledge of Food Guide Pyramid, MyPyramid and food label by site

	All	CT	OH	CA	TX	p^a
Food Guide Pyramid						
FGP recognition						.000
No	37 (7.8%)	2 (2.0%)	23 (23.7%)	9 (8.7%)	3 (1.7%)	
Yes	438 (92.2%)	99 (98.0%)	74 (76.3%)	94 (91.3%)	171 (98.3%)	
What is FGP						.000
Incorrect	60 (12.6%)	5 (5.0%)	26 (26.0%)	11 (10.6%)	18 (10.4%)	
Correct	418 (87.4%)	96 (95.0%)	74 (74.0%)	93 (89.4%)	155 (89.6%)	
Fruit servings						.000
Incorrect	129 (27.4%)	13 (13.7%)	50 (51.0%)	26 (25.0%)	40 (23.1%)	
Correct	341 (72.6%)	82 (86.3%)	48 (49.0%)	78 (75.0%)	133 (76.9%)	
Vegetable servings						.001
Incorrect	208 (44.4%)	48 (50.5%)	58 (59.2%)	35 (33.7%)	67 (39.2%)	
Correct	260 (55.6%)	47 (49.5%)	40 (40.8%)	69 (66.3%)	104 (60.8%)	
Grains & cereals servings						.014
Incorrect	407 (87.0%)	89 (91.8%)	92 (93.9%)	83 (81.4%)	143 (83.6%)	
Correct	61 (13.0%)	8 (8.2%)	6 (6.1%)	19 (18.6%)	28 (16.4%)	
Dairy servings						.047
Incorrect	224 (47.5%)	40 (40.4%)	57 (58.2%)	43 (41.7%)	84 (48.8%)	
Correct	248 (52.5%)	59 (59.6%)	41 (41.8%)	60 (58.3%)	88 (51.2%)	
Meat & alternates servings						.080
Incorrect	228 (48.1%)	42 (42.4%)	58 (59.2%)	46 (44.2%)	82 (47.4%)	
Correct	246 (51.9%)	57 (57.6%)	40 (40.8%)	58 (55.8%)	91 (52.6%)	
FGP score[b]						.000
Low	119 (26.0%)	12 (12.9%)	41 (42.7%)	20 (19.8%)	46 (27.4%)	
High	339 (74.0%)	81 (87.1%)	55 (57.3%)	81 (80.2%)	122 (72.6%)	
MyPyramid						
MyPyramid recognition						.018
No	299 (63.1%)	66 (65.3%)	72 (72.0%)	52 (51.0%)	109 (63.7%)	

	All	CT	OH	CA	TX	*p*[a]
Yes	175 (36.9%)	35 (34.7%)	28 (28.0%)	50 (49.0%)	62 (36.3%)	
Fruit servings						.033
Incorrect	396 (83.7%)	90 (89.1%)	90 (90.0%)	79 (79.0%)	137 (79.7%)	
Correct	77 (16.3%)	11 (10.9%)	10 (10.0%)	21 (21.0%)	35 (20.3%)	
Vegetable servings						.005
Incorrect	382 (80.8%)	85 (84.2%)	90 (90.0%)	70 (70.7%)	137 (79.2%)	
Correct	91 (19.2%)	16 (15.8%)	10 (10.0%)	29 (29.3%)	36 (20.8%)	
Grains & cereals servings						.418
Incorrect	446 (94.1%)	98 (97.0%)	95 (95.0%)	92 (92.0%)	161 (93.1%)	
Correct	28 (5.9%)	3 (3.0%)	5 (5.0%)	8 (8.0%)	12 (6.9%)	
Dairy servings						.134
Incorrect	406 (85.8%)	91 (90.1%)	89 (89.9%)	85 (85.0%)	141 (81.5%)	
Correct	67 (14.2%)	10 (9.9%)	10 (10.1%)	15 (15.0%)	32 (18.5%)	
Meat & alternates servings						.379
Incorrect	448 (94.5%)	98 (97.0%)	96 (96.0%)	94 (94.0%)	160 (92.5%)	
Correct	26 (5.5%)	3 (3.0%)	4 (4.0%)	6 (6.0%)	13 (7.5%)	
MyPyramid score[c]						.064
Low	423 (90.4%)	96 (95.0%)	93 (93.9%)	87 (88.8%)	147 (86.5%)	
High	45 (9.6%)	5 (5.0%)	6(6.1%)	11 (11.2%)	23 (13.5%)	
Food label						
Food label recognition						.748
No	38 (8.0%)	10 (10.0%)	6 (6.0%)	9 (8.7%)	13 (7.5%)	
Yes	438 (92.0%)	90 (90.0%)	94 (94.0%)	94 (91.3%)	160 (92.5%)	
Food label utilization						.043
Rare or sometimes	383 (80.3%)	79 (78.2%)	73 (73.0%)	82 (78.8%)	149 (86.6%)	
Often or quite often	94 (19.7%)	22 (21.8%)	27 (27.0%)	22 (21.2%)	23 (13.4%)	

[a] χ^2 for categorical variables, one-way ANOVA for continuous variables

[b] Food Guide Pyramid knowledge score based on whether the respondents: (a) could correctly recognize the Food Guide Pyramid and (b) knew the Food Guide Pyramid recommended daily servings of different food groups

[c] MyPyramid knowledge score based on whether the respondents: (a) could correctly recognize the MyPyramid and (b) knew the MyPyramid recommended daily servings of different food groups

Table 3

Association between site and acculturation level with FGP awareness and knowledge among Latinas in the US

Outcome variables	*n*	OR	95% Confidence interval	
			Lower	Upper
What is FGP				
CT&CA low	110	1.276	.418	3.899
CT&CA high	84	3.125	.788	12.387
TX low	112	2.031	.621	6.647
TX high	37	1.000	–	–
Fruits				
CT&CA low	105	1.469	.652	3.310
CT&CA high	83	3.410	1.344	8.657
TX low	113	2.676	1.154	6.202
TX high	37	1.000	–	–
Vegetables				
CT&CA low	105	1.104	.517	2.359
CT&CA high	83	1.501	.680	3.311
TX low	113	1.571	.736	3.354
TX high	36	1.000	–	–
Grains & cereals				
CT&CA low	105	.500	.133	1.881
CT&CA high	83	2.794	.885	8.822
TX low	112	2.132	.686	6.629
TX high	37	1.000	–	–
Dairy				
CT&CA low	107	.946	.444	2.016
CT&CA high	84	1.789	.807	3.967
TX low	113	.944	.445	2.000
TX high	36	1.000	–	–
Meat & alternates				
CT&CA low	108	1.454	.682	3.098
CT&CA high	84	1.161	.532	2.534
TX low	113	1.227	.581	2.594
TX high	37	1.000	–	–
FGP score[a]				
CT&CA low	101	1.795	.776	4.154
CT&CA high	82	4.056	1.523	10.802
TX low	111	1.556	.687	3.523
TX high	36	1.000	–	–

Backward stepwise multivariate logistic regression, covariates included in all models: age, family size, monthly food expenditure

[a]Food Guide Pyramid knowledge score based on whether the respondents: (a) could correctly recognize the Food Guide Pyramid and (b) knew the Food Guide Pyramid recommended daily servings of different food groups

Table 4

Association between site and birth place with FGP awareness and knowledge among Latinas in the US

Outcome variables	*n*	OR	95% Confidence interval	
			Lower	Upper
What is FGP				
CT&CA US	71	1.117	.324	3.847
CT&CA other places	132	.667	.263	1.689
TX US	27	.293	.088	.980
TX other places	128	1.000	–	–
Fruits				
CT&CA US	70	2.438	.946	6.286
CT&CA other places	127	.679	.373	1.233
TX US	27	.543	.213	1.386
TX other places	129	1.000	–	–
Vegetables				
CT&CA US	70	1.204	.655	2.214
CT&CA other places	127	.771	.468	1.272
TX US	27	1.068	.452	2.521
TX other places	127	1.000	–	–
Grains & cereals				
CT&CA US	70	1.764	.866	3.593
CT&CA other places	127	.389	.171	.885
TX US	27	1.158	.394	3.403
TX other places	128	1.000	–	–
Dairy				
CT&CA US	71	1.527	.843	2.768
CT&CA other places	129	1.150	.703	1.881
TX US	27	.950	.414	2.181
TX other places	128	1.000	–	–
Meat & alternates				
CT&CA US	71	.679	.378	1.221
CT&CA other places	130	1.204	.728	1.990
TX US	27	.510	.218	1.192
TX other places	129	1.000	–	–
FGP score[a]				
CT&CA US	70	2.719	1.123	6.584
CT&CA other places	122	1.234	.670	2.270
TX US	27	.514	.212	1.244
TX other places	125	1.000	–	–

Backward stepwise multivariate logistic regression, covariates included in all models: age, family size, monthly food expenditure

[a]Food Guide Pyramid knowledge score based on whether the respondents: (a) could correctly recognize the Food Guide Pyramid and (b) knew the Food Guide Pyramid recommended daily servings of different food groups

Table 5

Association between site and staying time in the US with FGP awareness and knowledge among Latinas in the US

Outcome variables	*n*	OR	95% Confidence interval	
			Lower	Upper
What is FGP				
CT&OH&CA <10 years	162	.390	.155	.982
CT&OH&CA >10 years	131	1.251	.427	3.670
TX <10 years	74	.884	.282	2.770
TX >10 years	71	1.000	–	–
Fruits				
CT&OH&CA <10 years	156	.518	.275	.976
CT&OH&CA >10 years	130	1.259	.629	2.521
TX <10 years	75	1.259	.574	2.763
TX >10 years	71	1.000	–	–
Vegetables				
CT&OH&CA <10 years	156	.580	.326	1.033
CT&OH&CA >10 years	130	.964	.531	1.752
TX <10 years	75	1.020	.521	1.994
TX >10 years	69	1.000	–	–
Grains				
CT&OH&CA <10 years	158	.412	.163	1.040
CT&OH&CA >10 years	128	1.130	.497	2.569
TX <10 years	74	1.683	.706	4.009
TX >10 years	71	1.000	–	–
Milk				
CT&OH&CA <10 years	159	.893	.507	1.573
CT&OH&CA >10 years	130	1.620	.897	2.926
TX <10 years	75	1.304	.672	2.532
TX >10 years	70	1.000	–	–
Meat				
CT&OH&CA <10 years	159	.816	.464	1.436
CT&OH&CA >10 years	131	1.411	.786	2.532
TX <10 years	75	1.410	.731	2.718
TX >10 years	71	1.000	–	–
FGP score[a]				
CT&OH&CA <10 years	153	.760	.406	1.421
CT&OH&CA >10 years	126	2.140	1.043	4.393
TX <10 years	73	1.161	.549	2.458
TX >10 years	69	1.000	–	–

Backward stepwise multivariate logistic regression, covariates included in all models: age, family size, monthly food expenditure

[a] Food Guide Pyramid knowledge score based on whether the respondents: (a) could correctly recognize the Food Guide Pyramid and (b) knew the Food Guide Pyramid recommended daily servings of different food groups