

Immigration, Acculturation and Chronic Back and Neck Problems Among Latino-Americans

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Abstract Higher acculturation is associated with increased obesity and depression among Latino-Americans, but not much is known about how acculturation is related to their prevalence of back and neck problems. This study examines whether acculturation is associated with the 12-month prevalence of self-reported chronic back or neck problems among US-born and immigrant Latinos. We performed multivariable logistic regression analysis of data from 2,553 noninstitutionalized Latino adults from the 2002–2003 National Latino and Asian American Survey (NLAAS). After adjusting for demographic, physical and mental health indicators, English proficiency, nativity and higher generational status were all significantly positively associated with the report of chronic back or neck problems. Among immigrants, the proportion of lifetime in the US was not significantly associated. Our findings suggest that the report of chronic back or neck problems is higher among more acculturated Latino-Americans independent of health status, obesity, and the presence of depression.

Keywords Acculturation · Back pain · Latino · Hispanic · Neck pain

This study has been reviewed and approved by the Institutional Review Board of the University of Washington.

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Introduction

Among American adults, the three-month prevalence of having either back or neck pain is estimated to be as high as 31% [1]. They are leading causes of disability and Americans who reported having either chronic back or neck problems had about 65% greater yearly health care expenditures than those who did not [2].

The three-month prevalence of back pain is lower in Latino-Americans than in white Americans [3]. No studies in the US have examined whether the prevalence of chronic back or neck pain in Latino-Americans differs by acculturation. However, there is evidence that acculturation does affect the health of immigrants and of their descendants [4–24]. Factors associated with chronic back or neck pain, such as increased body mass index [25–31], depression, [32–40] smoking and heavy alcohol use [31, 41–43] have also been shown to be higher among more acculturated Latino-Americans [6, 16, 17, 20].

In Europe, certain immigrant populations have had higher prevalence of pain compared to native-born subjects [44, 45]. Immigrants from southern Europe and the Middle East living in Sweden have higher odds of chronic widespread pain, higher pain-associated psychosocial dysfunction, and higher rates of disability [45–48]. Similarly, South Asian immigrants residing in the United Kingdom had 3.7 times higher odds of reporting widespread musculoskeletal pain than native-born British [30]. Among these immigrants, higher acculturation was negatively associated with the report of widespread pain [44].

Very little is known about how culture affects the experience or report of chronic back or neck pain. One line of research suggests that the stress of the immigrant experience would lead to higher report of chronic back or neck problems among immigrant and less acculturated

respondents. Alternatively, evidence of the deterioration of some health behaviors and outcomes in Latino-Americans with acculturation would lend support for the acculturation hypothesis which states that migrants from cultures with protective health practices experience worsening health with longer exposure to a host culture as they adopt the host culture's unhealthy practices [4, 7, 23, 24].

This study investigates whether the 12-month prevalence of chronic back or neck problems in Latino-Americans is associated with acculturation measured by nativity, generation in the US, percentage of lifetime in the US, and English proficiency. We hypothesize that the prevalence of reported chronic back or neck problems will be higher in more acculturated Latino-Americans and that differences in physical health, depression, and obesity may mediate the effect of acculturation.

Methods

Sample and Data Collection

The 2002–2003 National Latino and Asian American Study (NLAAS) is a national, representative, household survey of non-institutionalized adults aged 18 and older residing in the US who self-identified as Latino or Asian and spoke English, Spanish, Mandarin, Cantonese, Vietnamese, or Tagalog. The NLAAS employed two multi-stage probability sampling components: a core sampling of primary sampling units, area segments and housing units designed to be nationally representative of all US populations and a high-density supplemental sampling which oversampled geographic areas with greater than 5% residential density of target ancestry groups (Latino: Cuban, Mexican, Puerto Rican; Asian: Chinese, Filipino, Vietnamese). Secondary respondents were recruited from households in which one eligible member had already been interviewed. Weighting adjustments developed for the NLAAS account for the joint probabilities for selection under this sampling design. The sample design and survey methods of the NLAAS have been described in detail elsewhere [49, 50].

The NLAAS-weighted sample is similar to the 2000 Census in age, sex, education, marital status, and geographic distribution but different in nativity and household income, with more US immigrants and lower income respondents in the NLAAS sample. This analysis focuses on Latino-American NLAAS respondents. Although the NLAAS targeted Mexican, Puerto Rican, or Cuban individuals, those identifying other Latino ancestry were also surveyed. "Other Latinos" primarily included respondents from the Dominican Republic, Colombia, El Salvador, Ecuador, Guatemala, Honduras, Peru, and Nicaragua. A total of 2,554 Latino-Americans (2009 primary respondents; 545 secondary

respondents) were recruited between May 2002 and November 2003 as part of the larger NLAAS survey. The overall weighted response rate for Latinos was 75.5%. Detailed sample characteristics have been reported by Heeringa et al. [51].

Measures

The NLAAS survey instruments have been translated and back-translated in Spanish, Mandarin, Cantonese, Vietnamese and Tagalog. A comprehensive process based on a cultural equivalence conceptual model was used to translate and adapt pre-validated measures. Other authors have described the development of the full survey instrument in detail [50].

Chronic Back or Neck Problems

The primary outcome of interest was the 12-month prevalence of chronic back or neck problems as reported using a standard chronic conditions checklist designed for use in cross-cultural epidemiological research as part of the World Mental Health Composite International Diagnostic Interview (WHO-CIDI) [52]. Respondents were considered to have had chronic back or neck problems or pain in the past 12 months if they answered "yes" to both the questions: "Have you ever had chronic back or neck problems?" and "During the past 12 months, did you still have chronic back or neck problems?"

Nativity and Acculturation Measures

Acculturation is a complex concept that describes the process that occurs when contact between two cultures results in substantial change in the culture of the individual members of one or both groups [17]. Four measures were used to approximate acculturation: nativity, generational status, self-rated English proficiency, and percentage of lifetime spent in the US. Nativity was defined by whether the respondent reported having been born in or outside the US. Puerto Ricans were considered US-born if they were born in one of the fifty US states and were considered immigrants if they were born in Puerto Rico or another country. Generational status was defined with immigrants as the first generation. Respondents were categorized as belonging to the second generation if they were US-born and had at least one immigrant parent. US-born respondents with two US-born parents were considered to belong to the third generation or greater. Respondents rated their English oral proficiency as "excellent", "good", "fair" or "poor." The proportion of the respondent's lifetime spent in the US was applied only to immigrants and was constructed by dividing the number of years spent in the US by

the respondent's current age and is used to partially account for the age at immigration as well as the time spent in the US [5, 53, 54].

Health Measures

The respondent provides a self-rating of physical health by answering the question, "How would you rate your overall physical health—excellent, very good, good, fair, or poor?" Smoking status was dichotomized into current smoker and current non-smoker. Body mass index (BMI) is defined as the body weight in kilograms divided by the height in meters squared and was dichotomized at obese (BMI of 30 or greater) and not obese.

The NLAAS mental health interview was based on the WMH-CIDI [55]. The NLAAS used WMH-CIDI modules to measure the lifetime prevalence of alcohol abuse and the combined 12-month prevalence of two depressive disorders: major depression and dysthymia. Alcohol abuse and depression were modeled as dichotomous variables. Respondents were considered to have had alcohol abuse in their lifetime if they had ever met diagnostic criteria for alcohol abuse from the Diagnostic and Statistical Manual of Mental Disorders. They were considered to have depression if they met criteria for either major depression or dysthymia in the last year.

Socio-Demographic Measures

Socio-demographic measures included age, sex, years of education and household income. Age is rescaled such that one unit of age is equal to 10 years. Years of education were divided into four categories: less than 12 years, 12 years, 13–15 years, and greater than 16 years of schooling. Household income was modeled as percentage of the federal poverty level in four categories: below poverty level, 100% to less than 200%, 200% to less than 300%, and 300% of poverty level or greater.

Statistical Analysis

All statistical analyses were performed using STATA statistical software package (version 9.2) [56]. We used cross-tabulation to illustrate the distributions of demographic and immigration variables in the NLAAS data. Using the US Latino population as a denominator, we computed age- and sex-adjusted 12-month prevalence of chronic back or neck problems across Latino ethnic subgroups and immigration groups. Weighted percentage estimates and 95% confidence intervals are reported.

We modeled the association between the 12-month prevalence of chronic back or neck problems and our measures of acculturation using weighted logistic regression

analysis with adjustments for age, sex, income, education, self-rated physical health, obesity, depressive disorder in the past 12 months, alcohol abuse, and smoking status. Standard error estimates from logistic regression models were adjusted for the complex sampling design using a first-order Taylor series approximation [57]. We conducted significance tests using a design-adjusted Wald test. For logistic regression analyses, we report prevalence ratios with 95% confidence intervals estimated using methodology described by Zhang and Yu [58].

The University of Washington institutional review board has reviewed and approved this study.

Results

Table 1 shows the unweighted study sample characteristics for Latino-Americans stratified by the presence of reported chronic back or neck problems in the last 12 months. Mexican-Americans were the largest ethnic group. The group reporting chronic back or neck problems had greater numbers of respondents who were obese, currently smoking, in fair or poor health, or had depressive disorder or alcohol abuse.

The weighted age- and sex-adjusted 12-month prevalence of chronic back or neck problems in all Latinos sampled was 14.6% (13.2, 16.0). This prevalence was significantly lower for immigrant Latinos (12.0%, 95% CI: 10.3, 13.8) than for US-born Latinos (20.2%, 95% CI: 17.1, 23.8). This pattern was consistent and significant in each of the largest Latino ethnic subgroups (Table 2).

Unadjusted associations presented in Table 3 showed that being born in the US, belonging to the third or greater generation, and reporting good or excellent English proficiency were all associated with significantly higher risk of reporting chronic back or neck problems in the past 12 months. Those who reported obesity, poorer physical health, depression, alcohol abuse, or current smoking also had significantly greater risk of reporting chronic back or neck problems compared to those who did not have these characteristics.

Model 1 in Table 3 shows the relative risks of reporting chronic back or neck problems in the past 12 months by generation adjusted for English proficiency, age, sex, and ethnicity. Compared to immigrants, Latinos in the third generation or greater were 1.6 times more likely to report chronic back or neck problems but second generation Latinos were not at greater risk. Good or excellent English proficiency was also associated with about 1.6 times the risk of chronic back or neck problems and was independent of generational status.

Model 2 also adjusts for education, poverty level, self-reported health status, depression and alcohol abuse.

Table 1 Sample characteristics of Latino respondents from the National Latino- and Asian-American study, 2002–2003

Variable	Latinos (<i>n</i> = 2,553) (%)	Without back and neck problems (<i>n</i> = 2,137) (%)	With back and neck problems (<i>n</i> = 416) (%)
Male	44.1	45.5	38.9
Mean age (SD)	40.6 (15.6)	39.8 (15.5)	44.9 (15.7)
<i>Ethnicity</i>			
Mexican (<i>n</i> = 868)	34.0	22.3	24.3
Puerto Rican (<i>n</i> = 495)	19.4	18.4	24.3
Cuban (<i>n</i> = 577)	22.6	34.8	29.8
Other Latino (<i>n</i> = 614)	24.0	24.5	21.6
Nativity—born in US	36.2	34.9	43.0
<i>Generational status</i>			
1st Generation (immigrants)	64.1	65.1	57.0
2nd Generation	20.3	20.3	21.4
3rd Generation or greater	15.7	14.6	21.6
<i>Percent of lifetime in US (Immigrants only) (n = 1630)</i>			
0–25% Lifetime in US	26.0	26.6	23.0
25–50% Lifetime in US	30.3	31.4	24.3
50–99% Lifetime in US	43.7	42.1	52.8
English proficient	50.4	49.8	55.9
<i>Income</i>			
Below poverty level	25.0	24.2	28.1
100–199% Of poverty level	21.2	20.8	21.4
200–299% Of poverty level	13.2	13.0	12.7
300% Or greater of poverty level	40.7	42.0	37.7
<i>Education</i>			
11 years or less	39.2	38.7	39.9
12 years	25.0	25.3	22.4
13–15 years	29.5	29.3	32.0
16 years or greater	6.3	6.8	5.8
<i>Physical health rating</i>			
Excellent	17.3	19.4	5.5
Very good	24.6	26.0	20.0
Good	30.4	30.8	28.4
Fair/poor	27.7	23.7	46.0
BMI—30 or greater	27.0	25.4	35.1
Affective disorder in past 12 months	9.9	8.1	19.5
Alcohol abuse in lifetime	8.8	7.9	14.2
Current smoker	20.2	19.0	25.0

Depression in the last 12 months was associated with almost twice the likelihood of chronic back or neck problems while each unit of poorer self-rated physical health was associated with a 34% increase in risk. Belonging to the third generation or greater continued to be significantly positively associated with chronic back or neck problems but the relative risk was attenuated (1.31, 95% CI 1.01, 1.67). English proficiency was associated with 1.67 times the risk of reporting chronic back or neck problems.

Obesity and alcohol abuse also remained positively associated.

In another weighted logistic analysis, we looked at whether differences exist among immigrants using proportion of lifetime in the US and English proficiency as measures of acculturation. In a model that was adjusted for age, sex, ethnicity, education, poverty level, and health indicators but not for English proficiency, no significant association was found between proportion of lifetime in the

Table 2 Weighted age- and sex-adjusted 12-month prevalence of chronic back or neck problems by ethnicity and nativity

	Prevalence % (95% CI)
<i>Latino</i>	
Total	14.6 (13.2, 16.0)
Immigrant	12.0 (10.3, 13.8)
US born	20.2 (17.1, 23.8)
<i>Mexican</i>	
Total	14.9 (13.5, 16.5)
Immigrant	11.8 (10.3, 13.6)
US born	19.9 (16.5, 23.7)
<i>Puerto Rican</i>	
Total	17.2 (13.9, 21.0)
Immigrant	12.8 (9.7, 16.7)
US born	21.3 (17.2, 26.2)
<i>Cuban</i>	
Total	13.2 (11.2, 15.4)
Immigrant	12.3 (10.2, 14.7)
US born	20.6 (17.4, 24.2)
<i>Other Latinos</i>	
Total	13.4 (11.3, 15.9)
Immigrant	11.4 (9.5, 13.6)
US born	19.2 (14.9, 24.4)

Age and sex adjusted to US Latino population means

US and report of chronic back or neck problems in the last 12 months. Respondents who had been in the US for 50 to 75% of their lifetime had a relative risk of 0.6 (95% CI: 0.34, 1.04) for chronic back or neck problems compared to those who had spent less than 25% of their lifetime in the US. Those who had greater than 75% of their lifetime in the US had a relative risk of 0.97 (95% CI: 0.52, 1.79) for chronic back or neck problems (data not shown).

Among immigrants, English proficiency was associated with a 61% increased risk of chronic back or neck problems (1.61, 95% CI: 1.18, 2.14) in an adjusted model that did not include proportion of lifetime in the US, but was not significant (1.5, 95% CI: 0.95, 2.29) when proportion of lifetime in the US was included (data not shown). A similar analysis using years residing in the US and age at immigration did not yield any significant differences in chronic back or neck problems by these measures of acculturation.

Discussion

These findings support the hypothesis that the report of chronic back or neck pain is associated with acculturation in Latino-Americans. While we found a strong association between chronic back or neck problems and obesity, depression and poorer self-rated physical health, these

factors did not completely explain the observed generational or language associations.

Our findings apparently contradict those of a similar study conducted among South Asians in the United Kingdom where higher acculturation was negatively associated with reports of widespread pain [44]. Possibly, the relative prevalence of health behaviors between the culture of origin and the host culture helps determine the direction of change in health behavior and ultimately in health outcome [24]. In the case of back or neck pain, immigrants and their descendants who originate from a culture of low prevalence of back or neck pain entering a culture of high prevalence would show an increase in back or neck pain prevalence with acculturation. Likewise, individuals coming from a culture of high back or neck pain prevalence entering a culture of low prevalence would experience lower back or neck pain prevalence with acculturation. This model of acculturation would predict that the prevalence of back or neck pain in the United States is high relative to the countries of origin of the Latino respondents in this survey, while this prevalence is higher in the countries of south Asia than in the United Kingdom. While direct cross-national comparisons are not available, comparisons that do exist suggest that prevalence of chronic pain in the United States is high compared to other developed and developing nations [33]. Other cross-national comparisons of back pain prevalence revealed the United Kingdom to have a low prevalence compared to other developed nations [59, 60]. Although this evidence is not adequate to support this model of acculturation, it reveals a possible future direction for research in this area.

We found a consistent positive association between English proficiency and the report of chronic back or neck pain, even though the survey was conducted in the language in which the respondent was more fluent. This finding suggests that language acculturation may be associated with changes in certain health related concepts such as the definitions of back or neck pain or chronicity. Alternatively, English proficiency, even independent of generational status, might be associated with other aspects of lifestyle such as type of work, social networks, or health behaviors (e.g., physical activity) which may affect back or neck pain. Whether acculturation is related to the actual experience of back or neck problems, the reporting of these problems, or both cannot be determined from this study. These findings are compatible with other studies which have found differing health behaviors, reporting, or outcomes based on linguistic differences [5, 7, 23].

Our results indicate a strong relationship between physical health, depression and the report of chronic back or neck pain. They are consistent with cross-national findings from the World Mental Health Survey which have shown significant positive associations between the report

Table 3 Unadjusted and adjusted prevalence ratios between 12-month report of back or neck problems and acculturation, socio-demographic, and health factors

	Unadjusted associations PR (95% CI)	Model 1 PR (95% CI)	Model 2 PR (95% CI)
Nativity—born in US	1.66 (1.29, 2.11)***		
1st Generation (immigrants)		Referent	Referent
2nd Generation	1.04 (0.77, 1.39)	1.04 (0.73, 1.43)	0.90 (0.65, 1.24)
3rd Generation or greater	1.88 (1.41, 2.44)***	1.63 (1.17, 2.23)**	1.31 (1.01, 1.67)*
English proficient	1.73 (1.37, 2.15)***	1.60 (1.23, 2.03)**	1.67 (1.33, 2.05)***
Age (10 years)	1.14 (1.04, 1.23)**	1.17 (1.06, 1.28)**	1.13 (1.03, 1.23)**
Female	1.32 (1.03, 1.24)*	1.28 (1.00, 1.61)	1.22 (0.96, 1.54)
Mexican	0.86 (0.73, 1.01)	Referent	Referent
Puerto Rican	1.35 (1.10, 1.66)**	1.27 (1.03, 1.57)*	1.32 (1.03, 1.67)*
Cuban	0.89 (0.68, 1.15)	1.06 (0.70, 1.38)	1.18 (0.92, 1.48)
Other Latino	1.06 (0.84, 1.32)	1.08 (0.86, 1.35)	1.17 (0.97, 1.4)
Education—11 years or less	0.94 (0.75, 1.16)		Referent
Education—12 years	0.91 (0.61, 1.30)		0.93 (0.62, 1.33)
Education—13–15 years	1.16 (0.87, 1.52)		1.13 (0.81, 1.52)
Education—greater than 16 years	1.08 (0.69, 1.63)		1.21 (0.72, 1.84)
Below poverty level	0.90 (0.69, 1.16)		1.05 (0.81, 1.34)
100–199% Of poverty level	1.17 (0.84, 1.58)		1.20 (0.83, 1.64)
200–299% Of poverty level	0.94 (0.63, 1.37)		1.15 (0.74, 1.67)
300% Or greater of poverty level	1.00 (0.77, 1.29)		Referent
Low physical health rating	1.44 (1.33, 1.57)***		1.34 (1.23, 1.45)***
DSM-IV criteria for affective disorder in past 12 months	2.65 (1.84, 3.61)***		1.97 (1.36, 2.61)***
BMI—30 or greater	1.67 (1.40, 1.99)***		1.35 (1.1, 1.62)**
DSM-IV criteria for alcohol abuse in lifetime	1.94 (1.40, 2.60)***		1.52 (1.03, 2.09)*
Current smoker	1.38 (1.08, 1.74)*		1.21 (0.96, 1.49)

Model 1 adjusted for generation, English proficiency, age, sex, and ethnicity. *Model 2* added adjustment for education, poverty level, self-rated physical health, affective disorder, overweight, alcohol abuse, and smoking

Two-tailed *P*-values: * *P* ≤ 0.05; ** *P* ≤ 0.01; *** *P* ≤ 0.001

of chronic pain and that of poor physical health, affective dysfunction, and alcohol abuse [33, 61, 62]. Our findings further support the assertion that the relationship between chronic pain and psychological dysfunction is consistent cross-culturally.

This study is the first to demonstrate an association between acculturation and chronic back or neck problems among Latino-Americans. Its strengths lie in the use of data from a national representative survey conducted in both English and Spanish and developed with attention to cross-cultural meanings of survey items [63]. We were able to adjust for many social and physical factors that may influence the experience or report of chronic back pain [64].

Our study has a number of limitations. As the National Latino and Asian American Study is cross-sectional, causal relationships cannot be determined. Additionally, the report of chronic back or neck problems is not precisely defined or clinically validated. However, self-reports of

chronic conditions have been found to have good correlation with medical records in several methodological studies [65, 66], and the use of chronic condition checklists has been found to elicit more complete reporting than the use of open-ended questions [67]. Martin et al. used Medical Expenditure Panel Survey data to show that about 78% of complaints of back or neck problems that carried diagnostic codes had codes that corresponded to “intervertebral disk disorders,” “sprains and strains of the back,” and “other and unspecified disorders of back,” which include diagnoses of lumbago, backache, and unspecified symptoms of the back [2]. Another limitation is the lack of adequate power to examine associations within specific ethnic groups. Weighted age- and sex-adjusted prevalence by the largest ethnic groups in this survey revealed a consistent pattern of higher report of chronic back and neck problems among US-born respondents. Finally, we did not have data on physical activity and work-related factors that might affect the experience or report of chronic back or

neck pain. Other unmeasured confounders may affect findings.

Future research should include longitudinal studies to clarify causal relationships between acculturative processes and chronic pain conditions. Further investigation into the possible connections between chronic pain and specific changes in lifestyle, attitudes, and stressors related to immigration and acculturation are warranted. Future studies should also examine differences that may exist across specific ethnic groups.

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