Title
Acculturation and Smoking Patterns Among Hispanics: A Review

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THE ASSOCIATION BETWEEN ACCULTURATION AND SMOKING PATTERNS AMONG HISPANICS: A SYSTEMATIC REVIEW

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ABSTRACT

Objective
To conduct a systematic review of published studies investigating the association of acculturation and smoking patterns among Hispanic men and women in the United States.

Methods
Online bibliographic databases were searched as of November 2003 and reference lists from review articles and the selected articles were also reviewed for potential studies. The methodology and findings of all retrieved articles were critically evaluated. Data were extracted from each article regarding study methods, exposure assessment, outcomes measured, acculturation measured used, and results.

Results
The literature search identified 78 articles from MEDLINE, PubMed, and PsychINFO databases; of these, eleven studies met the inclusion criteria. Included were seven regional studies based in the western U.S. and four nationwide studies. Seven studies utilized formal acculturation scales, three used language spoken, and one used language spoken and country of birth to indicate acculturation status. Nine studies showed a positive association between acculturation and smoking in women, but none of the studies in men showed an association.

Conclusion
The findings suggest that the association of acculturation and smoking is gender-specific. In this case, increased smoking prevalence with acculturation is consistently observed among Hispanic women but not among men. However, this trend cannot be generalized to the entire U.S. Hispanic population as a large percentage of the study participants were of Mexican descent. As Hispanic women acculturate, their cigarette smoking may increase because their behavior
becomes more strongly influenced by the norms and practices of the dominant group than in men.
INTRODUCTION

Cigarette smoking is the leading cause of preventable death in the United States and produces substantial health-related economic costs to society. From 1995-1999, over 440,000 people in the U.S. died from smoking-related causes each year. Among adults, most smoking deaths were from lung cancer (124,813), ischemic heart disease (81,976), and chronic airway obstruction (64,735). Estimates show that smoking caused over $150 billion in annual health-related economic losses from 1995-1999 including $81.9 billion in mortality-related productivity and $75.5 billion in excess medical expenditures in 1998.

National and regional surveys have shown that Hispanics have lower smoking rates than non-Hispanic whites. Data from the 2001 National Health Interview Survey (NHIS) show that the overall prevalence of cigarette smoking was significantly lower for Hispanics (16.7%, SD=1.2) than for non-Hispanic whites (24.0%, SD=0.6). The percentage of Hispanic men who currently smoked (21.6%, SD=1.9) was lower than the percentage among non-Hispanic white men (25.4%, SD=1.0). However, a wider gap was seen when comparing Hispanic and non-Hispanic white women. The percentage of Hispanic women who currently smoked (11.9%, SD=1.3) was nearly half of the percentage among non-Hispanic white women (22.8%, SD=0.9).

Several studies have demonstrated that the level of acculturation is an important predictor of smoking behavior among U.S. Hispanics of Mexican and Central American origin. The term acculturation refers to changes in values, attitudes, and behaviors experienced by individuals of an ethnic group as a result of continuous interaction with people of a different ethnic group. This acculturation model predicts that smoking patterns of Hispanics would reflect the extent to which they have adopted the smoking norms and practices of the larger society. This suggests that Hispanic smoking rates will rise with increasing levels of acculturation and eventually equal
those of non-Hispanic Whites. With more than 35 million Hispanics living in the U.S. (40% are foreign-born), the effect of acculturation on smoking is clearly a public health concern. The concept of acculturation is a complex phenomenon and is not fully understood. However, formal scales have been developed and proxy measures used in an attempt to better understand its association with health outcomes and health behaviors.

The objectives of this paper are to 1) review published studies investigating the association of acculturation on smoking patterns among Hispanic men and women in the U.S, and 2) examine the acculturation measures used in these studies.

METHODOLOGY

This literature review consisted primarily of studies that examined acculturation and health behaviors of Hispanics in the U.S. Studies under review were initially identified using MEDLINE, PubMed, and PsychINFO database search engines. The three key search terms were smoking, and acculturation or immigration, and Hispanic or Mexican-American or Latino/a. The search terms were limited from 1985 to 2003. This lower limit was chosen to include articles using data from the Hispanic Health and Nutrition Examination Survey (HHANES) 1982-1984. In addition, articles on other studies were selected from the reference lists of the reviewed articles. This search strategy identified 78 articles that provided data on smoking and acculturation/immigration among Hispanics in the U.S. These articles were examined and final inclusion into the review was determined by the use of an acculturation measure based on a validated scale, language preference, country of birth or time (years) living in the U.S.
RESULTS

A total of 26,611 men and women were included in the 11 studies with sample sizes ranging from 76 to 8,882. Three studies analyzed women only and the remaining eight studies analyzed men and women (Table 1). The respondents were predominantly of Mexican origin with a small proportion coming from Puerto Rico, Cuba, Central America, and South America. Approximately 70% of the respondents were drawn from the general U.S. population and the remainder were from Western U.S. states including Arizona, California, Colorado, New Mexico, and Texas. All of the studies were cross-sectional in design; eight utilized in-person interviews, two used telephone interviews, and one study used a self-administered survey. Seven studies employed formal acculturation scales, three used language spoken and one used language spoken and country of birth to indicate acculturation status.

Smoking rates by study location

Current smoking rates ranged from 24.5% to 45.8% in the eight studies involving men and 11.5% to 26.1% in the eleven studies involving women (Table 2). The prevalence ratios in this table show that among Hispanics, smoking rates in men were approximately twice as high as rates in women in most studies. Among men and women, similar ranges of smoking rates and prevalence ratios were found in studies using nationwide samples and populations in the Western U.S.

Smoking rates by acculturation measures

1. Proxy measures for acculturation

The association between acculturation and current smoking rates was examined to address the primary objective of the review. Three studies used language spoken and one study used country of birth and language spoken as proxy measures for acculturation. All of these studies
analyzed women and three analyzed men and women. Smoking rates were first evaluated in these four studies. A positive association was found between acculturation and smoking among women in three of the four studies (Table 3). 7-10 Specifically, English language use was associated with higher rates of smoking than Spanish language use. However, this association between language and smoking was not found for men in the three studies using this proxy measure for acculturation.

The study by Acevedo categorized women into three groups based on primary language spoken: 1) Spanish-speaking, 2) English and Spanish-speaking, and 3) English-speaking. 7 Current smoking rates were 5.7% for Spanish-speaking women, 8.0% for English & Spanish-speaking women, and 25.0% for English-speaking women (p=0.006). Samet’s study in New Mexico found that current smoking tended to be most prevalent (38%) among males speaking Spanish and English equally, but there were no trends across the range of language use in men. 9 Current smoking prevalence ranged from 24% to 30% among the three language preference groups of females with no clear pattern emerging. Palinkas et al found that the prevalence of current cigarette smoking was similar between English-speaking and Spanish-speaking Hispanic men in California. 8 However, in contrast to men, the prevalence of current cigarette smoking among English-speaking Hispanic women was nearly twice as great as that seen among Spanish-speaking Hispanic women.

Utilizing data from the National Health and Nutrition Examination Survey III (NHANES III), one study used the participant’s country of birth and language preference together as a proxy for acculturation. 10 Participants were categorized into Mexican -born, US-born Spanish-speaking, and US-born English-speaking groups. Both language groups of US-born women had a higher age and education adjusted percentage of females who currently smoked than the Mexican-born
women. However, no trend was observed among men. Logistic regression model results also confirm the association of acculturation and smoking that was observed among women but not among men. Each of U.S.-born female language groups was at a significantly greater risk of smoking than their Mexican-born counterparts. However, results showed that only U.S.-born Spanish-speaking men were more likely to smoke than their Mexican-born counterparts.

2. Acculturation Scales

Seven studies involved women and utilized a formal scale to assess acculturation whereas five studies involved men and a formal acculturation scale. When smoking rates and model results were examined, six of the seven studies involving women showed a positive association between acculturation and smoking (Table 3). However, none of the studies in men showed a positive association between acculturation and smoking. One study utilizing men revealed a negative association of acculturation and smoking.

Two studies, which examined only women, observed a positive association between acculturation and smoking. Coonrod and colleagues found that a Mexican-American woman born in the U.S. and a “U.S.-oriented” woman as designated by their acculturation scale were 4.6 and 3.7 times as likely to have smoked during their current pregnancy (current smoker) than a foreign-born Mexican-American woman and a Mexican-oriented woman, respectively. Cantero and colleagues found that current smoking rates increased from 11.0% to 13.1% to 25.1% with higher levels of acculturation.

Two studies examining men and women reported adjusted current smoking rates. Marin et al found a higher current age-adjusted smoking rate in more acculturated women than less acculturated women (22.6% vs. 13.6%). The opposite was observed in men; more acculturated men had a lower current age-adjusted smoking rate than less acculturated men (26.7% vs.
Haynes and colleagues showed that acculturation was associated with current cigarette smoking only among Mexican-American women, increasing from 19% among Mexican-oriented women to 28% among US-oriented women (p<0.05). For men, there was no clear trend for smoking and acculturation.14

Perez-Stable and colleagues found a significant association of birthplace and acculturation with current smoking status in Hispanic women but not men.17 Current smoking rates of 13.8% in U.S.-born women compared to 11.1% for foreign-born women (p=0.008) were reported and current smoking rates of 10.3%, 11.9%, and 15.5% were seen for the three groups of increasing acculturation, respectively (p<0.001). No significance difference in current smoking prevalence was seen between US-born men compared to foreign-born men as well as between the three acculturation groups. However, multiple logistic regression results (adjusted for age, education, and income) showed that an increase in acculturation was associated with a lower likelihood of being a current smoker in men. Consistent with the reported smoking prevalence, multiple logistic regression models revealed a significant positive association of acculturation and current smoking status in women.

Markides and colleagues obtained mixed results using a multiple logistic regression analysis of smoking status and three indices of acculturation—ethnicity of friends, language scale, and a traditional values scale.16 Significant associations were found between current smoking status and only one of the three scales in each of the genders. Coreil et al found a significant positive association between acculturation and current smoking status across all age groups among women but only the older age group for men.13
DISCUSSION

This review found a consistent positive association between acculturation and smoking in Hispanic women but not men, indicating a differential association of acculturation and current smoking status by gender. Specifically, nine of the eleven studies involving women reported a significant positive association between acculturation and current smoking status. In these studies, more acculturated women were more likely to be current smokers. The remaining two studies observed no association between acculturation and current smoking status. In contrast, only one of the eight studies involving men found a significant association between acculturation and current smoking status and this relationship was negative; an increase in acculturation was associated with a lower prevalence of current smoking.

The relationship between acculturation and smoking in women was evident in studies that used formal acculturation scales as well as in studies that used proxy measures. Six of the seven studies that used formal acculturation scales and three of the four studies that utilized country of birth and/or language spoken as proxies reported this trend. The association was also consistent across studies that presented prevalence values only, adjusted prevalence values, and multivariate logistic regression results. The seven studies that did not find a significant association between acculturation and current smoking status in men utilized formal acculturation scales as well as country of birth and/or language spoken as proxy measures.

However, the trends discovered in this review cannot be generalized to the entire Hispanic or Latino population throughout the U.S. All seven of the regional studies included Hispanics who were predominantly or entirely Mexican-American. These studies were based in Western U.S. states such as Colorado, California, Texas, New Mexico, and Arizona. Also, three of the four nationwide studies used Mexican-American sub-samples for their analyses instead of the entire
Hispanic sample. Therefore, it may only be appropriate to generalize these results to Mexican-Americans living in the U.S. The large sample sizes, sophisticated sample schemes of the nationwide studies such as the HHANES and NHANES, and strong internal validity of the study populations allow the results to be adequately generalized to the Mexican-American population. Regardless of the acculturation measures used in these studies, a potential source of bias exists. Seven studies in this review used formal scales to assess acculturation and six of these studies primarily used language-based acculturation scales. The language-based scales (including the Acculturation Rating Scale for Mexican Americans, ARSMA-I) measure acculturation linearly with Mexican culture at one extreme and American culture at the other. Thus, acculturation is defined as a linear movement in one direction of the continuum. This definition assumes that strengthening of one ethnic tie requires weakening of the other. These measures do not account for those biculturals who score high in the two cultures. Two-dimensional models should be used which stress that acculturation is a process in which the relation to the culture of origin and the new culture can be considered simultaneously. ARSMA-II was developed to address these concerns, but was not used in any of the studies in the review.

The final four studies utilized proxy measures for acculturation such as nativity, length of U.S. residence, language preference, and generation status. These studies make similar linear assumptions as seen in the language-based acculturation scales. Many public health studies use proxy measures to represent the complicated acculturation process. These measures are particularly convenient because they are often found in secondary data sources such as Vital Statistics records and national databases. However, these measures are limited in their ability to adequately assess an individual’s level of acculturation, and these limitations have not been sufficiently evaluated.
Another potential source of bias shared by all studies in the review was the self-reporting of cigarette use. Cigarette use has been falsely reported and underreported in New Mexico Hispanics and in a sub-sample of the Mexican-American population in HHANES.\textsuperscript{20,21} Thus, the smoking prevalence reported in these studies may be underestimates. An analysis of Mexican-American smokers in HHANES indicated that at least 20.4\% of men and 24.7\% of women who reported smoking less than 10 cigarettes per day may be underreporting their actual consumption. However, we are unable to confirm this underreporting, or to compare it to inaccurate reporting among non-Hispanics. We do not believe that inaccuracies in reporting smoking prevalence would invalidate the basic conclusions of this review.

The findings from this review suggest that some of the processes of acculturation are gender-specific. Specifically, gender modified the effect of acculturation on smoking behavior in Hispanics. Hispanic women, or in particular Mexican-American women, were especially susceptible to the initiation of smoking behaviors with increasing acculturation, whereas Hispanic men were not. Authors from two studies in this review suggest that this phenomenon may simply reflect the current social norms for smoking in the United States.\textsuperscript{14,15} As Hispanic women acculturate, their cigarette smoking rates increase because their behavior becomes more strongly influenced by the norms and practices of the dominant group; therefore, their smoking rates will become closer to those of the U.S. white population. Cigarette smoking may also be a way to establish a Hispanic woman’s independence in American society. Another explanation is that cigarette smoking may symbolize the acquisition of greater equality of status in society associated with changing gender roles and employment opportunities. The abandonment of Hispanic social pressures, which traditionally helped prevent cigarette smoking in women but not men may also contribute to the observed differences by gender.\textsuperscript{8} Whatever the reason, public
health interventions need to be designed to combat the increase in smoking rates among Hispanic immigrants to the U.S.
REFERENCES


Table 1. Review of studies on smoking and acculturation

<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Year</th>
<th>Site</th>
<th>Study Population</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acevedo⁷</td>
<td>2000</td>
<td>Colorado</td>
<td>Pregnant Women</td>
<td>331</td>
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<tr>
<td>Cantero et al¹¹</td>
<td>1999</td>
<td>Los Angeles</td>
<td>Women 46-92</td>
<td>573</td>
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<tr>
<td>Coonrod et al¹²</td>
<td>1999</td>
<td>Arizona</td>
<td>Women 18-65</td>
<td>76</td>
</tr>
<tr>
<td>Coreil et al¹³</td>
<td>1991</td>
<td>Nationwide</td>
<td>Men &amp; Women 20-74</td>
<td>3464</td>
</tr>
<tr>
<td>Haynes et al¹⁴</td>
<td>1990</td>
<td>Nationwide</td>
<td>Men &amp; Women 20-74</td>
<td>3464</td>
</tr>
<tr>
<td>Marin et al¹⁵</td>
<td>1989</td>
<td>California</td>
<td>Men &amp; Women 15-64</td>
<td>1669</td>
</tr>
<tr>
<td>Markides et al¹⁶</td>
<td>1987</td>
<td>Texas</td>
<td>Men &amp; Women 18-80</td>
<td>1125</td>
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<tr>
<td>Palinkas et al⁸</td>
<td>1993</td>
<td>California</td>
<td>Men &amp; Women 18+</td>
<td>3164</td>
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<tr>
<td>Perez-Stable et al¹⁷</td>
<td>2001</td>
<td>Nationwide</td>
<td>Men &amp; Women 18+</td>
<td>8882</td>
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<td>Samet et al⁹</td>
<td>1992</td>
<td>New Mexico</td>
<td>Men &amp; Women 18+</td>
<td>1072</td>
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<tr>
<td>Sundquist et al¹⁰</td>
<td>1999</td>
<td>Nationwide</td>
<td>Men &amp; Women 25-64</td>
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<tr>
<td>Study Authors</td>
<td>Current Smoking Rate</td>
<td></td>
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<tr>
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<tr>
<td></td>
<td><strong>Men</strong></td>
<td><strong>Women</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Western States</strong></td>
<td></td>
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<tr>
<td>Acevedo</td>
<td>--</td>
<td>13.0%</td>
<td>--</td>
<td></td>
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<td>Cantero et al</td>
<td>--</td>
<td>16.4%</td>
<td>--</td>
<td></td>
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<td>Coonrod et al</td>
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<td>17.8%</td>
<td>--</td>
<td></td>
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<td>45.8%</td>
<td>22.9%</td>
<td>2.00</td>
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<td>24.5%</td>
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<td>1.13</td>
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<tr>
<td><strong>Nationwide</strong></td>
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<td></td>
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<tr>
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<td>43.4%</td>
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<tr>
<td>Haynes et al</td>
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<td>1.60</td>
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<tr>
<td>Perez-Stable et al</td>
<td>25.0%</td>
<td>12.1%</td>
<td>2.07</td>
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<td>Sundquist et al</td>
<td>31.1%</td>
<td>15.7%</td>
<td>1.98</td>
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</table>

* Men prevalence/women prevalence
### Table 3. Association of acculturation and smoking and acculturation measures used

<table>
<thead>
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<th>Women</th>
<th>Acculturation Measure(s)</th>
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<td>Acevedo</td>
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<td>Language spoken</td>
</tr>
<tr>
<td>Cantero et al</td>
<td>--</td>
<td>Positive</td>
<td>11-item acculturation scale(^{18,22-26}), years living in US</td>
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<tr>
<td>Coonrod et al</td>
<td>--</td>
<td>Positive</td>
<td>General Accultuation Index(^{27}), birthplace, years living in US</td>
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<tr>
<td>Coreil et al</td>
<td>None</td>
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<td>8-item acculturation scale(^{18})</td>
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<td>Marin et al</td>
<td>Negative</td>
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<td>5-item acculturation scale(^{29})</td>
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<tr>
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<td>5-item acculturation scale(^{29}), birthplace</td>
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<td>Samet et al</td>
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<tr>
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