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THE ASSOCIATION BETWEEN ACCULTURATION AND SMOKING PATTERNS  
AMONG HISPANICS: A 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 from 1985 to 2003 using three key search terms. The methodology and findings of all retrieved articles were critically evaluated. Data were extracted from each article regarding study population, study methods, exposure assessment, outcomes measured, acculturation measures used, and results.

### Results

The literature search identified 78 articles from MEDLINE, PubMed, and PsychINFO databases; of these, eleven studies met the inclusion criteria. Seven regional studies based in the western U.S. and four nationwide studies were included in the review. 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 among women and one study involving men showed a negative association.

### Conclusion

The findings suggest that the association of acculturation and smoking is gender-specific. In this instance, increased smoking prevalence with increased acculturation is consistently observed among Hispanic women but not among men. 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 among men. Immigrant- and gender-specific public

health interventions need to be designed to combat the increase in smoking rates among Hispanic in the U.S.

## 1 INTRODUCTION

2 Cigarette smoking is the leading cause of preventable death in the United States and produces  
3 substantial health-related economic costs to society.<sup>1</sup> From 1995-1999, over 440,000 people in  
4 the U.S. died from smoking-related causes each year. Among adults, most smoking deaths were  
5 from lung cancer (124,813), ischemic heart disease (81,976), and chronic airway obstruction  
6 (64,735).<sup>1</sup> Estimates show that smoking caused over \$150 billion in annual health-related  
7 economic losses from 1995-1999 including \$81.9 billion in mortality-related productivity and  
8 \$75.5 billion in excess medical expenditures in 1998.<sup>1</sup>

9 National and regional surveys have shown that Hispanics have lower smoking rates than non-  
10 Hispanic whites. Data from the 2001 National Health Interview Survey (NHIS) show that the  
11 overall prevalence of cigarette smoking was significantly lower for Hispanics (16.7%, SD=1.2)  
12 than for non-Hispanic whites (24.0%, SD=0.6).<sup>2</sup> The percentage of Hispanic men who currently  
13 smoked (21.6%, SD=1.9) was lower than the percentage among non-Hispanic white men  
14 (25.4%, SD=1.0). However, a wider gap was seen when comparing Hispanic and non-Hispanic  
15 white women. The percentage of Hispanic women who currently smoked (11.9%, SD=1.3) was  
16 nearly half of the percentage among non-Hispanic white women (22.8%, SD=0.9).<sup>2</sup>

17 Acculturation to the mainstream U.S. society is a complex, multidimensional phenomenon that  
18 has a crucial but poorly understood role in many health behaviors, including smoking.<sup>3</sup> The term  
19 acculturation refers to changes in values, attitudes, and behaviors experienced by individuals of  
20 an ethnic group as a result of continuous interaction with people of a different ethnic group.<sup>4-6</sup>  
21 This acculturation model predicts that smoking patterns of Hispanics would reflect the extent to  
22 which they have adopted the smoking norms and practices of the larger society. This suggests  
23 that Hispanic smoking rates will eventually equal those of non-Hispanic whites with increasing

24 levels of acculturation. With more than 35 million Hispanics living in the U.S. (40% are foreign-  
25 born), the effect of acculturation on smoking is clearly a public health concern.<sup>7</sup> Again, the  
26 concept of acculturation is a complex phenomenon which is not fully understood. However,  
27 formal scales have been developed and proxy measures used in an attempt to better understand  
28 its association with health outcomes and health behaviors.

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

32

### 33 METHODOLOGY

34 This literature review consisted of studies that examined acculturation and health behaviors of  
35 Hispanics in the U.S. Studies under review were initially identified using MEDLINE, PubMed,  
36 and PsychINFO database search engines. The three key search terms were *smoking*, and  
37 *acculturation* or *immigration*, and *Hispanic* or *Mexican-American* or *Latino/a*. The search terms  
38 were limited from 1985 to 2003 but included all journals in the databases. This lower limit was  
39 chosen to include articles using data from the Hispanic Health and Nutrition Examination Survey  
40 (HHANES) 1982-1984, an important study of Hispanic health in the U.S. This search strategy  
41 identified 78 articles that provided data on smoking and acculturation/immigration among  
42 Hispanics in the U.S. These articles were examined and final inclusion into the review was  
43 determined by 1) English language reference 2) use of an adult study population and 3)  
44 examination of smoking rates across acculturation groups using measures based on a validated  
45 scale, language preference, country of birth or time (years) living in the U.S. The large  
46 percentage of the excluded references did not satisfy the second or third criterion.

## 47 RESULTS

48 A total of 26,611 men and women were included in the 11 studies with sample sizes ranging  
49 from 76 to 8,882. Three studies analyzed women only and the remaining eight studies analyzed  
50 men and women (Table 1). The respondents were predominantly of Mexican origin with a small  
51 proportion coming from Puerto Rico, Cuba, Central America, and South America.

52 Approximately 70% of the respondents were drawn from the general U.S. population and the  
53 remainder was from western U.S. states including Arizona, California, Colorado, New Mexico,  
54 and Texas. All of the studies were cross-sectional in design; eight utilized in-person interviews,  
55 two used telephone interviews, and one study used a self-administered survey. All studies were  
56 administered in English or Spanish based on the participants' preference. Seven studies  
57 employed formal acculturation scales<sup>19,23-31</sup>, three used language spoken<sup>7-9</sup> and one used  
58 language spoken and country of birth<sup>10</sup> to indicate acculturation status. The studies using formal  
59 acculturation scales reported excellent internal reliability with Cronbach alpha values ranging  
60 from 0.75 to 0.96.

### 61 *Smoking rates by study location*

62 Current smoking rates ranged from 24.5% to 45.8% in the eight studies involving men and  
63 11.5% to 26.1% in the eleven studies involving women (Table 2). The prevalence ratios show  
64 that among Hispanics, smoking rates in men were approximately twice as high as rates in women  
65 in most studies (Table 2). Among men and women, similar ranges of smoking rates and  
66 prevalence ratios were found in studies using nationwide samples and populations in the Western  
67 U.S.

### 68 *Smoking rates by acculturation measures*

#### 69 1. Proxy measures for acculturation

70 The association between acculturation and current smoking rates was examined to address the  
71 primary objective of the review. Four studies used proxy measures for acculturation including  
72 three which used language spoken and one which used country of birth and language spoken.  
73 All of these studies analyzed women and three analyzed men and women. A positive association  
74 was found between acculturation and smoking in three of the four studies involving women  
75 (Table 3). English language use was associated with higher rates of smoking than Spanish  
76 language use. Specifically, English-speaking Hispanic women had current smoking rates of over  
77 four and two times higher than Spanish-Speaking Hispanic women in studies by Acevedo et al.<sup>8</sup>  
78 and Palinkas et al.<sup>9</sup>, respectively. In the study by Sundquist and Winkleby<sup>11</sup>, both Spanish- and  
79 English-speaking US-born Hispanic women had a higher age- and education-adjusted smoking  
80 prevalence than the Mexican-born women. However, among men, no studies using a proxy  
81 measure for acculturation showed an association between language preference and smoking.

## 82 2. Acculturation Scales

83 Seven studies involved women and utilized formal scales to assess acculturation whereas five  
84 studies involved men (and women) and used a formal acculturation scale.<sup>12-18</sup> When smoking  
85 rates and analytical model results were examined, six of the seven studies involving women  
86 showed a positive association between acculturation and smoking (Table 3). An increase in  
87 acculturation was consistently associated with higher current smoking rates. Specifically, studies  
88 by Cantero et al., Haynes et al., Marin et al., and Perez-Stable et al. found ranges of current  
89 smoking rates (from low to high acculturation) of 11.0% to 25.1%, 19.0% to 28.0%, 13.6% to  
90 22.6%, and 10.3% to 15.5% among Hispanic women, respectively.<sup>12,15,16,18</sup> Coonrod and  
91 colleagues found a current smoking prevalence ratio of 3.7 comparing US-oriented and Mexico-  
92 oriented Hispanic women.<sup>13</sup> Finally, Coreil et al. used logistic regression to find a significant

93 positive association between acculturation and current smoking status across all age groups of  
94 women.<sup>14</sup>

95 Only one study involving men showed a significant association between acculturation and  
96 smoking. Marin et al. found a negative association between acculturation and smoking in which  
97 more acculturated men had a lower current age-adjusted smoking rate than less acculturated men  
98 (26.7% vs. 37.5%).

99

## 100 DISCUSSION

101 This review found a consistent positive association between acculturation and smoking among  
102 Hispanic women but not men, indicating a differential association of acculturation and current  
103 smoking status by gender. Specifically, nine of the eleven studies involving women reported a  
104 significant positive association between acculturation and current smoking status. In these  
105 studies, more acculturated women were more likely to be current smokers. In contrast, only one  
106 of the eight studies involving men found a significant association between acculturation and  
107 current smoking status and this relationship was negative; an increase in acculturation was  
108 associated with a lower prevalence of current smoking.

109 The low smoking rates of women in Mexico may help explain the presence of an association  
110 between acculturation and smoking among Hispanic women in the U.S. The second and third  
111 editions of Mexico's National Survey of Addictions (ENA-93 and ENA-98) found female  
112 smoking rates of 16.3% and 18.4% in Mexico, respectively.<sup>32,33</sup> These are lower than the rates  
113 reported among non-Hispanic white women and more acculturated Hispanic women found in  
114 this review. Authors from two studies in this review suggest that the association between  
115 acculturation and female Hispanics may simply reflect the current social norms for smoking in

116 the United States.<sup>15,16</sup> As Hispanic women acculturate, their cigarette smoking rates increase  
117 because their behavior becomes more strongly influenced by the norms and practices of the  
118 dominant group; therefore, their smoking rates will become closer to those of the U.S. non-  
119 Hispanic white population.

120 The specific reason why Hispanic women are more susceptible than Hispanic men is unknown;  
121 however, researchers have provided sociological and psychological theories to help explain this  
122 observation. Cigarette smoking may be a way for a Hispanic woman to establish her  
123 independence in American society. Cigarette smoking may also symbolize the acquisition of  
124 greater equality of status in society associated with changing gender roles and employment  
125 opportunities. Also, the abandonment of Hispanic social pressures, which traditionally helped  
126 prevent cigarette smoking among women but not men may also contribute to the observed  
127 differences by gender.<sup>35,36</sup> Finally, differential exposure to acculturative stress by gender may  
128 also explain the association between acculturation and smoking among women but not among  
129 men.<sup>37</sup>

130 The high smoking rates of men in Mexico may explain the absence of an association between  
131 acculturation and smoking among Hispanic men in the U.S. The second and third editions of  
132 Mexico's National Survey of Addictions (ENA-93 and ENA-98) found male smoking rates of  
133 42.9% and 51.2%, respectively. These rates are much higher than the overall smoking  
134 prevalence of non-Hispanic white men in the U.S. (24.0%)<sup>2</sup> but similar to rates reported in a few  
135 of the studies under review. According to the idea that immigrants' smoking rates will equal  
136 those of the dominant group, male Hispanic smoking rates should decrease from their higher  
137 levels in Mexico to the level of non-Hispanic whites in the U.S. Only one study showed this

138 negative relationship and two studies showed a negative relationship between acculturation and  
139 smoking which was not statistically significant.<sup>11,18</sup>

140 Results from this review were evident across acculturation measures used. The positive  
141 relationship between acculturation and smoking among women was present in studies that used  
142 formal acculturation scales as well as in studies that used proxy measures. Six of the seven  
143 studies that used formal acculturation scales and three of the four studies that utilized country of  
144 birth and/or language spoken as proxies reported this trend. The seven studies that did not find a  
145 significant association between acculturation and current smoking status among men utilized  
146 formal acculturation scales as well as country of birth and/or language spoken as proxy  
147 measures. The results found were also consistent across studies that presented prevalence values  
148 only, adjusted prevalence values (age- and/or education-adjusted), and multivariate logistic  
149 regression results. Although only two studies used the same acculturation scale, systematic  
150 differences between the scales would not explain the differential association between  
151 acculturation and smoking by gender because the same study instrument was used on men and  
152 women. Also, the use of the various scales in different populations in the western U.S. and  
153 nationwide demonstrates that the observed association between acculturation and smoking was  
154 externally valid.

155 The trends discovered in this review, however, cannot be generalized to the entire Hispanic  
156 population throughout the U.S. All seven of the regional studies included Hispanics who were  
157 predominantly or entirely Mexican-American. These studies were based in Western U.S. states  
158 such as Colorado, California, Texas, New Mexico, and Arizona. Also, three of the four  
159 nationwide studies used Mexican-American sub-samples for their analyses instead of the entire  
160 Hispanic sample. Therefore, it may only be appropriate to generalize these results to Mexican-

161 Americans. The large sample sizes, sophisticated sample schemes of the nationwide studies such  
162 as the HHANES and NHANES, and strong internal validity of the study populations allow the  
163 results to be adequately generalized to the Mexican-American population.

164 Regardless of the acculturation measures used in these studies, a potential source of bias exists.  
165 Seven studies in this review used formal scales to assess acculturation and six of these studies  
166 used primarily language-based acculturation scales. The language-based scales (including the  
167 Acculturation Rating Scale for Mexican Americans, ARSMA-I) measure acculturation linearly  
168 with Mexican culture at one extreme and American culture at the other. Thus, acculturation is  
169 defined as a linear movement in one direction of the continuum.<sup>19</sup> This definition assumes that  
170 strengthening of one ethnic tie requires weakening of the other. These measures do not account  
171 for those biculturals who score high in the two cultures. Two-dimensional models should be  
172 used which stress that acculturation is a process in which the relation to the culture of origin and  
173 the new culture can be considered simultaneously. ARSMA-II was developed to address these  
174 concerns, but was not used in any of the studies in the review.<sup>20</sup>

175 Four studies utilized proxy measures for acculturation such as nativity, length of U.S. residence,  
176 language preference, and generation status.<sup>8,10,11,17</sup> These studies make similar linear  
177 assumptions as seen in the language-based acculturation scales. Many public health studies use  
178 proxy measures to represent the complicated acculturation process. These measures are  
179 particularly convenient because they are often found in secondary data sources such as Vital  
180 Statistics records and national databases. However, these measures are limited in their ability to  
181 adequately assess an individual's level of acculturation, and these limitations have not been  
182 sufficiently evaluated.

183 Another potential source of bias shared by all studies in the review was the self-reporting of  
184 cigarette use. Cigarette use has been falsely reported and underreported among New Mexico  
185 Hispanics and among a sub-sample of the Mexican-American population in HHANES.<sup>21,22</sup>  
186 Thus, the smoking prevalence reported in these studies may be underestimates. An analysis of  
187 Mexican-American smokers in HHANES indicated that at least 20.4% of men and 24.7% of  
188 women who reported smoking less than 10 cigarettes per day may have underreported their  
189 actual consumption. However, we are unable to confirm this underreporting, or to compare it to  
190 inaccurate reporting among non-Hispanics. We do not believe that inaccuracies in reporting  
191 smoking prevalence would invalidate the basic conclusions of this review.

192 The findings from this review suggest that some of the processes of acculturation are gender-  
193 specific. Specifically, gender modified the effect of acculturation on smoking behavior among  
194 Hispanics. Again, as Hispanic women acculturate, their cigarette smoking rates increase because  
195 their behavior becomes more strongly influenced by the dominant group; therefore, their  
196 smoking rates will become closer to those of the U.S. non-Hispanic white population. Smoking  
197 cessation and prevention programs should be customized to address the needs of specific  
198 Hispanic subpopulations. Female Hispanic immigrants are a group particularly susceptible to  
199 smoking initiation upon arrival in the U.S. Public health interventions need to account for the  
200 unique acculturation experience of Hispanics entering the U.S. Specifically, gender-specific and  
201 immigrant-specific approaches are necessary to halt the increase in smoking among Hispanics  
202 before it begins.

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**Table 1.** Review of studies on smoking and acculturation

<b>Study Authors</b>	<b>Year</b>	<b>Site</b>	<b>Study Population</b>	<b>Sample Size</b>
Acevedo <sup>7</sup>	2000	Colorado	Pregnant Women	331
Cantero et al. <sup>11</sup>	1999	Los Angeles	Women 46-92	573
Coonrod et al. <sup>12</sup>	1999	Arizona	Women 18-65	76
Coreil et al. <sup>13</sup>	1991	Nationwide	Men & Women 20-74	3464
Haynes et al. <sup>14</sup>	1990	Nationwide	Men & Women 20-74	3464
Marin et al. <sup>15</sup>	1989	California	Men & Women 15-64	1669
Markides et al. <sup>16</sup>	1987	Texas	Men & Women 18-80	1125
Palinkas et al. <sup>8</sup>	1993	California	Men & Women 18+	3164
Perez-Stable et al. <sup>17</sup>	2001	Nationwide	Men & Women 18+	8882
Samet et al. <sup>9</sup>	1992	New Mexico	Men & Women 18+	1072
Sundquist et al. <sup>10</sup>	1999	Nationwide	Men & Women 25-64	2791

**Table 2.** Current smoking rates in Hispanics by study location and gender

<b>Study Authors</b>	<b>Current Smoking Rate</b>		<b>Prevalence Ratio<sup>a</sup></b>
	<b>Men</b>	<b>Women</b>	
<b>Western States</b>			
Acevedo	--	13.0%	--
Cantero et al.	--	16.4%	--
Coonrod et al.	--	17.8%	--
Marin et al.	32.4%	16.8%	1.93
Markides et al.	45.8%	22.9%	2.00
Palinkas et al.	24.5%	11.5%	2.13
Samet et al.	29.6%	26.1%	1.13
<b>Nationwide</b>			
Coreil et al.	43.4%	24.8%	1.75
Haynes et al.	40.0%	25.0%	1.60
Perez-Stable et al.	25.0%	12.1%	2.07
Sundquist et al.	31.1%	15.7%	1.98

<sup>a</sup> Men prevalence/women prevalence

**Table 3.** Association of acculturation and smoking and acculturation measures used

<b>Study Authors</b>	<b>Association of Acculturation and Smoking</b>		<b>Acculturation Measure(s)</b>
	<b>Men</b>	<b>Women</b>	
Acevedo	--	Positive	Language spoken
Cantero et al.	--	Positive	11-item acculturation scale <sup>18,22-26</sup> , years living in US
Coonrod et al.	--	Positive	General Acculturation Index <sup>27</sup> , birthplace, years living in US
Coreil et al.	None	Positive	8-item acculturation scale <sup>18</sup>
Haynes et al.	None	Positive	8-item acculturation scale <sup>28,32</sup>
Marin et al.	Negative	Positive	5-item acculturation scale <sup>29</sup>
Markides et al.	None	None	Ethnicity of friends, language, and traditional values scales <sup>30</sup>
Palinkas et al.	None	Positive	Language spoken
Perez-Stable et al.	None	Positive	5-item acculturation scale <sup>29</sup> , birthplace
Samet et al.	None	None	Language spoken
Sundquist et al.	None	Positive	Birthplace and language spoken