Original investigation

Cigarette Smoking and Depressive Symptoms Among Hispanic/Latino Adults: Results From the Hispanic Community Health Study/Study of Latinos (HCHS/SOL)

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Abstract

Introduction: In the present study, we investigated associations among cigarette smoking, smoking cessation treatment, and depressive symptoms in Hispanic/Latino adults.

Methods: The multisite prospective population-based Hispanic Community Health Study/Study of Latinos (HCHS/SOL) enrolled a cohort of Hispanic/Latino adults (aged 18–74) from diverse backgrounds ($n = 16,412$) in 4 U.S. communities (Chicago, San Diego, Miami, and Bronx). Households were selected using a stratified 2-stage probability sampling design and door-to-door recruitment, and sampling weights calibrated to the 2010 U.S. Population Census. Hispanic/Latino individuals of Dominican, Central American, South American, Cuban, Mexican, and Puerto Rican background were considered. Cigarette smoking, smoking cessation treatment, and depressive symptoms were measured by self-report.

Results: Results indicated that current smokers had greater odds for significant depressive symptoms (CES-D score ≥ 10) than never smokers in all Hispanic background groups [odds ratio (*OR*) > 1.5]. Depressed persons were not more likely to receive prescribed smoking cessation medications from a doctor (*OR* = 1.43, 95% CI = 0.98–2.08), take over-the-counter medications (*OR* = 1.11, 95% CI = 0.75–1.66), or receive psychotherapy (*OR* = 1.02, 95% CI = 0.57–1.85).

Conclusions: In conclusion, these findings suggest that the positive association between smoking status and depressive symptoms is present in all examined Hispanic/Latino background groups.

Introduction

Cigarette smoking remains one of the leading behavioral risk factors for chronic disease morbidity and mortality. Similarly, depression is

a major public health burden, with depression being the 4th leading cause of disability-adjusted life years (DALYS) worldwide.¹ In fact, it is estimated that depression will be the 2nd leading cause of DALYS worldwide by the year 2020.¹ Hispanic/Latinos are important to

study because they are the largest ethnic minority population in the United States, comprising 16.3% of the population in 2010. They are also a rapidly growing population, with projections of 24.4% of the U.S. population by 2050.

It is well-established that cigarette-use prevalence, patterns, and long-term outcomes differ across racial/ethnic populations. Hispanic/Latinos have a lower prevalence of cigarette use compared to non-Hispanic Whites; and non-Hispanic Blacks suffer a disproportionate burden of cigarette-related morbidity and mortality. Among Hispanics/Latinos, Perez-Stable and colleagues² found that persons of Puerto Rican and Cuban American background have the greatest rates and persons of Mexican American and Central American background had the lowest rates of cigarette smoking. These findings were recently replicated in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL).³

An association between cigarette smoking and depression is well established in the literature. There is already some evidence that the association between cigarette smoking and depression may be stronger for women in the general U.S. population⁴ and in the Mexican population living in Mexico.⁵ However, some other studies report no gender differences in the association between smoking and depression in the general population.⁶ To our knowledge, there are no studies relating smoking and depression that have considered a wide range of Hispanic/Latino background groups and that have also considered gender differences within these groups. Although Hispanics/Latinos are the largest minority group in the U.S., previous studies on health outcomes among this group have been limited by collapsing all Hispanic/Latino backgrounds and have included mostly Mexican Americans. A limitation of collapsing Hispanics/Latinos as a group is that they may differ socially, psychologically, and culturally by Hispanic/Latino background, which might have differential effects on health outcomes. Indeed, findings from HCHS/SOL, (<http://www.csc.unc.edu/hchs/>) which includes Dominican Americans, Central Americans, South Americans, Cuban Americans, Mexican Americans, and Puerto Ricans, have shown that health outcomes such as diabetes, sleep, heart disease, and respiratory disease differ by Hispanic/Latino background.⁷⁻⁹ In this study, we used data from the HCHS/SOL to examine associations between depression and smoking variables among U.S. men and women from different Hispanic/Latino background subgroups (i.e., Mexican American, Puerto Rican, Cuban American, Dominican American, Central American, and South American), while adjusting for other variables (age, education, acculturation, and binge drinking) that could account for these associations.¹⁰⁻¹² We hypothesized that there would be gender and Hispanic/Latino background differences in the associations between cigarette use and significant depressive symptoms. In this study, we hypothesize that there would be Hispanic and gender background group differences in the associations between cigarette use and significant depressive symptoms. We also hypothesized that persons with significant depressive symptoms would receive tobacco cessation treatment more frequently than others.

Materials and Methods

Participants

Data came from the HCHS/SOL, which is an epidemiologic study of health and disease in diverse Hispanic/Latino populations in the United States. Participants were recruited from four sites (the Bronx, NY; Chicago, IL; Miami, FL; and San Diego, CA). A detailed

description of the study design and methods has been published.¹³ At the time of enrollment, participants had to self-identify as Hispanic and be between 18 and 74 years old. A detailed description of the sample design and cohort selection has been published.¹⁴ The institutional review board (IRB) at each site approved the study protocol and all participants gave informed consent. This study included participants who attended the baseline exam between 2008 and 2011 and who had sample weights and values for the variables analyzed. Participants who had missing data on Hispanic/Latino background group affiliation or who self-reported as “more than one heritage” or “other” were excluded (3.9% of men and 3.3% of women). The total number of participants used in this study was 16,412.

Measures

Demographic Characteristics

Age (in years), gender, and education (<high school, =high school, and >high school) were measured by self-report.

Acculturation

Acculturation was measured by using a reliable and validated 10-item Short Acculturation Scale.¹⁵ This questionnaire measures a total score of two acculturation domains: language and social. Sample questions include “In general, what language(s) do you read and speak?” and “What was the language(s) you used as a child?” A 5-point Likert-type scale is assigned to each question with 1 = Only Spanish/All Hispanic/Latino and 5 = Only English/All non-Hispanic/non-Latino. The average of the 10 questions indicates the degree of acculturation. In this study, the reliability coefficient of this measure was 0.93.

Binge Drinking

Binge drinking was measured by the question “How often do you have 4 or more drinks (for females) and 5 or more drinks (for males) containing any kind of alcohol within a two-hour period?”

Smoking Status

Smoking status was measured by self-report and categorized into three categories: current, former, and never. Two questions were used: “Have you ever smoked at least 100 cigarettes in your entire life?” and “Do you now smoke daily, some days or not at all?” If participants had smoked at least 100 cigarettes in their entire life and reported smoking daily or some days, then they were considered current smokers; if participants had smoked at least 100 cigarettes in their entire life and did not report smoking daily or some days, then they were considered former smokers; and if participants had not smoked at least 100 cigarettes in their entire life, they were considered never smokers. Nondaily smokers were smokers who had reported smoking at least 100 cigarettes in their lifetime but reported smoking “some days” and not “all days”.³

Pack Years

Pack years are a numeric variable that calculates the cigarette pack years as the number of exposure years multiplied by the average number of cigarettes smoked per day.

Smoking Cessation Treatment

Smoking cessation treatment included whether former or current smokers were prescribed medications by a doctor, over-the-counter medications, or psychotherapy. These items were measured by the following three questions, respectively:

1. Has a doctor ever prescribed any aids to help you quit smoking, such as nicotine replacement gum, the patch, or any type of medication?
2. Have you ever used any over-the-counter aids to help you quit smoking, such as nicotine replacement gum, the patch, or any type of medication?
3. Have you ever used behavioral or group therapy to help you quit smoking?

Participants answered either Yes or No to these questions.

Depressive Symptoms

Depressive symptoms were measured by a 10-item Center for Epidemiologic Studies Depression Scale (CES-D).¹⁶ This 10-item version has been used widely and has good predictive accuracy of the full-length 20-item version ($\kappa = 0.97$) and has good validity and reliability.¹⁶ Response format: 0 = rarely or none of the time, 1 = some or a little of the time, 2 = occasionally or a moderate amount of time, 3 = all of the time. These responses resulted in a numeric variable with values ranging from 0 to 30. Significant depressive symptoms were measured using a cutpoint of ≥ 10 on the CES-D.¹⁶

Statistical Analysis

Logistic regression models were used with the cigarette items predicting significant depressive symptoms (CES-D score ≥ 10). The first model was only adjusted for complex survey design. The second models were adjusted for complex survey design, age, study site, acculturation, alcohol consumption, and education. In two subsequent models adjusting for the same variables, logistic regression

models were used to regress significant depressive symptoms to the smoking cessation variables (i.e., doctor prescribed medication, over-the-counter, and psychotherapy). Analyses were conducted using statistical software (SAS, version 9.2; SAS Institute).

Results

Demographic Characteristics and Main Variables of Eligible Sample

See Table 1 for the demographic characteristics and main variables of the eligible sample. The mean age was approximately 41 years. Approximately half of the sample was female; about 10% of Dominican background, 8% Central American background, 21% Cuban background, 39% Mexican background, 17% Puerto Rican background, and 5% South American background; and more than 60% of the sample had equal to or less than a high school education. Approximately 21% were current smokers, 17% former smokers, and 61% never smokers. The mean pack years were approximately 5 years and 27% of the sample had a CES-D score ≥ 10 , indicating risk of significant depressive symptoms. See Table 2 for the mean depressive symptoms by Hispanic/Latino background subgroup, gender, and smoking status.

Association Between Cigarette Smoking and Depressive Symptoms Among Hispanic Background Groups

We did not include Hispanics/Latinos of more than one heritage ($n = 402$) and other Hispanics/Latinos ($n = 101$) because of small cell sizes. See Tables 3 and 4 for the estimates of the association between

Table 1. Demographic Characteristics and Main Variables in the Hispanic Community Health Study/Study of Latinos

Variable	<i>n</i>	Mean or percent	<i>SE</i>
Age (years)	15,912	41.3	0.2
Gender			
Female	9,559	52.2	0.5
Male	6,353	47.7	0.5
Hispanic subgroup			
Dominican Americans	1,473	10.3	0.7
Central Americans	1,732	7.7	0.5
Cuban Americans	2,348	20.8	1.7
Mexican Americans	6,472	38.9	1.7
Puerto Ricans	2,728	16.8	0.8
South Americans	1,072	5.1	0.3
Study site			
Bronx	3,918	28.4	1.4
Chicago	4,034	15.9	0.9
Miami	3,965	29.2	2.1
San Diego	3,995	26.4	1.7
Acculturation score	15,654	2.1	0.0
Education			
<High school or General Equivalency Diploma (GED)	6,086	32.8	0.7
=High school or GED	4,076	28.4	0.5
>High school or GED	5,660	38.7	0.8
Smoking status			
Current	3,045	21.1	0.5
Former	3,138	17.3	0.4
Never	9,638	61.4	0.6
Pack years	15,755	5.2	0.2
Depression			
CES-D ≥ 10	4,589	27.0	0.6
CES-D < 10	10,987	72.9	0.6

Table 2. Mean CES-D Scores by Hispanic/Latino Background Subgroup and Gender

	Dominican Americans				Central Americans				Cuban Americans			
	CES-D score		CES-D score ≥ 10		CES-D score		CES-D score ≥ 10		CES-D score		CES-D score ≥ 10	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
	Mean	Mean	%	%	Mean	Mean	%	%	Mean	Mean	%	%
Smoking status												
Current	13.1	6.1	58.5	18.4	9.1	6.9	36.3	28.1	10.0	7.1	48.4	27.2
Nondaily	14.1	7.7	64.9	29.6	7.2	5.0	25.9	26.6	9.9	5.8	45.1	15.6
Former	9.3	5.8	36.4	21.2	8.5	5.6	38.7	17.2	9.1	6.05	40.5	22.0
Never	7.5	5.0	30.8	15.2	7.1	5.0	29.8	14.1	7.1	5.0	30.0	18.3
	Mexican Americans				Puerto Ricans				South Americans			
Smoking status												
Current	8.5	6.6	38.5	23.4	11.3	8.0	55.2	35.6	8.7	7.0	41.6	27.5
Nondaily	7.3	7.1	31.1	26.1	13.6	7.6	73.8	34.4	9.9	6.6	50.8	23.6
Former	7.1	5.1	27.4	15.3	11.0	7.9	51.0	34.5	6.2	5.4	26.6	19.8
Never	6.7	5.1	25.2	14.2	9.2	6.8	40.4	24.8	6.8	5.8	25.7	20.0

All means and percentages are adjusted for complex survey design.

cigarette smoking and significant depressive symptoms among Hispanic background groups in both models. In models that only adjusted for complex survey design, current smoking was associated with significant depressive symptoms among people of Dominican, Cuban, Mexican, and Puerto Rican background, but not those of Central American or South American background. The odds ratios (ORs) between smoking and significant depressive symptoms among nondaily smokers were similar to those of current smokers in the same groups; however, because of limited sample size, some failed to reach statistical significance. Former smokers were not at greater odds for significant depressive symptoms in any group. Pack years were associated with significant depressive symptoms among only among those of Cuban and Puerto Rican background.

In models further adjusting for complex survey design, age, gender, study site, acculturation, alcohol consumption, and education, current smokers had greater odds for significant depressive symptoms in all groups (i.e., Dominican Americans, Central Americans, Mexican Americans, Puerto Ricans, and South Americans). The ORs between smoking and significant depressive symptoms among nondaily smokers were similar as current smokers in the same groups; however, because of limited sample size, some failed to reach statistical significance. Former smokers were not at greater odds for significant depressive symptoms than never smokers. Among persons of Cuban, Mexican, and Puerto Rican backgrounds, pack years were positively associated with significant depressive symptoms; pack years were not significantly associated with significant depressive symptoms among persons of Dominican, Central American, and South American backgrounds.

Association Between Cigarette Smoking and Depressive Symptoms Among Hispanic and Gender Background Groups

See Tables 3 and 4 for the gender-stratified estimates of the association between cigarette smoking and depressive symptoms for individuals of Dominican, Central, and Cuban background and for individuals of Mexican, Puerto Rican, and South Americans background, respectively.

Women

In models only adjusted for complex survey design, current smoking was associated with significant depressive symptoms among women

of Dominican, Cuban, Mexican, Puerto Rican, and South American background, but not those of Central American background. The ORs between smoking and significant depressive symptoms among nondaily smokers were similar to those of current smokers in most of these groups. Former smokers were not at greater odds for significant depressive symptoms in any group. Pack years were associated with significant depressive symptoms among only among those of Dominican, Cuban, Mexican, and Puerto Rican background. When further adjusting for complex survey design, age, gender, study site, acculturation, alcohol consumption, and education, the same patterns of association between smoking items and significant depressive symptoms (as when only adjusting for complex survey design) were observed.

Men

When only adjusting for complex survey design, current smoking was associated with significant depressive symptoms among men of Central American, Cuban, Mexican, and Puerto Rican backgrounds, but not for men of Dominican and South American backgrounds. The ORs between smoking and significant depressive symptoms among nondaily smokers were similar to those of current smokers in most of these groups. Former smokers were not at greater odds for significant depressive symptoms than never smokers in any group. Pack years were associated with significant depressive symptoms among only among men of Cuban and Puerto Rican background. When further adjusting for complex survey design, age, gender, study site, acculturation, alcohol consumption, and education, the same patterns of association between the smoking items and significant depressive symptoms were observed.

Association Between Smoking Cessation Treatment and Depressive Symptoms Among All Hispanics/Latinos

See Table 5 for the estimates of the association between smoking cessation treatment and significant depressive symptoms in both models. When only adjusting for complex survey design, depressed persons were at greater odds for receiving doctor-prescribed smoking cessation medications than nondepressed persons while depressed persons were not at greater odds for taking over-the-counter medications

Table 3. Association Between Cigarette Smoking and Significant Depressive Symptoms (CES-D Scores ≥ 10) Among Hispanic and Gender Subgroups for Dominican, Central, and Cuban Americans

	Dominican Americans			Central Americans			Cuban Americans		
	Both genders		Male	Both genders		Female	Both genders		Female
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Model 1									
Smoking status									
Current	2.29 (1.13–4.61)	3.16 (1.38–7.23)	1.25 (0.46–3.37)	1.41 (0.98–2.04)	1.34 (0.76–2.36)	2.37 (1.32–4.25)	1.66 (1.33–2.08)	2.19 (1.56–3.06)	1.67 (1.18–2.36)
Nondaily	3.80 (0.87–16.49)	4.14 (0.70–24.31)	2.34 (0.61–8.91)	1.16 (0.73–1.83)	0.82 (0.37–1.82)	2.20 (1.07–4.49)	1.15 (0.70–1.90)	1.91 (0.87–4.22)	0.82 (0.34–2.00)
Former	1.22 (0.82–1.81)	1.28 (0.78–2.09)	1.49 (0.78–2.86)	1.10 (0.76–1.59)	1.48 (0.90–2.45)	1.26 (0.70–2.26)	1.23 (0.92–1.64)	1.59 (1.16–2.17)	1.25 (0.79–1.98)
Never	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Pack years	1.01 (0.99–1.02)	1.02 (1.00–1.05)	1.00 (0.98–1.02)	0.99 (0.98–1.00)	1.00 (0.98–1.02)	1.00 (0.98–1.02)	1.01 (1.00–1.01)	1.02 (1.01–1.03)	1.01 (1.00–1.01)
Model 2									
Smoking status									
Current	2.25 (1.26–4.02)	2.84 (1.36–5.92)	1.40 (0.52–3.78)	1.81 (1.18–2.76)	1.19 (0.64–2.21)	2.38 (1.33–4.24)	1.76 (1.37–2.28)	1.99 (1.41–2.81)	1.51 (1.07–2.13)
Nondaily	3.23 (0.90–11.54)	3.60 (0.65–19.77)	1.95 (0.54–7.05)	1.43 (0.83–2.47)	0.70 (0.30–1.61)	2.08 (1.04–4.15)	1.25 (0.76–2.05)	1.94 (0.90–4.17)	0.79 (0.34–1.86)
Former	1.10 (0.72–1.67)	1.06 (0.63–1.77)	1.27 (0.61–2.64)	1.33 (0.91–1.95)	1.62 (0.94–2.79)	1.27 (0.67–2.40)	1.17 (0.83–1.64)	1.32 (0.95–1.84)	0.96 (0.58–1.59)
Never	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Pack years	1.01 (0.99–1.02)	1.02 (1.00–1.04)	1.00 (0.98–1.02)	1.00 (0.98–1.01)	1.00 (0.98–1.01)	1.00 (0.98–1.02)	1.01 (1.00–1.01)	1.01 (1.00–1.02)	1.01 (1.00–1.01)

All smoking independent variables were regressed on significant depressive symptoms in separate models. Model 1 was only adjusted for complex survey design. Model 2 was adjusted for complex survey design, age, gender, study site, acculturation, alcohol consumption status, and education. The confidence intervals in bold indicate significance values. If they include 1 it is not significant.

Table 4. Association Between Cigarette Smoking and Significant Depressive Symptoms (CES-D scores ≥ 10) Among Hispanic and Gender Subgroups for Mexican, Puerto Ricans, and South Americans

	Mexican Americans			Puerto Ricans			South Americans		
	Both genders		Male	Both genders		Female	Both genders		Male
	OR (95% CI)	Female OR (95% CI)	OR (95% CI)	OR (95% CI)	Female OR (95% CI)	OR (95% CI)	OR (95% CI)	Female OR (95% CI)	OR (95% CI)
Model 1									
Smoking status									
Current	1.45 (1.12–1.89)	1.85 (1.25–2.74)	1.84 (1.20–2.82)	1.62 (1.23–2.13)	1.82 (1.23–2.67)	1.67 (1.14–2.46)	1.67 (0.97–2.88)	2.06 (1.16–3.66)	1.51 (0.56–4.04)
Nondaily	1.41 (0.99–2.03)	1.33 (0.73–2.43)	2.13 (1.24–3.63)	2.18 (1.33–3.57)	4.17 (1.96–8.87)	1.59 (0.79–3.18)	1.96 (1.02–3.79)	2.99 (1.31–6.82)	1.23 (0.42–3.61)
Former	0.91 (0.74–1.14)	1.12 (0.84–1.49)	1.09 (0.74–1.60)	1.46 (0.98–2.15)	1.53 (0.98–2.40)	1.60 (0.84–3.03)	0.92 (0.57–1.47)	1.04 (0.53–2.06)	0.98 (0.47–2.04)
Never	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Pack years	1.00 (0.99–1.01)	1.02 (1.00–1.04)	1.00 (0.99–1.01)	1.01 (1.00–1.02)	1.01 (1.00–1.02)	1.01 (1.00–1.02)	0.99 (0.98–1.01)	1.00 (0.98–1.02)	0.97 (0.94–1.00)
Model 2									
Smoking status									
Current	1.74 (1.30–2.32)	1.77 (1.21–2.59)	1.65 (1.09–2.50)	1.67 (1.26–2.22)	1.66 (1.13–2.43)	1.67 (1.10–2.51)	1.91 (1.08–3.40)	2.06 (1.18–3.61)	1.59 (0.59–4.22)
Nondaily	1.62 (1.11–2.38)	1.27 (0.70–2.29)	1.95 (1.18–3.21)	2.56 (1.64–3.99)	4.31 (2.10–8.85)	1.72 (0.86–3.47)	1.83 (0.96–3.49)	2.22 (0.93–5.29)	1.27 (0.44–3.67)
Former	1.06 (0.84–1.35)	1.10 (0.82–1.48)	1.01 (0.69–1.49)	1.39 (0.92–2.09)	1.35 (0.82–2.20)	1.34 (0.73–2.46)	1.08 (0.60–1.95)	0.93 (0.41–2.10)	1.28 (0.54–3.00)
Never	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Pack years	1.01 (1.00–1.02)	1.02 (1.00–1.04)	1.00 (0.99–1.01)	1.01 (1.00–1.02)	1.01 (1.00–1.02)	1.01 (1.00–1.02)	0.99 (0.98–1.01)	1.00 (0.98–1.01)	0.98 (0.96–1.01)

All smoking independent variables were regressed on significant depressive symptoms in separate models. Model 1 was only adjusted for complex survey design. Model 2 was adjusted for complex survey design, age, gender, study site, acculturation, alcohol consumption status, and education.

Table 5. Association Between Smoking Cessation Treatment and Significant Depressive Symptoms (CES-D Scores ≥ 10) Among Hispanics

	Prescribed medication		Over-the-counter medication		Received psychotherapy	
	<i>n</i>	OR (95% CI)	<i>n</i>	OR (95% CI)	<i>n</i>	OR (95% CI)
Model 1						
Significant depressive symptoms	4,703	2.14 (1.55–2.95)	4,703	1.39 (0.99–1.96)	4,702	1.24 (0.70–2.19)
Not significant depressive symptoms		Reference		Reference		Reference
Model 2						
Significant depressive symptoms	4,626	1.43 (0.98–2.08)	4,626	1.11 (0.75–1.66)	4,625	1.02 (0.57–1.85)
Not significant depressive symptoms		Reference		Reference		Reference

Model 1 was only adjusted for complex survey design. Model 2 was adjusted for complex survey design, age, gender, study site, acculturation, alcohol consumption status, and education.

and having received psychotherapy. When further adjusting for complex survey design, age, gender, study site, acculturation, alcohol consumption, and education, depressed persons were marginally at greater odds for receiving doctor-prescribed smoking cessation medications, but odds for taking over-the-counter medications and having received smoking cessation psychotherapy were not significant.

Discussion

This is the first study to examine the association between smoking and depressive symptoms among five major U.S. Hispanic/Latino background groups, using a large-scale population-based epidemiologic study. In all Hispanic/Latino background groups, current smokers had greater odds for significant depressive symptoms than never smokers, which is consistent with the literature in the general population of a positive association between smoking status and significant depressive symptoms.¹⁷ Pack years were associated with significant depressive symptoms only among Dominican, Cuban, Mexican, and Puerto Rican women; and the association between pack years was positively associated with significant depressive symptoms only among Cuban and Puerto Rican men. Last, we found that depressed persons were more likely to receive prescribed smoking cessation medications from a doctor than nondepressed persons in unadjusted models, and in adjusted models, depressed persons were marginally more likely to receive prescribed smoking cessation medications from a doctor, but not take over-the-counter medications, or receive psychotherapy for smoking cessation. The finding that smoking status is positively associated with significant depressive symptoms is consistent with the literature in the general population.¹⁷ Our study suggests that this association is significant beyond demographic, socioeconomic, and other factors related to the different Hispanic background groups. There have been some reasons posited for the positive association between smoking status and significant depressive symptoms. First, cigarette smokers may be attempting to self-medicate symptoms of depression or anxiety.¹⁸ Alternatively, findings from large longitudinal epidemiologic studies have suggested that cigarette smoking may lead to the onset of significant depressive symptoms.¹⁹ There may also be shared familial or socioenvironmental factors that may link cigarette smoking to significant depressive symptoms.¹⁹

Our findings that the positive association between pack years and significant depressive symptoms is more consistent for women than men among Mexican Americans is consistent with findings from a population-based study by Benjet et al.⁵ conducted in Mexico. Interestingly, following a similar pattern as in Mexican Americans, we found significant positive associations between all smoking

variables (i.e., smoking status, pack years) and significant depressive symptoms only among Dominican women and no significant associations between any of the smoking variables and significant depressive symptoms among Dominican men. Associations between smoking variables and significant depressive symptoms were significant for Cuban and Puerto Rican women and men. These differences may be accounted for by differences in rates of smoking and significant depressive symptoms by gender and Hispanic/Latino background group. We also found in fully adjusted models that persons who are depressed are marginally more likely to seek treatment for smoking cessation. This is important because these persons tend to be heavier smokers; and thus, the burden of morbidity and mortality may be more apparent in these smokers.^{20,21}

There are limitations to this paper. First, although we have a large sample size of over 16,000 Hispanic/Latino adults, our study is cross-sectional; and thus, cause-effect relationships cannot be established. This is important since the temporality of the association between cigarette smoking and significant depressive symptoms is not clear. Likewise, our depression measure does not include diagnosis of major depressive disorder; and therefore, we report symptom means and CES-D scores ≥ 10 as a proxy measure of depression. Our study is not nationally representative of the general Hispanic/Latino population in the United States, given that we only sampled persons from the Bronx, San Diego, New York City, and Chicago. Another limitation is the smaller number of nondaily smokers, as observed by nonsignificant findings for modest associations. However, mean depressive symptoms by smoking status were similar for nondaily smokers and current smokers. Strengths of this study include the large sample size. As mentioned, most Hispanics in the United States are Mexican American; and thus, our study presents findings in understudied Hispanic populations, such as Cuban Americans and Dominican Americans. Similarly, oversampling of low socioeconomic and older Hispanics includes understudied Hispanic populations.

In conclusion, our study highlights that smoking status is positively associated with depressive symptoms in all Hispanic background groups. Treatment and preventive measures should mainly focus on all Hispanic background groups since current smokers in all groups had more depressive symptoms than never smokers. For example, healthcare professionals can administer brief depression measures among smokers. Other interventions for depressed smokers include phone consultations on how to effectively quit smoking (<http://smokingcessationleadership.ucsf.edu/1800QuitNow.htm>); and healthcare professionals can direct their smoking patients to this phonenumber. Last, healthcare professionals can prescribe tobacco cessation medications as well as advise about over-the-counter alternatives.

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Declaration of Interests

None declared.

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