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CHARACTERISTICS ASSOCIATED WITH SMOKING IN A HISPANIC COLLEGE STUDENT SAMPLE

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Abstract

This study examined the smoking related behaviors of Hispanic young adult college students as part of a larger study that assessed characteristics of Hispanic smokers in a metropolitan area on the U.S./México border. One hundred seventy-four English-speaking Hispanic college students completed questionnaires that assessed tobacco use, drug/alcohol use, body mass index, weight concerns, acculturation, depressive symptoms, and expired carbon monoxide level. Of the 74 smoking participants (42.5% of the sample), 77% reported light or intermittent smoking. Univariate analyses and a backward elimination logistic regression model were used to compare smokers' and nonsmokers' characteristics. Significant univariate differences between smokers and nonsmokers were higher reported weekly alcohol use and ever use of marijuana. Logistic regression findings indicated smokers reported heightened odds of being younger, lower acculturation, ever use of drugs, and weekly drinking. These results suggest a drug and alcohol use component is important to cessation interventions targeted toward Hispanic college student smokers.

Keywords

Smoking; Hispanic; College student

1. Introduction

Young adults aged 18–25 have the highest rates of smoking (Substance Abuse and Mental Health Services Administration [SAMHSA], 2009) and are at risk for future and continued smoking. Approximately 26% identify as smokers (Lawrence, Fagan, Backinger, Gibson, &

Hartman, 2007) compared to 20.6% of the general population (Centers for Disease Control [CDC], 2010). Young adult smokers tend to be light smokers (Solberg, Asche, Boyle, McCarty, & Thoele, 2007) who smoke in conjunction with alcohol use (Reed, Wang, Shillington, Clapp, & Lange, 2009).

Hispanics are also at risk for smoking (Gilpin, White, & Pierce, 2005). Hispanic young adults are an important population to study: (1) Hispanics represent a large and growing segment of the population (Lee, 2011; U.S. Census Bureau, 2009); (2) research indicates a positive correlation between acculturation and smoking for Hispanics, suggesting smoking in the U.S. may be a greater problem over time (Lara et al., 2005); (3) tobacco companies target U.S. immigrant groups (Acevedo-García, Barbeau, Bishop, Pan, & Emmons, 2004); and (4) lung cancer is the leading cause of cancer-related deaths in Hispanic men and the second leading cause for Hispanic women (American Cancer Society, 2009).

Study aims were to develop a profile of Hispanic college smokers and identify characteristics that differentiate smokers from nonsmokers to inform intervention planning. In a similar community-based study, smoking was associated with alcohol and drug use, general weight concern, and younger age (Rodríguez-Esquivel et al., 2009). Other hypothesized predictors of smoking status included acculturation, depressive symptomatology, and mental health service utilization, which have also been found to predict smoking status.

2. Methods

2.1 Participants

Participants were English-speaking college student (ages 18–26) Hispanics recruited from a large U.S. university through means of advertisement and class participation. Participants (mean age = 19.6 years; SD = 1.76) included 75 smoking and 101 nonsmoking college students (57% female) in the El Paso, TX/Ciudad Juárez, México area. Smokers were defined as those who reported having smoked a cigarette in the past week. Those who did not report smoking in the past week and who self-reported being a nonsmoker were labeled nonsmokers. Two participants (1 smoker, 1 nonsmoker) were excluded because they were outliers on the age variable (ages 44 and 32), resulting in a final sample of 74 smoking and 100 nonsmoking college students.

2.2 Measures

Smoking Status—A categorical question assessed smoking status (0 = smoker, 1 = nonsmoker). Within either smoker or nonsmoker categories, participants could be identified as daily smokers, weekly smokers, monthly smokers, experimenters, or quitters. Weekly smoking was indicated by smoking in the past week, but not daily; monthly smoking was indicated by smoking in the past month yet not the past week; experimental smoking was indicated by trying a cigarette yet not smoking in the past week or past month; quitting was indicated by at one time meeting smoking criteria and subsequently quitting smoking; and relevant to only nonsmokers, never smoking was indicated by not ever taking a puff of a cigarette. One participant was initially recruited as a smoker, but at the time of assessment, reported having quit smoking and was recoded as a nonsmoker.

Demographics and Tobacco Use—A demographic questionnaire assessed typical background information, and a tobacco survey assessed smoking initiation, past quit attempts, cessation aid use history, general weight concern, cessation-related weight concern, and cessation aid and program preferences. This questionnaire has been used in past studies (Rodríguez-Esquivel et al., 2009). Subsequent analyses utilized the variables

gender and general weight concern, which were coded in the following manner: 1 = male, 2 = female; 0 = not weight concerned, 1 = weight concerned.

The Fagerström Test of Nicotine Dependence (FTND)—The FTND assessed the degree of psychological dependence on nicotine (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND has been found to be a valid measure of heaviness of smoking compared to biochemical indices and has acceptable levels of internal consistency (Heatherton et al., 1991). FTND sum scores range from zero to 10 with higher scores indicating greater dependence on nicotine.

The Daily Drinking Questionnaire (DDQ)—Participants' drinking rate and time spent drinking was measured (Collins, Parks, & Marlatt, 1985). Internal reliability of this scale ranges between .73 and .78 (Geisner, Larimer, & Neighbors, 2004; Lewis & Neighbors, 2004), and internal reliability for our sample was found to be .72. The numbers of drinks reported for each day of the week were summed to yield a total number of drinks per week. Outliers (higher than three standard deviations from the mean) were winsorized for subsequent analyses ($n = 3$; Kirk, 1982); those scoring higher than three standard deviations above the mean were given that value in order to retain outliers in analyses (resulting range 0 to 51).

The Short Acculturation Scale for Hispanics (SASH)—The SASH assessed level of acculturation to U.S. culture (Marín, Sabogal, VanOss, Otero-Sabogal, & Pérez-Stable, 1987) and has been found to have high internal reliability ($\alpha = .92$; Marín et al., 1987); internal reliability for our sample was .93. Mean item scores from one (indicating less acculturation) to five (indicating greater acculturation).

The Primary Care Evaluation of Mental Disorders (PRIME-MD)—This measure assessed depressive symptomatology and has been found to be consistent with diagnoses made independently by mental health professionals ($\kappa = .71$; Spitzer et al., 1994). Internal reliability was .86. Scores are derived by summing items. Outliers were winsorized ($n = 1$; Kirk, 1982); afterward, scores ranged from 0 to 21. Participants were also asked to indicate whether they had sought mental health services for mood, anxiety, and psychotic disorders. Participants reporting past mental health service utilization were coded as such for analyses (0 = no utilization, 1 indicating mental health service utilization).

Drug use—A drug use frequency questionnaire assessed use of several drugs utilizing numeric response options from the Adolescent Problem Severity Index (Metzger, Kushner, & McLellan, 1991). Drugs assessed were marijuana, cocaine, crack, speed, barbiturates/sedatives, inhalants, hallucinogens, and opiates. Frequencies for each drug were calculated, and participants were dichotomized to specify whether or not they had ever tried illicit drugs (0 = no, 1 = yes).

A Bedfont Smokerlyzer—The Bedfond Smokerlyzer assessed expired CO with a precision of more than 99.8% (Hald, Overgaard, & Grau, 2003). Expired CO ranged from 0 to 17 ppm.

A Tanita-TBF 215 scale—The scale measured weight, BMI, and body fat percentage. This scale provides reliable estimates of body composition and correlates highly with dual energy X-ray absorptiometry (DEXA; Nuñez, Gallagher, Russell-Aulet, & Heymsfield, 1997a; Nuñez, Gallagher, Russell-Aulet, & Heymsfield, 1997b). Outliers were identified for weight and BMI and were winsorized for subsequent analyses (weight $n = 3$, BMI $n = 8$;

Kirk, 1982) resulting in ranges from 98.4 to 284 lbs. and 17.6 to 36.0 BMI; body fat percentage ranged from 5 to 51.7%.

2.3 Procedure

This was a cross-sectional assessment of characteristics associated with smoking versus nonsmoking. Efforts were made to recruit through advertising and courses equal numbers of smokers and nonsmokers.

Informed consent was obtained by research staff. Questionnaires were distributed to the participants. Upon completion, CO and body composition were measured. The procedure lasted under an hour. All participants received a $10 cash incentive or course credit. Data were number coded for confidentiality. Consent forms and surveys were filed separately. University IRB approval was obtained prior to study commencement.

2.4 Approach to analyses

Descriptive analyses were used to create a profile of Hispanic college smoking. Univariate analyses were used to compare smoking and nonsmoking participants. Bonferroni corrections were employed, and the α level was set to .005 (.05/10) for *t*-tests and .003 (.05/15) for χ^2 tests.

To identify predictors of smoking a backward elimination logistic regression model was used. Smoking status was the dependent variable, and the following were used as independent variables: age; gender; history of mental health service; SASH score; PRIME-MD score; history of illicit drug use; general weight concern; weekly alcohol use; BMI; body fat percentage; and weight. Multicollinearity was assessed, and independent variables with a Variance Inflation Factor greater than 2.5 were removed (Allison, 1999). Weight and BMI were subsequently removed.

3. Results

A great majority of smokers reported a light (<10cpd; 31.1%) or intermittent (non daily; 45.9%) smoking pattern. Among daily smokers, the average number of cigarettes smoked per day was 6.5 (*SD* = 11.5). More than half of smokers reported general weight concerns, and 69% reported cessation-related weight concern.

Univariate tests confirmed hypothesized differences in smoking indicators between groups (e.g., smoking status ($\chi^2(5) = 144.63$, $p < .001$); nicotine dependence ($t(161.1) = -15.71$, $p < .001$), CO level ($t(80.7) = -4.91$, $p < .001$)). Weekly alcohol use ($t(133.1) = -6.81$, $p < .001$) and lifetime use of marijuana ($\chi^2(1) = 10.32$, $p = .004$) were significantly greater in smokers relative to nonsmokers. See Table 1.

The final backward elimination logistic regression model was significant, $\chi2 (4) = 47.54$, $p < .001$, Nagelkerke $R^2 = .347$, see Table 2. The final model included age, acculturation scores, illicit drug use, and number of alcoholic drinks per week. Number of alcoholic drinks per week was the only significant predictor of smoking in the model.

4. Discussion

Consistent with community and university sample findings (Rodríguez-Esquivel et al., 2009; Taylor & Cooper, 2010), Hispanic college students were predominantly light and intermittent smokers, with the majority of daily smokers smoking fewer than ten cigarettes a day. Implications of this smoking profile include tailoring interventions to low level smokers

and using adequate follow-up periods in intervention studies to enable measurement of cessation.

Consistent with studies in this region (Rodríguez-Esquivel et al., 2009) and in college students (Ames et al., 2010; Jackson, Colby, & Sher, 2010) smokers were more likely to report greater alcohol use relative to their nonsmoking counterparts as well as illicit drug use (Reed, Wang, Shillington, Clapp, & Lange, 2007) and more specifically, marijuana use (Buckner, Ecker, & Cohen, 2010; Reed et al., 2007).

Inconsistent with other studies (Rodríguez-Esquivel et al., 2009), there were no differences between smokers and nonsmokers in terms of general weight concern. Given that there is evidence of willingness to engage in unhealthy weight loss behaviors in this population (Blow, Taylor, Cooper, & Redfearn, 2010), it is likely that during college years general weight concern is present regardless of smoking status; however, the assessment of more nuanced characteristics associated with weight concern (e.g., Hovland & Ceballos, 2007) may further the understanding of this relationship.

Lower levels of acculturation were marginally associated with smoking, which is inconsistent with studies that find greater acculturation associated with smoking (Lara et al., 2005) and studies that observe no relationship between acculturation and smoking (Rodríguez-Esquivel et al., 2009). Frequent border crossing for and limited access to healthcare (Byrd & Law, 2009) may result in limited assessment of and intervention with smoking, and/or border proximity and frequent crossing may result in unique associations between acculturation and substance use, as has been observed in other border region studies (Resor & Cooper, 2010).

Limitations include a college student convenience sample potentially limiting generalizability to other Hispanic young adults, as well as a cross-sectional design which does not allow for temporal assessments of relationships with smoking. Although differences in CO levels were observed, overall levels were low. This suggests that biological confirmation should be refined in future studies using more sensitive tests (e.g., cotinine levels), especially with light and intermittent smokers. Additionally, the current study did not examine other potentially relevant factors such as generational status, familial country of origin, or familial socioeconomic status. Including other cultural and demographic variables that may be related to smoking status will likely enhance future studies. Strengths include the assessment of theoretically and empirically derived correlates of smoking within an understudied population.

Future directions include similar assessments in other Hispanic young adult populations and longitudinal assessments to help determine levels of smoking and correlates over time. Intervention implications include the use of tailored interventions to light and intermittent Hispanic college student smokers that include alcohol and illicit substance use components and are accessible to those with lower levels of acculturation perhaps by implementing them bilingually.

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Highlights

- Examined characteristics of smoking v. nonsmoking Hispanic college students.

- Smokers were predominantly light and intermittent smokers.

- Univariate differences included weekly alcohol use and ever use of marijuana.

- Smokers were younger, less acculturated, drank more, and ever used drugs more.

Table 1

Participant characteristics and univariate differences between smokers and nonsmokers.

Characteristics	All participants (N= 174)	Smoking participants (n = 74)	Nonsmoking participants (n = 100)	p-value
	Statistic	Statistic	Statistic	
Age (years)	M= 19.6	M= 19.3	M= 19.8	.035
	SD= 1.76	SD=1.40	SD=1.96	
Gender				.005
% Female	56.9	44.6	66.0	
% Male	43.1	55.4	34.0	
Marital status				.049
% Single	93.1	98.6	89.0	
% Living with someone	1.7	0	3.0	
% Married	4.0	0	7.0	
% Divorced	1.1	1.4	1.0	
Educational status				.148
% High school or equivalent	9.8	10.8	9.1	
% Some college	85.1	87.8	83.8	
% Vocational school/Associate's Degree	2.9	0	5.1	
% College graduate	1.1	0	2.0	
% Some post graduate training	.6	1.4	0	
Age of tobacco initiation in years	M= 15.6	M= 15.3	M= 15.8	.172
	SD= 2.04	SD= 2.11	SD=1.93	
Smoking status				<.001[*]
% Daily smoker	14.4	33.8	0	
%Weekly smoker	19.0	44.6	0	
% Monthly smoker	14.4	21.6	9.6	
% Experimental smoker	25.9	0	47.9	
% Quitter	5.2	0	9.6	
% Never smoked	17.8	0	33.0	
Exhaled carbon monoxide (ppm)	M=1.7	M=2.9	M=0.8	<.001[*]
	SD= 2.63	SD= 3.55	SD= 0.94	
Fagerström Test of Nicotine Dependence	M=1.6	M=3.0	M=0.6	<.001[*]
	SD= 1.55	SD= 0.70	SD=1.23	
SASH[a]	M=3.1 (range 1.1–4.7)	M=3.0(range 1.1–4.7)	M=3.2 (range 1.3–4.5)	.182
	SD= 0.81	SD= 0.86	SD= 0.76	
Mental health				
% Have used MH services	2.3	1.4	3.0	.467
PRIME-MD[b]	M=5.9(range 0–21)	M=6.6(range 0–21)	M=5.4 (range 0–20)	.122
	SD= 4.87	SD= 4.86	SD= 4.85	
Drinks per week	M= 12.9	M= 19.9	M=7.8	<.001[*]

Characteristics	All participants (N= 174)	Smoking participants (n = 74)	Nonsmoking participants (n = 100)	p-value
	Statistic	Statistic	Statistic	
	SD= 12.65	SD= 12.60	SD= 9.98	
Ever used drugs				
% Have used drugs	55.7	69.4	47.5	.004
Drug use (lifetime)				
% Marijuana	50.0	65.3	40.4	.001[*]
% Cocaine	12.1	17.8	8.0	.051
% Crack	1.1	1.4	1.0	.822
% Speed	8.6	15.1	4.0	.011
% Barbiturates	15.5	20.5	12.0	.126
% Inhalants	5.7	8.2	4.0	.240
% Opiates	4.0	6.8	2.0	.113
% Other	1.1	2.7	0	.096
Weight concern				
% Have weight concerns	59.8	55.4	64.9	.205
% Have cessation-related weight concern	N/A	69.0	N/A	
Weight	M= 156.0	M= 158.7	M= 154.0	.475
	SD= 42.64	SD= 37.88	SD= 45.96	
BMI	M= 24.7	M= 24.8	M = 24.7	.843
	SD= 4.81	SD= 4.55	SD= 5.02	
Body fat percentage	M= 23.6	M=22.1	M= 24.7	.086
	SD= 9.87	SD= 10.35	SD= 9.40	

[*]Notes: Univariate tests that remain significant after Bonferroni correction are marked with an.

[a]The range for the SASH was 1.3 to 4.7, with higher scores indicating more acculturation to American culture.

[b]The range for the PRIME-MD was 0–20, with higher scores indicating greater endorsement of depressive symptoms.

Table 2

Final backward elimination logistic regression model – Predicting the odds of smoking ($N = 159$).

Variables	B	Odds Ratio	95% Confidence Intervals		p
			Lower	Upper	
Age	−0.194	0.824	.653	1.040	.103
SASH scores	−0.405	0.667	.411	1.081	.100
Use of illicit drugs	0.769	2.158	.969	4.810	.060
Number of drinks per week	0.090	1.095	1.055	1.136	<.001
Constant	3.150				0.194

Note: Overall model was significant, χ^2 (4) = 47.541, p < .001, Nagelkerke R^2 = .347