

# Smoking and Depression in Chinese Americans

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**ABSTRACT:** *Background:* A close link between smoking and depression has been documented by research primarily based on U.S. white populations. This study examined the association between depressive symptoms and smoking behaviors in Chinese American smokers. *Methods:* Analyses were based on baseline data collected from a convenience sample of 199 Chinese smokers who resided in northern California. The sample included 20.6% women, 97% immigrants, with mean age of 40.8 years and mean cigarettes/day of 8.9. *Results:* Compared with population-based studies of Chinese Americans, the Chinese smokers in the current study reported higher depressive symptoms assessed by the Center for Epidemiologic Studies-Depression Scale [M, 20.4; 95% confidence interval (CI), 18.8–22.2], higher lifetime prevalence rates of major depressive disorders (30.3%; 95% CI, 24.0–37.2%) and dysthymia (11.6%; 95% CI, 7.5–16.9%). Multiple regression analysis suggested female gender, unemployment, major

depression or dysthymia within the past year, previous experience with nicotine withdrawal syndrome, and high temptation to smoke under negative affect situations are associated with a higher level of depressive symptoms. *Conclusions:* The level of depressive symptoms among Chinese American smokers is comparable with that observed in other US populations reported. In the current sample, elevated depressive symptoms were more prominent among women or those who were unemployed, smokers who reported significant nicotine withdrawal at previous quit attempts, and high temptation to smoke when experiencing negative emotions. Findings support further examination of the role of depression in smoking among Chinese Americans and underscore the importance of addressing depressive symptoms when treating tobacco use in Chinese smokers. **KEY INDEXING TERMS:** Smoking; Nicotine dependence; Major depression; Dysthymia; Chinese Americans. [*Am J Med Sci* 2003;326(4):187–191.]

The lifetime prevalence rate of major depression among smokers is almost 3 times higher than that in nonsmokers.<sup>1</sup> Current smokers consistently report higher depressive symptoms than former or never smokers.<sup>2</sup> However, the link between smoking and depression has been documented by research primarily based on English-speaking white populations in the United States, with few reports based on ethnic-specific samples. Among Vietnamese Americans, high depression scores were found to be associated with current smoking and lower smoking cessation.<sup>3</sup> Among Native Hawaiians, no relationship was found when education and age were adjusted statistically.<sup>4</sup> A lower lifetime prevalence of major depression in African American smokers has been reported in both treatment and population samples

compared with white smokers,<sup>5</sup> with 8.7% of African American versus 21.6% of whites in a treatment sample, and 14.5% versus 23.8%, respectively, in the National Comorbidity Survey-Tobacco Supplement population. A recent study showed no relationship between depressive symptoms and smoking status among 520 US African American adults.<sup>6</sup> Research thus far suggests that the association between smoking and depression may vary by ethnic groups, although the reasons are not clear. Investigations on smoking and depression in ethnic-specific groups may increase our understanding for the link between smoking and depression.

According to the 2000 US Census, the largest Asian/Pacific Islander ethnic group is Chinese (23%).<sup>7</sup> The prevalence estimates of current smoking among Chinese Americans vary depending on the settings and the languages used. The prevalence rates ranged from 9.7% among English-speaking Chinese<sup>8</sup> to 34% among Chinese men residing in Chicago.<sup>9</sup> Almost 70% of Chinese Americans are first-generation immigrants; more than 90% originate from mainland China (excluding Taiwan, Hong Kong, and Macau).<sup>10</sup> Given the tobacco epidemic in China, with the smoking prevalence rate for men reported as high as 74%,<sup>11</sup> smoking cessation efforts directed toward Chinese residing in the United

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**Table 1.** Participant Characteristics (N = 199)

	n	% or Mean (SD); range
<b>Demographic Characteristics</b>		
Female	41	20.6%
Mean age (SD)	199	40.8 (13.5); range: 18–81
Beyond high school education	131	66.2%
Employed	121	60.8%
Household income < \$20 K/year	75	38.9%
Married/living w/partners	124	62.3%
Acculturation/culture orientation <sup>a</sup>		
GEQ-American	198	2.9 (0.5); range: 1.3–4.9
GEQ-Chinese	197	3.9 (0.5); range: 2.2–5.0
Preferred spoken language		
English	19	9.5%
Cantonese	111	55.8%
Mandarin	69	34.7%
Place of birth		
US	6	3.0%
China (Mainland)	115	57.8%
Hong Kong	50	25.1%
Taiwan	19	9.5%
Other (Macau, Malaysia, Vietnam, Philippines)	9	4.5%
Years lived in US (among foreign born only)	193	9.6 (7.7); range: 1 month–43.5 years
<b>Smoking History/Characteristics</b>		
Cigarettes per day	199	8.9 (6.7); range: 0.7–40
Smoke daily	173	86.9%
Years smoked	199	17.9 (12.8); range: 6 months–62 years
Age started smoking	199	20.4 (7.7); range: 6–62 years old
FTND <sup>b</sup>	199	2.9 (2.3); range: 0–9
DSM-IV Lifetime Nicotine dependence	104	52.5%
DSM-IV Nicotine withdrawal syndrome	41	20.7%
Had at least one 24-hour quit attempt last year	131	65.8%
Ever had a 24-hour quit attempt	170	85.4%
Stages of change		
Precontemplation	72	36.2%
Contemplation	73	36.7%
Preparation	54	27.1%

Note: All percentages reported are based on non-missing data.

<sup>a</sup> General Ethnicity Questionnaire (GEQ); range from 1–5; GEQ-American score indicates the cultural orientation toward the US culture and GEQ-Chinese score indicates the degree of orientation toward the Chinese culture.

<sup>b</sup> FTND, Fagerström Test of Nicotine Dependence; range 0–10.

States, particularly among recent immigrants, are urgently needed.

The purpose of this study is to examine the association between depressive symptoms and smoking behaviors in Chinese American smokers in an effort to establish a knowledge base for adapting and developing smoking cessation interventions for this population. Two research questions were examined: (1) Do Chinese smokers experience a higher level of depression (depressive symptoms, prevalence of major depressive episodes, and dysthymia) than the population-based estimates of Chinese Americans, and (2) What are the associations between smoking characteristics and depressive symptoms among Chinese smokers?

## Methods

**Participants.** A convenience sample of 199 Chinese smokers who resided in northern California was recruited by flyers and advertisements via radio, newspapers, television, and the inter-

net. The study was described as research examining culture, health, mood, and smoking behaviors. Participants self-identified as ethnic Chinese who smoked at least 5 cigarettes in the preceding 7 days and could read English or Chinese were eligible for the study. Participants were paid \$30 for completing a baseline and a 6-month assessment in person or by telephone and mail in the language of their choice (English, Cantonese, or Mandarin). Baseline data collection was completed in 14 months, from July 2000 to September 2001. This report contains analyses using data collected at baseline only. Table 1 shows the participant characteristics.

**Measures.** All measures underwent both forward and backward translations and rounds of focus group reviews. The translated measures have demonstrated adequate psychometric properties (the details may be obtained from JYT). The *Center of Epidemiological Studies–Depression Scale (CES-D)*<sup>12,13</sup> was used to assess depressive symptoms; the DSM-IV diagnoses of major depressive disorder, dysthymia, nicotine dependence, and withdrawal were assessed by the Composite International Diagnostic Interview (CIDI).<sup>14</sup> The *Fagerström Test for Nicotine Dependence (FTND)*<sup>15</sup> was used to measure levels of nicotine dependence. The *Stages of Change Scale*<sup>16</sup> was used to assess readiness to quit smoking; current smokers were classified into 1 of 3 stages: precontemplation (no intent to quit smoking in the next 6

**Table 2.** Mean CES-D scores, Prevalence of Major Depressive Episode and Dysthymia in Chinese American Smokers versus Population-Based Estimates

CES-D	Chinese Smokers (current sample)				Population-based Estimates <sup>a</sup>			
	N	Mean	SD	95% CI	N	Mean	SD	95% CI
Whole Sample	198	20.43	11.89	18.76–22.09	360	11.55	8.23	10.70–12.40
Female only	41	28.19	11.46	24.58–31.81	182	12.83	7.78	11.69–13.96
Male only	157	18.40	11.18	16.64–20.16	178	10.25	8.50	8.99–11.51
DSM-IV Major Depressive Episode	N	%		95% CI	N	%		95% CI
Lifetime	198	30.30		23.99–37.22	1747	6.86		5.73–8.16
12-month	198	16.67		11.75–22.60	1747	3.37		2.58–4.33
DSM-IV Dysthymia								
Lifetime	198	11.61		7.51–16.92	1747	5.21		4.21–6.36
12-month	198	7.07		3.91–11.58	1747	0.91		0.52–1.48

N, sample size.

<sup>a</sup> Population-based estimates are based on two studies: (1) for depressive symptoms measured by CES-D scores, estimates are obtained from Ying (1988),<sup>20</sup> in which data were collected via a telephone survey of Chinese Americans located in the San Francisco public telephone directory where differences in CES-D scores by gender were reported; (2) for prevalence of major depressive episode and dysthymia, estimates are based on the Chinese American Psychiatric Epidemiological Study (CAPES),<sup>21</sup> the largest community epidemiological study of 1747 Chinese Americans residing in Los Angeles County; data were collected through completed household interviews during 1993 and 1994 where no gender difference in the prevalence rates was reported.

months); contemplation (intend to quit within next 6 months); and preparation (plan to quit in the next 30 days and have a 24-hour quit attempt within the past year). The *Decisional Balance Inventory*,<sup>17</sup> which consists of the pros and cons of smoking subscales, required participants to rate how important each statement was to their decision to smoke. The *Situational Temptation Inventory*<sup>18</sup> measured the level of temptation to smoke under 3 situations: positive/social, negative/affective, and habitual/physical cravings. The *Process of Change Inventory*<sup>18</sup> was used to assess the use of 10 processes associated with changing smoking behavior. The *General Ethnicity Questionnaire*<sup>19</sup> assessed the degree of cultural orientation to both Chinese and American cultures. In addition, general sociodemographic data and descriptive information on smoking history and previous quit attempts were obtained.

**Data Analyses.** To compare the study sample and population-based estimates, *t* test and Pearson  $\chi^2$  test were used. Two population-based studies were chosen for the comparisons, one for the comparison of CES-D scores<sup>20</sup> and the CAPES (Chinese American Psychiatric Epidemiological Study) for prevalence estimates of depressive disorders.<sup>21</sup> These studies used the same instruments for assessing depression and the samples were obtained from similar geographical areas. One-way analyses of variance and correlation coefficients were used to identify smoking and background characteristics associated with CES-D score ( $P < 0.10$ ), and standard multiple regression using CES-D score as the dependent variable evaluated the association between smoking and depression.

## Results

The Chinese smokers in the current study reported significantly more depressive symptoms compared with a community sample of Chinese Americans obtained in the same geographical location<sup>20</sup>; these differences were observed across gender. Chinese smokers also reported higher lifetime and 12-month prevalence rates of major depressive disorders and dysthymia than estimates from the CAPES based on the general population of Chinese Americans<sup>21</sup> (Table 2). Multiple regression analysis (Table

3) found significant associations between depressive symptoms and female gender, unemployment, major depression or dysthymia within past year, previous experience with nicotine withdrawal syndrome, and high temptation to smoke under negative affect situations.

## Discussion

Preliminary findings suggest elevated depression among Chinese American smokers, which is somewhat comparable with the levels of depression re-

**Table 3.** Standard Multiple Regression Model using CES-D as the Dependent Variable<sup>a</sup>

Variables <sup>b</sup>	$\beta$	P
Female	4.38	0.01
Unemployed	4.03	0.01
Income $\leq$ \$20 K per year	2.03	0.19
Major depressive episode within past 12 months	8.67	<0.001
Dysthymia within past 12 months	7.74	0.01
Nicotine dependence (DSM-IV criteria)	1.54	0.31
Nicotine withdrawal (DSM-IV criteria)	4.70	0.01
Temptation to smoke under negative affect situations	2.21	0.01
Pros of smoking	1.20	0.20
Processes of change: self-reevaluation	-1.06	0.32
Processes of change: dramatic relief	1.20	0.19
Processes of change: environmental reevaluation	-0.71	0.52
Processes of change: counter-conditioning	1.16	0.29
Processes of change: reinforcement management	1.24	0.26
Processes of change: stimulus control	1.39	0.22

<sup>a</sup> Model summary:  $R^2 = 0.45$ ; adjusted  $R^2 = 0.41$ ;  $F = 9.62$  ( $p < 0.001$ ).

<sup>b</sup> Variables were selected based on bivariate analyses (*t*-tests, one-way ANOVA and Pearson correlation coefficients) using CES-D scores as the dependent variable and  $p < 0.10$ .

ported by white populations in previous studies. Chinese smokers in the study sample reported a higher level of depressive symptoms than would be expected from the population estimates obtained from Chinese Americans residing in San Francisco. The lifetime prevalence of major depression and dysthymia was approximately 2 to 5 times higher than that of the population estimate of Chinese American in the Los Angeles area. From these observations, it seemed that a close connection between smoking and depression, as observed in the US white population, was also observed among Chinese Americans. However, the nature of the association might not be the same.

Female Chinese smokers seem to report more significant depressive symptoms than male Chinese smokers, even after statistically adjusting for diagnosis of depression or dysthymia. No association was found between depression and nicotine dependence, smoking rates, or readiness to quit smoking in Chinese smokers. However, depressive symptoms were related to experience with significant nicotine withdrawal, as well as high temptation to smoke under negative emotional situations. This finding suggests depressed Chinese smokers are likely to encounter difficulty when quitting because of significant nicotine withdrawal symptoms and a higher level of temptation to smoke in situations involving negative moods.

The mechanism underlying the link between smoking and depression among Chinese Americans remains unknown. Longitudinal data based on primarily white adolescents and young adults have supported a potential causal link between smoking and depression; some suggest depression leads to regular or increased smoking<sup>22</sup>; others have implied that smoking increases vulnerability to depression.<sup>23</sup> Recent case-control and family studies, however, suggest that shared genetic and environmental factors underlie both smoking and depression.<sup>24,25</sup> Findings of this study support further examination of the role of depression in smoking among Chinese Americans, which may impact study designs for prevention and cessation interventions.

The results of this study should be regarded as preliminary and interpreted with caution because of its limitations. The data were cross-sectional in nature and were collected using a convenience sample of smokers who self-identified as Chinese or Chinese Americans. As the majority of the sample achieved at least some college-level education, were employed and married, the generalizability of these findings to other Chinese American smokers remains to be tested. In addition, the study sample comprised current smokers and did not include former or never smokers, thereby limiting the nature of associations between tobacco use histories and level of depressive symptoms that could be examined. Finally, the population estimates used included both smokers and

nonsmokers, where smoking status were not reported in these studies.

Nevertheless, this is the first study to document the association between smoking and depression among Chinese smokers in the United States. This study adds to the current literature, wherein research on nonwhite groups is lacking. Current findings support the adaptation of strategies to manage mood and other depressive symptoms within the context of cessation interventions. Furthermore, because only 27% of the Chinese American smokers in our study sample expressed commitment to quit smoking within 30 days, treatments designed to effectively reach and motivate those not ready to quit smoking is important. Finally, interventions matching stage of change/readiness to quit smoking are prime candidates for population-based approaches.

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