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Food Insecurity and Psychological Distress among Former and Current Smokers with Low Income

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Abstract

Purpose—To examine how food insecurity and psychological distress interact in its association with smoking; to explore how food insecurity and psychological distress are associated with quitting smoking using quit ratio estimates.

Design—Cross-sectional study

Setting—Data from the 2015 California Health Interview Survey

Participants—3,007 lower-income adults who have ever smoked

Measures—Ever smoking was defined as smoking 100+ cigarettes in entire lifetime, with current smoking defined as smoking “every day” or “some days,” and former smoking defined as smoking “not at all.” Psychological distress and food insecurity were measured by the 6-item K6 Psychological Distress Scale and the 6-item Food Security Survey Short Form, respectively.

Analysis—Multiple logistic regression analysis was used to examine correlates of smoking status. Quit ratios (percent of ever smokers who have quit) were calculated across study variables.

Results—Reporting food insecurity with psychological distress was independently associated with lower odds of being a former smoker, compared to reporting food security without psychological distress. The quit ratio was lower among ever smokers reporting food insecurity with distress (41%) compared to ever smokers reporting food security without distress (63%).

Conclusions—Specific conditions of impoverishment, such as food insecurity, interact with psychological distress in its association with continued smoking. Interventions to reduce socioeconomic disparities in smoking should consider the interacting role of food insecurity and psychological distress.

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DECLARATION OF CONFLICTING INTERESTS

The authors declare that there is no conflict of interest.

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Keywords

Food insecurity; psychological distress; cigarette smoking

INTRODUCTION

The association between socioeconomic status (SES) and smoking prevalence is well delineated.¹ Alongside declines in the overall prevalence of smoking, cigarette use has become disproportionately concentrated among poorer segments of the population,² contributing to disparities in tobacco-related health problems.^{3,4} In the U.S., the current smoking prevalence of adults living below poverty is 25.3%, compared to 14.3% among those at or above poverty.⁵ Although more than half (55.0%) of adult smokers in the U.S. made a serious quit attempt in 2014,⁶ the percentage of ever cigarette smokers who are now former smokers—known as the quit ratio—varies significantly across indicators of SES. For example, the quit ratio among ever smokers who are living above poverty is 57.5%, in contrast to only 34.5% among ever smokers living below poverty.⁷ Smokers with lower SES are less likely to successfully quit compared to their higher SES counterparts,⁸ partly due to the combination of greater life stressors, such as financial stress,^{9,10} and more limited access to and utilization of resources that facilitate quitting.^{8,11} A better understanding of socioeconomic stressors that complicate smoking cessation is needed towards developing interventions to address tobacco use disparities.

Food insecurity is a key area of socioeconomic stress that disproportionately affects individuals and households living in poverty.¹² Defined as a lack of consistent access to food at all times to live a healthy life, hallmarks of food insecurity include worrying about running out of food before being able to buy more and having to eat less by cutting the size of meals or skipping meals because of lack of money for food.¹² Numerous nationally representative studies have reported that adult smoking prevalence is higher among households with food insecurity versus households without food insecurity (also known as food security).^{13–15} Furthermore, from 1998 to 2011, the prevalence of adult smoking declined more slowly among those who were food insecure (14% decline) compared to those who were not food insecure (33% decline).¹⁵

The association between food insecurity and smoking does not appear to be merely an artifact of low SES; the association remains when accounting for socioeconomic indicators, such as poverty and education.¹⁶ The relationship has also been demonstrated among a population group experiencing more extreme conditions of impoverishment, particularly when considering the degree of food insecurity. A cohort study of women experiencing homelessness and unstable housing showed that severe food insecurity was longitudinally associated with increased odds of smoking, after adjusting for confounders such as substance use and mental health.¹⁷

There are numerous mental health consequences of food insecurity that overlap with population-level characteristics of individuals who smoke. For example, many smokers report using cigarettes to regulate their mood and cope with stress.¹⁸ At the population level, those with psychological distress, particularly severe psychological distress, are more likely

to be current smokers than those without severe psychological distress.¹⁹ Although prior studies have reported that food insecurity is associated with smoking, independent of mental health-related variables,^{16,17} the experience of food insecurity is nevertheless highly stressful and is associated with depression²⁰ and nonspecific psychological distress.^{21,22} This raises the question of whether there is an interaction between food insecurity and psychological distress that is associated with smoking. Given that smoking has declined more slowly among food insecure populations compared to their food secure counterparts,¹⁵ understanding how the interaction may be associated with continued smoking may also identify strategies for promoting smoking cessation in tobacco use disparity groups that are contending with unmet needs.

The aim of this study is to examine how food insecurity and psychological distress interact in their association with smoking status among a representative sample of ever cigarette smokers with lower income. We hypothesized that ever smokers experiencing both food insecurity and psychological distress will be less likely to have quit smoking, as measured by their current smoking status, compared to ever smokers who are not experiencing food insecurity and psychological distress. We further hypothesized that quit ratios would be lower among ever smokers experiencing both food insecurity and psychological distress, compared to experiencing just one or experiencing neither. For both hypotheses, we explored whether associations varied when examining other categories of food insecurity and psychological distress (i.e., no food insecurity with psychological distress and food insecurity without psychological distress).

METHODS

Dataset and Sampling

We used publicly available data from the 2015 California Health Interview Survey (CHIS).²³ CHIS is the largest population-based state health survey in the U.S., assessing health and demographic information from non-institutionalized California residents. It uses a multistage sampling design and random-digit-dialed telephone numbers (half landline and half cellular). CHIS, initially conducted every other year since 2001, is conducted yearly since 2011. The CHIS 2015 Adult Survey had responses from 21,034 adults, and includes respondents who were interviewed in a non-English language (including Spanish, Mandarin, Cantonese, Vietnamese, Korean, and Tagalog). Responses for the 2015 CHIS were collected between May 2015 and February 2016, and detailed study information is published elsewhere.²⁴

The sample for the current study consisted of adults who were ever cigarette smokers (i.e., smoked 100 or more cigarettes in entire lifetime) with lower income. Lower income was measured by annual income below 200% of the federal poverty level (FPL). FPL is set annually by the U.S. Department of Health and Human Services and is used to assess eligibility for federal assistance programs, such as Medicaid and the Supplemental Nutrition Assistance Program. As the data for this study were de-identified and publicly available, IRB approval was not required.

Measures

Among the sample of ever smokers, current smoking status was ascertained by the question “Do you now smoke cigarettes every day, some days, or not at all?” Current smokers were those who responded that they smoked “every day” or “some days,” and former smokers were those who responded “not at all.”

Past-year food insecurity was assessed by the U.S. Household Food Security Survey, 6-item short form.²⁵ In the CHIS, the food insecurity module is only administered to individuals who were below 200% of FPL (or whose income information was not known). The short form is a validated subset of six items from the 18-item Food Security Survey developed by the U.S. Department of Agriculture. Those who answered two or more questions affirmatively (depending on the question, responding “often true” or “sometimes true” versus “never true,” or responding “yes” for yes/no questions) were considered food insecure, whereas those who answered one or no question(s) affirmatively were considered not food insecure, or food secure, in the past year.²⁵ Only affirmative responses were counted towards determining food insecurity; “don’t know” responses or refusals were not considered separately in the analyses.

Past-year psychological distress was assessed by the 6-item Kessler Psychological Distress scale (K6).²⁶ The K6 measured nonspecific depressive and anxiety symptoms such as hopelessness and worthlessness experienced in a 30-day period on a scale of 0 (none of the time) to 4 (all of the time). The 6 items are summed to create a distress score ranging from 0 to 24. On the basis of the K6 score for the worst month in the past year, the presence of past-year psychological distress was determined by scores of 5 or greater, which is indicative of moderate to severe psychological distress.²⁷

Based on dichotomous indicators of food insecurity and psychological distress, we created a combined variable with four possible categories: food secure without distress, food secure with distress, food insecure without distress, and food insecure with distress.

Sociodemographic characteristics included gender, age, race/ethnicity, nativity, educational level, marital status, poverty level, general health status, past-year doctor visit (as physician advice to quit is effective in smoking cessation²⁸), and past-year alcohol use. We also included receipt of food assistance by Supplemental Nutrition Assistance Program (SNAP) participation, which is known to reduce food insecurity²⁹ and psychological distress.³⁰

Analysis

Weighted descriptive analyses were used to derive population-level frequencies and corresponding 95% confidence intervals across study variables among current and former smokers. Multiple logistic regression analysis was used to examine factors associated with former smoking (versus current smoking). Quit ratios were derived by examining the proportion of former smokers to ever smokers. Analyses were conducted in SAS version 9.4 (SAS Institute, Inc) using CHIS final sampling weights to estimate parameters, and replicate weights and jackknife replication to estimate standard errors.³¹

RESULTS

Sample Characteristics

The analytic sample included 3,007 adults who were considered ever cigarette smokers (smoked 100+ cigarettes in lifetime) with lower income (< 200% FPL). Former smokers comprised 52.8% (also the quit ratio of this population), and current smokers comprised the remaining 47.2%. Table 1 displays sample characteristics across sociodemographic and study variables for the total sample and across current smoking status. A significantly greater proportion of current smokers reported any food insecurity in the past year compared to former smokers (53.7% vs. 38.1%). A significantly greater proportion of current smokers also reported psychological distress in the past year compared to former smokers (54.6% vs. 41.3%).

Table 2 displays unadjusted odds ratios of factors associated with former versus current smoking, as well as adjusted odds ratios derived from a multiple logistic regression analysis. In terms of unadjusted associations, older adults (aged 65 or older) were more likely to be former smokers than younger adults (aged 18–34), and African Americans were less likely to be former smokers in reference to non-Hispanic Whites. Those born outside of the U.S. were more likely to be former smokers than those born in the U.S. Those who were never married, compared to those who were married, were less likely to be former smokers. Any alcohol use was associated with decreased odds of being a former smoker. Across categories of food insecurity and psychological distress, only food insecurity with psychological distress was associated with decreased odds of being a former smoker, in reference to food security without psychological distress.

In the multiple logistic regression analysis, age and food insecurity with distress were independently associated with smoking status. Those who were aged 65 or older were over three times more likely to be former smokers than those aged 18–34 (adjusted odds ratio [AOR] = 3.26, 95% CI [1.29, 8.25]). In support of our hypothesis, those who reported food insecurity with distress were about half as likely to be former smokers (AOR = 0.47, 95% CI [0.26, 0.86]) in reference to those who were food secure without distress.

A total of 2,954 respondents provided information on whether or not they received food assistance in the past year through SNAP, and 23.2% (95% CI [18.76, 27.73]) reported receiving SNAP benefits. When we included SNAP receipts in the adjusted model (results not shown on table), no variable changed in significance.

We calculated population-level quit ratios across study variables, displayed in Table 3. There were no significant differences by gender, race/ethnicity, education, general health status, and past-year doctor visit. For age, ever smokers who were 65 or older had the highest quit ratio (77.1%) of all age groups, whereas ever smokers aged 18–34 had the lowest quit ratio (40.6%). Ever smokers who were born outside the U.S. had a higher quit ratio (59.4%) than those who were born in the U.S. (48.6%). In terms of food insecurity and psychological distress, those who were food secure without distress had the highest quit ratio (63.4%), whereas those who were food insecure with distress had the lowest quit ratio (40.9%). We also observed lower quit ratios for those reporting any food insecurity (see Table 3).

DISCUSSION

In this representative study of ever smokers in California with lower income, we found that it was the combination of food insecurity and psychological distress that was associated with lower likelihood of having quit smoking, compared to being food secure without psychological distress. Food insecurity alone (i.e., without psychological distress) and psychological distress alone (i.e., without food insecurity) were not associated with smoking status. These results contribute to the growing body of work on the association between food insecurity and cigarette smoking by clarifying that food insecurity with and without distress vary in their association with smoking status, at least among ever smokers with lower income.

In this sample, 29% reported experiencing both food insecurity and psychological distress in the past year. Previous findings have shown that the economic hardship associated with food insecurity has profound direct effects on one's mental health.³² Moreover, poorer mental health also appears to contribute to food insecurity in some cases,³³ demonstrating the potential reciprocal relationship between the two. Regardless of whether or not food insecurity and psychological distress are direct consequences of one another, it is likely that experiencing both conditions presents hardships across multiple domains that may make smokers less likely to quit smoking or to be successful in their quit attempts. Qualitative findings have illustrated that in some cases, smokers who are contending with financial stressors, including food insecurity, prioritize purchase of cigarettes over food and other household essentials.³⁴ Many recognize the tradeoffs they make and feel helpless in their situations while desiring more help in the quitting process.³⁴ Thus, possible explanations of the current findings are that ever smokers who are experiencing both food insecurity and psychological distress in the recent past are less likely to have quit because cigarettes are considered an important priority given their stressful life circumstances, or that these smokers are less likely to be successful in their quit attempts in part due to their stressful life circumstances.

It is also important to acknowledge, however, that there is a complex association between psychological distress and smoking irrespective of food insecurity. In this study, the prevalence of psychological distress (moderate or severe) was higher among current smokers (55%) than former smokers (41%). This is consistent with previous research using the National Survey of Drug Use and Health, reporting that 10% of current smokers reported severe psychological distress compared to 3% of former smokers.³⁵ The study also reported that severe psychological distress increased over time among smokers, but it remained steady for former smokers and those who have never smoked. This finding raises the possibility that cigarettes may sustain an elevated level of psychological distress, and/or that psychological distress declines once a smoker quits smoking.³⁵ Related to this, it has long been argued that cigarette addiction itself may be a cause of stress or distress.³⁶ Thus, understanding attributions of distress, whether it is directly associated with economic hardship such as food insecurity, or related to smoking itself, or other factors, are important research questions.

We observed a gradient in population-level quit ratios by food insecurity and psychological distress status, with over a 20% difference in the quit ratios between those who were food secure without distress (63%) and those who were food insecure with distress (41%). In other words, a significantly greater proportion of ever smokers who reported that they were food secure and did not experience distress in the past year had quit smoking, compared to ever smokers who reported that they were food insecure and did experience distress in the past year. While our study sample examined ever smokers in California, the patterns found here support previous findings examining the broader U.S. population showing that from 2006/2007 to 2010/2011, the prevalence of smoking declined more slowly among households with food insecurity versus households without food insecurity.¹⁵ Furthermore, our results add to the literature by nuancing this association with psychological distress. The low quit ratio among populations with food insecurity may be partly driven by those who are also experiencing distress, given that in this study, quit ratios did not appear to substantially vary among those who experienced food insecurity without psychological distress (50%, with a 95% confidence interval of 36%-64%) and those who experienced psychological distress without food insecurity (54%, with a 95% confidence interval of 42%-65%).

The association between hunger and cigarette smoking is worth mentioning. One of the indicators of food insecurity is feeling hungry but not eating due to lack of money for food.¹² Nicotine acts as an appetite suppressant,³⁷ and nicotine withdrawal is associated with weight gain.³⁸ It has been previously hypothesized that smokers experiencing food insecurity may be using cigarettes to cope with feelings of hunger,¹⁷ and it is possible that this may create additional challenges to smoking cessation. Thus, an implication from these findings, in light of previous research, is that efforts to reduce the continued high smoking prevalence among socioeconomically disadvantaged populations should focus on a multilevel approach, whereby it is important to address both the socioeconomic- and psychological-level barriers to smoking cessation. For example, using food assistance settings to conduct programs for smoking cessation and overall health promotion may reach population groups who are contending with multiple life stressors and are missed by current tobacco control efforts.

It is possible that participation in the Supplemental Nutrition Assistance Program (SNAP) may modify the association between food insecurity, psychological distress, and smoking, as SNAP is known to reduce levels of household food insecurity²⁹ and psychological distress.³⁰ In this study, we did not find that receipt of food assistance, particularly past-year receipt of SNAP, changed the association between food insecurity, psychological distress, and smoking status. As previous researchers have noted, however, underreporting of SNAP participation is common, and there is also a selection effect in participation.³⁹ The relatively low percentage of respondents in this sample reporting participation in SNAP (23%), despite being below 200% of FPL, may reflect these and other known issues (e.g., ineligibility due to legal status or citizenship). Individuals and households may also participate in SNAP in some but not all months out of the year, which would not capture individuals who were not receiving SNAP at the time of the survey. SNAP is a critical social service safety net for reducing food insecurity, and further research exploring the relationship amongst food insecurity, SNAP, and smoking are warranted.

Although there is a known education gradient with respect to smoking prevalence,⁵ the results indicated that education level was not associated with smoking status in the study sample. This may be due to the characteristics of the study sample, as we did not include those who have never smoked. In a 13-year longitudinal study of current and former smokers, quitting was associated with level of income but not level of education.⁴⁰ Variations by income may not be detected given that this sample comprised of respondents who were of lower income. Furthermore, we found that race/ethnicity was not associated with current smoking status in our study. These findings must be understood given limitations of the current data, however, as prior research articulating the need for tailored smoking cessation interventions show that relative to non-Hispanic Whites, racial/ethnic minorities tend to smoke fewer cigarettes per day and are less likely to smoke within 30 minutes of waking.⁴¹ The lack of more specific information on smoking behaviors is a limitation that should be addressed in future work.

The current findings must be interpreted in light of additional limitations. As this was a cross-sectional study, inferences regarding causality cannot be drawn. Regarding generalizability, the study sample consisted of ever smokers with lower income residing in California, which has different population characteristics than other states and the country as a whole. In this sample, 45% identified as Hispanic or Latino, and 39% of the sample reported that they were born outside the U.S. Although ethnicity and nativity were not associated with likelihood of being a former smoker in the logistic regression model (Table 2), quit ratios did vary by nativity (Table 3). This may be an important area for future research, to better understand how the association between psychological distress, food insecurity, and smoking status might vary across groups by race and ethnicity, and immigration. Among Asian immigrants in California, for example, social norms regarding smoking may influence quitting.⁴²

Other study limitations are that the measures of food insecurity and psychological distress were in reference to the past year, but both conditions can and often do fluctuate over time. Although quit ratios provide information regarding the percentage of former smokers in the population at any given time, these data cannot provide more detailed information regarding when individuals quit (for former smokers) and any quit attempts (for current smokers). This would be an important direction for future research, to examine whether the low quit ratio among those with food insecurity and psychological distress is due to differences in interest in quitting or failed quit attempts.

As the prevalence of smoking has been declining in the general population, certain groups are disproportionately affected by smoking and its harms, contributing to the rise of tobacco-related health disparities. Findings from this study collectively add to the literature on the intersection of food insecurity and cigarette use among socioeconomically disadvantaged groups, by showing that certain conditions of impoverishment, such as food insecurity, interact with psychological distress in its association with smoking. Existing tobacco control efforts may be failing to effectively reach this population group who is contending with unmet subsistence needs and significant mental health problems. Targeting reductions in food insecurity through policies and interventions has the potential for a significant

population-level impact in reducing the socioeconomic disparity in smoking, thereby reducing overall smoking prevalence.

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SO WHAT?

What is already known on this topic?

Food insecurity is independently associated with increased likelihood of cigarette smoking, and psychological distress is also independently associated with smoking. Despite declines in the overall prevalence of smoking, those experiencing food insecurity and those experiencing psychological distress have shown slower declines in smoking.

What does this article add?

Food insecurity and psychological distress have been examined separately in their association with smoking. Given that the experience of food insecurity is oftentimes highly stressful, this study examines how food insecurity and psychological distress interact in their association with current smoking among those who have ever smoked regularly. The results showed that reporting both food insecurity and psychological distress was associated with lower odds of quitting smoking (i.e., being a former smoker). This article provides quit ratio estimates across categories of food insecurity and psychological distress.

What are the implications for health promotion practice or research?

As food insecurity interacts with psychological distress in its association with smoking, reducing socioeconomic disparities in cigarette smoking likely requires a more comprehensive approach that addresses subsistence needs as well as mental health needs.

Table 1
Sample Characteristics of Low-Income Ever Cigarette Smokers in the 2015 California Health Interview Survey by Current Smoking Status

Characteristic	Unweighted sample size	Total (N = 3,007)		Former Smokers (N = 1,711)		Current Smokers (N = 1,296)		p ^a
		% (95% CI)		% (95% CI)		% (95% CI)		
All	3,007	100.0		52.8 (46.8, 58.8)		47.2 (41.2, 53.2)		
Gender								0.953
Female	1,538	39.0 (35.4, 42.6)		39.1 (33.4, 44.9)		38.8 (32.2, 45.5)		
Male	1,469	61.0 (57.4, 64.6)		60.9 (55.1, 66.6)		61.2 (54.6, 67.8)		
Age								<0.001
18–34	477	26.5 (22.8, 30.3)		20.4 (14.0, 26.8)		33.4 (28.1, 38.7)		
35–49	532	25.1 (21.6, 28.5)		23.5 (18.6, 28.4)		26.9 (21.5, 32.2)		
50–64	1,078	29.7 (26.7, 32.8)		28.9 (24.4, 33.3)		30.7 (25.8, 35.6)		
65 or older	920	18.7 (15.2, 22.1)		27.2 (21.0, 33.5)		9.1 (6.1, 12.1)		
Race/ethnicity								0.487
African American	268	8.3 (6.6, 9.9)		6.2 (4.4, 8.1)		10.5 (7.6, 13.4)		
Asian	129	9.0 (6.2, 11.8)		9.2 (5.7, 12.7)		8.7 (4.4, 13.0)		
Hispanic/Latino	885	45.1 (41.0, 49.3)		47.7 (41.1, 54.2)		42.3 (33.9, 50.7)		
Other	209	4.3 (2.7, 5.9)		3.6 (0.9, 6.2)		5.1 (2.3, 8.0)		
White, non-Hispanic	1,516	33.4 (29.7, 37.1)		33.4 (27.5, 39.2)		33.4 (27.0, 39.8)		
Born outside U.S.	714	38.9 (33.9, 44.0)		43.8 (37.6, 49.9)		33.5 (26.8, 40.3)		0.014
Education level								0.874
Less than high school	686	32.7 (28.7, 36.8)		32.3 (25.5, 39.2)		33.2 (27.6, 38.9)		
High school or equivalent	992	29.9 (26.6, 33.3)		29.2 (25.0, 33.4)		30.7 (25.9, 35.5)		
Some college or more	1,329	37.4 (33.3, 41.4)		38.5 (31.2, 45.7)		36.1 (29.8, 42.4)		
Marital status								0.001
Married	764	34.8 (31.5, 38.2)		40.1 (33.0, 47.2)		29.0 (23.9, 34.0)		
Never married	704	25.3 (21.0, 33.6)		20.2 (10.9, 29.6)		30.9 (23.0, 38.9)		
Other	1,539	39.9 (25.9, 53.9)		39.7 (20.6, 58.7)		40.1 (30.5, 49.8)		
Federal poverty level (FPL)								0.020
0–99% FPL	1,387	49.4 (43.8, 55.1)		44.4 (38.4, 50.3)		55.1 (46.7, 63.5)		

Characteristic	Unweighted sample size	Total (N = 3,007)		Former Smokers (N = 1,711)		Current Smokers (N = 1,296)		p ^a
		% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	
100–199% FPL	1,620	50.6 (44.9, 56.2)	55.7 (49.7, 61.6)	44.9 (36.5, 53.3)				
General health status								0.946
Excellent, very good, or good	1,723	56.7 (49.7, 63.6)	56.6 (48.7, 64.4)	56.8 (48.4, 65.2)				
Fair or poor	1,284	43.3 (36.4, 50.3)	43.5 (35.6, 51.3)	43.2 (34.8, 51.6)				
Saw doctor, past year								0.267
Yes	2,479	77.3 (72.3, 82.4)	79.8 (73.1, 86.4)	74.6 (67.6, 81.6)				
No	528	22.7 (17.6, 27.7)	20.3 (13.6, 26.9)	25.4 (18.4, 32.4)				
Alcohol use, past year								0.014
Yes	1,854	66.5 (62.7, 70.3)	59.0 (51.5, 66.5)	74.9 (67.8, 82.0)				
No	1,153	33.5 (29.7, 37.3)	41.0 (33.6, 48.5)	25.1 (18.0, 32.2)				
Food insecurity, past year								0.001
Food secure	1,728	54.5 (49.8, 59.2)	61.9 (56.9, 66.9)	46.3 (38.2, 54.3)				
Food insecure	1,279	45.5 (40.8, 50.2)	38.1 (33.1, 43.1)	53.7 (45.7, 61.8)				
Psychological distress, past year								0.015
No distress	1,587	52.4 (48.6, 56.2)	58.6 (52.0, 65.2)	45.4 (39.0, 51.8)				
Moderate/severe distress	1,420	47.6 (43.8, 51.4)	41.3 (34.8, 48.0)	54.6 (48.2, 61.0)				
Food insecurity and psychological distress, past year								0.007
Food secure without distress	1,124	35.5 (31.5, 39.4)	42.6 (36.2, 49.0)	27.5 (20.2, 34.8)				
Food secure with distress	604	19.1 (15.5, 22.6)	19.3 (14.0, 24.6)	18.8 (13.7, 23.9)				
Food insecure without distress	463	16.9 (13.3, 20.5)	16.0 (11.1, 20.8)	17.9 (12.4, 23.5)				
Food insecure with distress	816	28.6 (24.7, 32.5)	22.1 (16.8, 27.4)	35.8 (30.0, 41.6)				

Notes:

^a p-value derived from Rao Scott chi-square test; All sample sizes shown are unweighted, and all percentages are weighted.

Table 2

Factors Associated with Former vs. Current Smoking among Low-Income Ever Smokers in the 2015 California Health Interview Survey ($N = 3,007$)

Variable	Unadjusted OR ^a (95% CI)	Adjusted OR ^b (95% CI)
Gender		
Female	Referent	Referent
Male	0.96 (0.59, 1.57)	0.95 (0.51, 1.77)
Age		
18–34	Referent	Referent
35–49	1.35 (0.74, 2.49)	1.20 (0.65, 2.21)
50–64	1.50 (0.96, 2.34)	1.26 (0.71, 2.22)
65 or older	4.49 * (2.12, 9.54)	3.26 * (1.29, 8.25)
Race/ethnicity		
African American	0.60 * (0.36, 0.99)	0.66 (0.39, 1.11)
Asian	1.05 (0.50, 2.21)	0.83 (0.27, 2.54)
Hispanic/Latino	1.12 (0.68, 1.83)	1.31 (0.73, 2.34)
Other	0.70 (0.26, 1.87)	0.85 (0.30, 2.39)
White, non-Hispanic	Referent	Referent
Nativity		
Born in U.S.	Referent	Referent
Born outside of U.S.	1.55 * (1.08, 2.22)	1.47 (0.88, 2.44)
Education level		
Less than high school	0.96 (0.59, 1.57)	0.70 (0.35, 1.39)
High school or equivalent	Referent	Referent
Some college or more	1.08 (0.73, 1.60)	1.06 (0.77, 1.45)
Marital status		
Married	Referent	Referent
Never married	0.50 * (0.30, 0.82)	0.82 (0.44, 1.51)
Other	0.76 (0.47, 1.23)	0.88 (0.58, 1.33)
Federal poverty level (FPL)		
0–99% FPL	0.67 (0.42, 1.06)	0.84 (0.47, 1.52)
100–199% FPL	Referent	Referent
General health status		
Excellent, very good, or good	Referent	Referent
Fair or poor	1.05 (0.75, 1.46)	1.11 (0.73, 1.67)
Saw doctor, past year		
Yes	Referent	Referent
No	0.77 (0.46, 1.29)	0.83 (0.46, 1.50)
Alcohol use, past year		
Yes	0.49 * (0.31, 0.79)	0.59 (0.35, 1.01)
No	Referent	Referent

Variable	Unadjusted OR ^a (95% CI)	Adjusted OR ^b (95% CI)
Food insecurity and psychological distress, past year		
Food secure without distress	Referent	Referent
Food secure with distress	0.66 (0.32, 1.38)	0.73 (0.42, 1.29)
Food insecure without distress	0.57 (0.26, 1.25)	0.59 (0.29, 1.20)
Food insecure with distress	0.39 [*] (0.20, 0.77)	0.47 [*] (0.26, 0.84)

Notes:

^a bivariate associations between variable and former smoking status;

^b adjusted for all other variables shown on table.

^{*} denotes statistical significance at $p < 0.05$

Table 3

Quit Ratio (Proportion of Former Smokers among Ever Smokers) by Participant Characteristics

Characteristic	Quit ratio %	(95% CI)	p
All	52.8	(46.8, 58.8)	
Gender			0.953
Female	53.0	(43.6, 62.4)	
Male	52.7	(46.0, 59.4)	
Age			< 0.001
18–34	40.6	(28.3, 52.9)	
35–49	49.5	(40.3, 58.6)	
50–64	51.3	(42.2, 60.3)	
65 or older	77.1	(70.4, 83.8)	
Race/ethnicity			0.487
African American	39.9	(29.6, 50.3)	
Asian	54.2	(37.1, 71.2)	
Hispanic/Latino	55.8	(44.4, 67.1)	
Other	43.9	(20.3, 67.5)	
White, non-Hispanic	52.8	(45.8, 59.8)	
Nativity			0.012
Born in U.S.	48.6	(42.7, 54.6)	
Born outside U.S.	59.4	(50.5, 68.2)	
Education level			0.874
Less than high school	52.1	(44.2, 60.1)	
High school or equivalent	51.6	(44.6, 58.5)	
Some college or more	54.4	(43.3, 65.5)	
Marital status			0.009
Married	60.8	(49.8, 71.7)	
Never married	42.3	(34.7, 49.9)	
Other	52.5	(45.2, 59.9)	
Federal poverty level (FPL)			0.020
0–99% FPL	47.4	(38.5, 56.3)	
100–199% FPL	58.1	(52.3, 64.0)	
General health status			0.946
Excellent, very good, or good	52.7	(45.7, 59.7)	
Fair or poor	53.0	(45.2, 60.7)	
Saw doctor, past year			0.267
Yes	54.5	(48.1, 60.9)	
No	47.2	(34.8, 59.5)	
Alcohol use, past year			0.014
Yes	46.8	(41.1, 52.6)	
No	64.7	(51.8, 77.5)	
Food insecurity and psychological distress, past year			0.007

Characteristic	Quit ratio %	(95% CI)	p
Food secure without distress	63.4	(56.2, 70.7)	
Food secure with distress	53.5	(41.6, 65.4)	
Food insecure without distress	49.9	(35.8, 64.1)	
Food insecure with distress	40.9	(30.2, 51.5)	

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