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Examining Vulnerability to Smokeless Tobacco Use Among Adolescents and Adults Meeting Diagnostic Criteria for Major Depressive Disorder

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Abstract

Introduction—Smoking prevalence is unevenly distributed in the U.S. population, with those with mental illness, other substance use disorders, and lower socioeconomic status being especially vulnerable. Less research has been conducted on the association between these same vulnerabilities and smokeless tobacco (ST) use. The present study examined cigarette and ST use among adolescents and adults who met diagnostic criteria for major depressive disorder in the National Survey on Drug Use and Health (NSDUH).

Methods—Utilizing the most recent (2011) NSDUH, we compared odds for current cigarette smoking and ST use among adolescents and adults meeting criteria for past-year major depressive disorder to the general population, after adjusting for potential confounding influences of sociodemographic and other substance use characteristics. Analyses were conducted to examine sex as a moderator of the relation between major depressive disorder and tobacco use.

Results—Odds for current cigarette smoking among those classified with major depressive disorder were increased among adolescents (OR with 95% CI = 1.33 [1.05, 1.69], $p = 0.021$) and adults (OR = 1.70 [1.47, 1.97], $p < .0005$), while odds for current ST use did not differ among adolescents (OR = 0.90 [0.54, 1.49], $p = 0.678$) and were lower among adults (OR = 0.68 [0.51, 0.91], $p = 0.010$). Sex was not a significant moderator in adolescents or adults.

Conclusions—Major depressive disorder is associated with increased risk for smoking but not ST use among adolescents and adults further demonstrating heterogeneity in predictors of vulnerability to use of different tobacco products.

Keywords

smokeless tobacco; cigarette smoking; epidemiology; major depression; NSDUH

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Introduction

Cigarette smoking is the leading preventable cause of morbidity and premature death in the US and other industrialized countries (Danaei, et al., 2009). The adverse health consequences of cigarette smoking and other tobacco use include coronary heart disease, stroke, numerous site-specific cancers as well as other chronic disease (USDHHS, 2004). Smoking prevalence is unevenly distributed in the US population, with those with mental illness, other substance use disorders, and lower socioeconomic status being especially vulnerable (CDC, 2012; Lasser, et al., 2000; Lawrence, Mitrou, & Zubrick, 2009; Redner, White, Harder, & Higgins, 2014; Schroeder & Morris, 2010). The present study is focused on individuals with major depressive disorder (MDD), a group with increased smoking prevalence including heavy smoking and nicotine dependence (Breslau, 1995; Glassman et al., 1990; Grant, Hasin, Chou, Stinson, & Dawson, 2004; Kendler, Neale, MacLean, Heath, Eaves, & Kessler, 1993; Lasser et al., 2000; Lawrence et al., 2009; Lyons, Hitsman, Xian, Panizzon, Jerskey, et al., 2008). The positive association between cigarette smoking and MDD has also been reported for adolescents (Brown, Lewinsohn, Seeley, & Wagner, 1996; Fergusson, Goodwin, & Horwood, 2003). Less research has been reported examining relations between MDD and vulnerability to other tobacco products (e.g., Goodwin, Zvolensky, & Keyes, 2008). We previously reported that a diagnosis of alcohol dependence, but not illicit drug dependence, increased the likelihood of ST use among NSDUH respondents (Redner et al., 2014). The purpose of the present study is to examine whether ST use is elevated among those with MDD among adolescents and adults in the most recent (2011) National Survey on Drug Use and Health (NSDUH; SAMSHA, 2012). Important to note is that there are substantive sex differences in prevalence of cigarette smoking, ST use, and MDD. In adolescents, current cigarette smoking is equally represented among males and females (SAMHSA, 2013), whereas current ST use is higher among males (CDC, 2013). In adults, the prevalence of current cigarette smoking and ST use is higher in males when compared to females (SAMHSA, 2013). Finally, MDD is overrepresented in both adolescent and adult females by about twofold, when compared to males (Weissman et al., 1993; Van de Velde, Bracke, & Levecque, 2010; Merikangas et al., 2010). Hence, we also consider the potential influence of sex on the relationship of MDD and cigarette smoking and ST use.

Understanding vulnerabilities to use of ST and other non-combustible tobacco products has become more important recently as cigarette manufacturers have increased production and release of novel types of ST products and are also promoting dual cigarette smoking and ST use (Tomar, Alpert, & Connolly, 2010; Delnevo, et al., 2012). ST products recently introduced in the US, for example, include snus (Mejia & Ling, 2010), dissolvable tobacco products (Zid, 2011), and electronic nicotine delivery systems (Regan, Promoff, Dube, & Arrazola, 2013). More longstanding ST products, which are the focus of this report and our prior report in those with substance use disorders (Redner et al., 2014), include snuff and chewing tobacco. Snuff is made from pulverized tobacco leaves, can be dry or moist, and is generally placed between the gum and cheek rather than chewed (McKim & Hancock, 2013). Chewing tobacco comes in loose leaf, pellet, or plug forms, and is placed between the gum and cheek and chewed (Boffetta, Hecht, Gray, Gupta, & Straif, 2008). Along with increases in availability of different types of ST products, the prevalence of ST use in the US

is increasing (Tomar et al., 2010; Federal Trade Commission, 2011). This increase in prevalence needs to be carefully monitored considering that ST use is directly linked to numerous adverse health outcomes, including immune system dysfunction, reproductive complications, and cardiovascular disease (Willis, Popovech, Gany, & Zelikoff, 2012). Should ST use become an effective substitute for use of combustible tobacco products, especially use of ST products low in nitrosamine, positive health impacts on population health might be realized as well (Britton & Edwards, 2008; Rodu, Jansson, & Eliasson, 2013).

We are aware of only a single report examining the relation between MDD and ST use among adults (Goodwin et al., 2008). Goodwin et al. (2008), utilizing the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions, reported that MDD was not associated with ST use. Of course, ST consumption and the ST marketplace are changing rapidly (Tomar et al., 2012) and thus continued monitoring of ST use will be necessary for the detection of emerging trends. Additionally, we know of no reports examining the relation between MDD and ST use among adolescents despite several reports noting positive associations between depressive symptoms and ST use in that age group. For example, Tercyak and Audrain (2002) reported that ST use was higher among adolescents who reported high levels of depressive symptoms. As another example, Coogan, Geller, and Adams (2000) reported that among a population of school aged children and adolescents, ST users were more likely than non-users to report feeling depressed, being stressed, and having thoughts of suicide.

For all of the above reasons, we utilized the 2011 NSDUH (SAMSHA, 2012) to examine the association of ST use among adolescents and adults with past-year MDD. We verified the relation between MDD and cigarette smoking to document a positive association between them in this data set. Adolescents and adults were examined separately considering the different patterns observed in the extant literature on this topic. The potential influence of sex on the relation between MDD, cigarette smoking, and ST use, was examined as well, due to known differential risks of each between males and females.

Method

Data Source

The 2011 NSDUH is a nationally representative survey of the US non-institutionalized population aged 12 that is designed to measure prevalence and correlates of drug use and mental health problems (SAMSHA, 2012). NSDUH recruitment (N = 58,397) was completed using a multistage area probability sample design. Respondents completed computer- and audio-assisted structured interviews. Respondents were selected from the civilian non-institutionalized population, including group homes, shelters, and college dormitories. Individuals on active military duty, in drug treatment programs, in jail, or homeless without residence were excluded. Respondents were compensated \$30 for completing the interview. The weighted interview response rate was 74.4%. A detailed description of survey procedures has been provided by SAMHSA (2012). The current analysis was conducted separately in two distinct groups: (a) adolescents age 12 to 17 years (n = 19,264, which included 9,881 males and 9,383 females) and (b) individuals age 18

years and older ($n = 39,133$ which included 18,473 males and 20,660 females). These groups differ qualitatively in their ability to acquire tobacco products because those 18 and older can purchase tobacco. Therefore, separate analyses were conducted for each group.

Major Depressive Disorder

Depression criteria utilized in the NSDUH were based on the DSM-IV (American Psychiatric Association, 1994). Respondents were classified as experiencing major depressive disorder (MDD) in the past year if they (a) reported meeting at least five of nine criteria within a two-week period at any point in their lifetime (i.e., depressed mood, diminished pleasure, weight gain/loss, fatigue, sleep changes, psychomotor distress, feelings of worthlessness, difficulty concentrating, or recurrent thoughts of suicide/death), one of which must have been either depressed mood or diminished pleasure, and (b) answered affirmatively to a question that queried whether they felt a depressed mood or diminished pleasure (in addition to other symptoms the respondent affirmed) for at least two weeks within the past year. There were minor wording differences between adult and adolescent depression questions to make them developmentally appropriate for adolescents (SAMHSA, 2012). No exclusions to this classification were made based on medical illness, bereavement, or substance use disorders.

Substance Use Disorders

Alcohol and illicit drug abuse or dependence variables were included in analyses in the present study to adjust for their potential effects on cigarette smoking and ST use. Alcohol and illicit drug abuse or dependence criteria were based on DSM-IV criteria (American Psychiatric Association, 1994). Substances for which diagnostic questions were asked included alcohol, marijuana, hallucinogens, heroin, inhalants, tranquilizers, cocaine, pain relievers, stimulants, and sedatives. Respondents had to endorse at least one of four diagnostic criteria as occurring within the past year to meet criteria for abuse (i.e., inability to fulfill major obligations, recurrent substance use in hazardous situations, substance-related legal problems, or persistent use despite social and interpersonal problems). Respondents had to endorse at least three of six or seven (depending on the substance) diagnostic criteria as occurring within the past year to meet criteria for dependence (i.e., spending a great deal of time with the drug, using more than intended, needing more of the drug to get the same effect, unsuccessful attempts to stop use, forgoing important activities to use the drug, continued use despite knowledge of problems, presence of withdrawal symptoms). The criterion related to withdrawal was only administered for alcohol, cocaine, heroin, pain relievers, sedatives, and stimulants. Respondents classified as dependent on a substance could not also be classified with abuse for that same substance.

Dependent Variables

The two dependent variables in the present study were self-reported smoking at least one cigarette in the past 30 days (i.e., current cigarette use), and self-reported use of snuff or chewing tobacco in the past 30 days (i.e., current ST use). It is convention in the literature to restrict the definition of current users to those who have used tobacco products a minimum number of times (e.g., Goodwin et al., 2008). Unfortunately the NSDUH does not include a lifetime measure of ST use and so a similar definitional restriction was not utilized.

Statistical Methods

Descriptive statistics and simple and multiple logistic regression analyses were conducted. Simple logistic regression analyses were used to estimate the odds of past 30-day cigarette smoking status and ST use for those meeting criteria for MDD in the past year. Current cigarette smoking, alcohol abuse or dependence, and illicit drug abuse or dependence were also considered as potential predictors in simple logistic regressions. Finally, sociodemographic variables were tested using simple logistic regressions. Age was coded into 17 categories (i.e., 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 to 23, 24 to 25, 26 to 29, 30 to 34, 35 to 49, 50 to 64, 65+), as defined in the public release codebook (SAMHSA, 2012). Sex was coded into male or female. Educational attainment was coded into four categories (less than high school, high school, some college, and college graduate) with 'less than high school' as the reference category. Race was coded into a binary variable as non-Hispanic Caucasian versus other. Marital status was coded as married or unmarried, which included never married, divorced, and widowed. Employment status was coded as 'unemployed' if the participant was not employed and was actively looking for work or 'other' if the participant was working, volunteering, disabled, keeping a house, retired, in school, or didn't have a job for another reason. Variables included in logistic regression analyses for adolescents were restricted to sex, age, and race which excluded education, marital status, employment status. Reported odds ratios (OR) were associated with a one-unit change in the aforementioned predictor variables.

For both cigarette use and ST use outcomes, MDD was entered into separate multiple logistic regressions adjusting for the influence of significant sociodemographic and substance use predictors identified in respective simple regressions. In the ST outcome models, current cigarette smoking was added to the model to adjust for its potential confounding effects on the association between MDD and ST use.

Two additional analyses were conducted. First, we examined whether sex moderated associations between MDD and cigarette smoking and ST use in separate analyses among adolescents and adults. Interaction terms were tested for statistical significance in our final models. Second, we conducted identical regression analyses to those described above with past- year and lifetime ST use (rather than past month ST use).

Statistical software STATA version 12.1 was used for all analyses. The complex sampling design was taken into account by using the survey commands in STATA. The NSDUH 2011 provided weighting, stratum, and probability sampling unit variables, and standard errors were computed using the jackknife repeated replication method. ORs and 95% confidence intervals (CI) are reported. Statistical significance was defined as $p < .05$.

Results

Adolescents

Prevalence—Prevalence of current cigarette smoking and current ST use in the adolescent population was estimated at 7.9% (8.2% among males, 7.6% among females) and 2.1% (3.7% among males, 0.5% among females), respectively. Among those with MDD, the

prevalence of cigarette smoking was 16% (14.3% among males, 16.7% among females) and the prevalence of ST use was 2.3% (3.9% among males, 1.4% among females).

Modeling predictors of cigarette smoking—Being older, non-Hispanic Caucasian, meeting criteria for alcohol or illicit drug abuse or dependence criteria, and meeting criteria for MDD increased the odds of being a current cigarette smoker in simple logistic regressions (Table 1). MDD remained a significant predictor of cigarette smoking after controlling for the influence of these other predictors in the multiple logistic regression (Table 2).

Modeling predictors of smokeless tobacco use—Being male, older, non-Hispanic Caucasian, and meeting criteria for alcohol or illicit drug abuse or dependence criteria increased the odds of being a current ST user in simple logistic regressions (Table 1), but MDD was not significantly related to ST use in simple or multiple regression models (Tables 1 & 2). Predictors that were significant in simple logistic regressions remained significant in the multiple logistic regression.

Adults

Prevalence—Prevalence of current cigarette smoking and current ST use in the general population of adults was estimated at 23.6% (26.2% among males, 21.1% among females) and 3.2% (6.3% among males, 0.4% among females), respectively. Among those with MDD, the prevalence of cigarette smoking was 38.3% (42.0% among males, 36.3% among females) and the prevalence of ST use 2.1% (6.1% among males, 0.3% among females).

Modeling predictors of cigarette smoking—Being male, younger, less educated, unmarried, unemployed, non-Hispanic Caucasian, meeting alcohol or illicit drug abuse or dependence criteria, and meeting criteria for MDD increased the odds of being a current cigarette smoker in simple logistic regressions (Table 3). Meeting criteria for MDD significantly increased the odds of current cigarette smoking after controlling for the influence of these other variables (Table 4). Predictors that were significant in simple logistic regressions remained significant in the multiple logistic regression.

Modeling predictors of smokeless tobacco use—Being male, younger, less educated, non-Hispanic Caucasian, meeting criteria for alcohol or illegal drug abuse or dependence increased the odds of ST use in simple logistic regressions (Table 3). Meeting criteria for MDD did not increase odds for ST use, but instead reduced the odds of ST use. In final models that adjusted for the influence of other significant predictors, MDD continued to significantly decrease the odds for ST use (Table 4). Predictors that were significant in simple logistic regressions remained significant in the multiple logistic regression.

Moderation analyses

Among adolescents the interaction terms between sex and MDD predicting cigarette smoking ($p = .203$) or ST use ($p = .069$) were not significant. Among adults the interaction

terms between sex and MDD predicting cigarette smoking ($p = .109$) or ST use ($p = .789$) were also not significant.

Replication analysis: Past-year and lifetime ST use

The results reported above revealed no significant increases in the odds of past month ST use among adolescents or adults with MDD. Those findings remained unchanged when we examined the odds of past year or lifetime ST use among those with MDD (data not shown).

Discussion

Previous research has documented robust increases in vulnerability to cigarette smoking among those with mental illness compared to the general population (e.g., Lasser et al., 2000; Lawrence et al., 2009). The present report provides still further confirmation of that relationship regarding those with MDD, even after adjusting for the potential confounding influences of sociodemographic and drug use characteristics associated with a greater likelihood of cigarette smoking. This association was identified among both adolescents and adults. Importantly, though, the present results indicate that this association with cigarette smoking does not extend to ST use.

To our knowledge the present study is the first to examine the association between MDD and ST use among adolescents. We observed no relation between adolescent MDD and ST use, although further research is needed to clarify the previously reported association between depression symptoms and ST use (e.g., Coogan et al., 2000; Tercyak & Audrain, 2002) and the present results. One interesting possibility is that certain depressive symptoms that alone do not meet criteria for MDD are nevertheless positively related to ST use, whereas the clinical diagnosis of MDD is not. This notion would need to be tested in another data set in which depression criteria are examined among all respondents, not just those endorsing initial depression screening questions (as is done in the NSDUH). Among adults we observed a negative association between ST use and MDD. It is noteworthy that Goodwin et al. (2008) also reported a negative association, although it did not reach statistical significance. Conducting the same analyses outlined in this paper using lifetime or past-year ST use and MDD did not change the results (i.e., still observed no significant association in adolescents and negative association in adults).

Given that the nicotine is the constituent thought to drive repeated use in cigarette smokers and ST users, one might expect that they would be similarly related to MDD. What, then, may account for the observed differences? One obvious factor to consider is that the different routes of administration across cigarette and ST products results in differential onset of drug effects. Cigarette smoke is absorbed through the mucous membranes in the lungs and results in rapid delivery to the brain (e.g., Benowitz, 2008). Chewing tobacco and dry snuff are absorbed through the buccal membranes in the cheeks and under the tongue (McKim & Hancock, 2013). Peak nicotine concentrations are reached more rapidly by cigarette smoking, while ST produces concentrations that are sustained for longer periods of time (Benowitz et al., 1988). Perhaps individuals with depression are especially sensitive to these known differences in nicotine effects between smoked and smokeless tobacco products. Another potential explanation that we were able to investigate in the present study

surrounds the differences in the prevalence of MDD and ST use among males and females. In adolescents and adults we examined whether sex moderated the relation between MDD and cigarette smoking or ST use, but observed no significant interactions and therefore did not conduct any further tests. Based on the present results, it seems unlikely that the association between MDD and cigarette smoking or MDD and ST use varies by sex, although these associations should continue to be monitored and explored. Lastly, shared genes are thought to contribute significantly to risk for MDD and cigarette smoking (Kendler et al., 1993; Lyons et al., 2008), although how that shared risk is expressed is not yet well understood. Perhaps advances in that area will shed light on why risk does not appear to extend to use of smokeless tobacco products, at least not at this time.

In light of the considerable ongoing efforts in the development and marketing of new smokeless tobacco products (Tomar et al., 2010) and increased ST consumption (Delnevo et al., 2010), it would be prudent to continue monitoring ST use among those with MDD and other mental health problems. Regular monitoring can be beneficial for detecting trends in use among new groups of users and for identifying adverse patterns such as dual use. Groups that are known to use ST, such as those meeting criteria for alcohol dependence (Redner, et al., 2013), should also continue to be monitored in future research.

There are a few noteworthy limitations to the present study. The current data set is observational, and as such it is important to acknowledge the possibility that unobserved variables may be related to increased or decreased vulnerability to tobacco use. We attempted to control for potential confounders where possible, but other possible influences cannot be ruled out. The design of the study is cross-sectional and does not permit us to make inferences regarding the direction of the relation between mental illness and tobacco use. In this dataset no exclusions were made to depression criteria based on medical illness, bereavement, or substance use disorders which may have led to instances of misdiagnosis of depression. Finally, the data collected in the NSDUH is self-report, and thus may be biased in the direction of underreporting of substance use.

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Adolescents: Simple logistic regressions of sociodemographic characteristics, substance use variables, and major depressive disorder predicting current cigarette smoking or smokeless tobacco (ST) use.

Table 1

	Cigarette Use			ST Use		
	OR	95% CI	p-value	OR	95% CI	p-value
Sociodemographics						
Age	1.82	1.72, 1.93	<.0005	1.65	1.50, 1.82	<.0005
Male sex	1.09	0.93, 1.27	0.269	8.33	5.48, 12.65	<.0005
Non-Hispanic white	1.70	1.42, 2.03	<.0005	4.59	3.07, 6.88	<.0005
Substance use						
Alcohol A/D	17.19	13.68, 21.60	<.0005	8.10	5.66, 11.59	<.0005
Illegal drug A/D	18.50	15.24, 22.45	<.0005	4.87	3.44, 6.89	<.0005
Cigarette smoking				14.63	11.62, 18.41	<.0005
Mental health						
MDD	2.48	2.08, 2.95	<.0005	1.01	0.60, 1.68	0.984

Notes: OR = odds ratio; CI = confidence interval; A/D = abuse or dependence; MDD = major depressive disorder past year.

Table 2

Adolescents: Final multiple logistic regression models of major depressive disorder predicting current cigarette smoking or smokeless tobacco (ST) use in adolescents and adults, after adjusting for potential confounders.

Mental Illness	Cigarette Use			ST Use		
	AOR	95% CI	p-value	AOR	95% CI	p-value
Sociodemographics						
Age	1.72	1.61, 1.84	<.0005	1.40	1.25, 1.57	<.0005
Male sex	1.14	0.97, 1.35	0.116	9.80	6.45, 14.88	<.0005
Non-Hispanic white	1.88	1.53, 2.31	<.0005	4.36	2.80, 6.79	<.0005
Substance use						
Alcohol A/D	6.71	5.02, 8.96	<.0005	2.53	1.60, 4.01	<.0005
Illegal drug A/D	9.34	7.26, 12.01	<.0005	0.91	0.58, 1.43	0.684
Cigarette smoking				7.81	5.41, 11.26	<.0005
Mental health						
MDD	1.33	1.05, 1.69	0.021	0.90	0.54, 1.49	0.678

Notes. AOR = adjusted odds ratio; CI = confidence interval; A/D = abuse or dependence; MDD = major depressive disorder past year.

Table 3

Adults: Simple logistic regressions of sociodemographic characteristics, substance use variables, and major depressive disorder predicting current cigarette smoking or smokeless tobacco (ST) use.

	<u>Cigarette Use</u>			<u>ST Use</u>		
	<i>OR</i>	<i>95% CI</i>	<i>p-value</i>	<i>OR</i>	<i>95% CI</i>	<i>p-value</i>
Sociodemographics						
Age	0.87	0.86, 0.88	<.0005	0.88	0.86, 0.89	<.0005
Male sex	1.33	1.22, 1.45	<.0005	17.96	11.96, 26.95	<.0005
Education						
High School Graduate	0.81	0.73, 0.90	<.0005	0.88	0.70, 1.11	.279
Some College	0.67	0.60, 0.76	<.0005	0.68	0.54, 0.85	.001
College Graduate	0.28	0.24, 0.32	<.0005	0.39	0.29, 0.52	<.0005
Married	0.45	0.42, 0.49	<.0005	0.88	0.76, 1.03	.116
Unemployed	2.40	2.09, 2.75	<.0005	1.02	0.79, 1.33	.861
Non-Hispanic white	1.24	1.13, 1.37	<.0005	3.05	2.44, 3.80	<.0005
Substance use						
Alcohol A/D	3.82	3.38, 4.32	<.0005	2.63	2.11, 3.28	<.0005
Illegal drug A/D	9.58	7.80, 11.77	<.0005	2.97	2.31, 3.83	<.0005
Cigarette smoking				2.15	1.84, 2.50	<.0005
Mental health						
MDD	2.15	1.88, 2.46	<.0005	0.68	0.52, 0.89	.005

Notes. The reference category for education is "less than high school."

OR = odds ratio; *CI* = confidence interval; A/D = abuse or dependence; MDD = major depressive disorder past year.

Table 4

Adults: Final multiple logistic regression models of major depressive disorder predicting current cigarette smoking or smokeless tobacco (ST) use in adults, after adjusting for potential confounders.

	<u>Cigarette Use</u>			<u>ST Use</u>		
	<i>AOR</i>	<i>95% CI</i>	<i>p-value</i>	<i>AOR</i>	<i>95% CI</i>	<i>p-value</i>
Sociodemographics						
Age	0.95	0.94, 0.96	<.0005	0.89	0.87, 0.91	<.0005
Male sex	1.29	1.18, 1.42	<.0005	17.70	11.89, 26.35	<.0005
Education						
High School Graduate	0.79	0.70, 0.89	<.0005	0.80	0.64, 1.01	0.064
Some College	0.63	0.55, 0.72	<.0005	0.64	0.51, 0.81	<.0005
College Graduate	0.29	0.24, 0.34	<.0005	0.36	0.26, 0.51	<.0005
Married	0.58	0.53, 0.64	<.0005			
Unemployed	1.70	1.47, 1.97	<.0005			
Non-Hispanic white	1.64	1.48, 1.83	<.0005	3.98	3.16, 5.01	<.0005
Substance use						
Alcohol A/D	2.64	2.34, 2.98	<.0005	1.60	1.27, 2.02	<.0005
Illegal drug A/D	4.49	3.62, 5.56	<.0005			
Cigarette smoking				1.38	1.16, 1.63	<.0005
Mental health						
MDD	1.70	1.47, 1.97	<.0005	0.68	0.51, 0.91	0.010

Notes. The reference category for education is "less than high school."

AOR = adjusted odds ratio; *CI* = confidence interval; A/D = abuse or dependence; MDD = major depressive disorder past year.