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Title
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Permalink
https://escholarship.org/uc/item/29v5930v

Journal
Tobacco Control, 23(1)

ISSN
0964-4563

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Publication Date
2014

DOI
10.1136/tobaccocontrol-2012-050479

Peer reviewed

Menthol use among smokers with psychological distress: findings from the 2008 and 2009 National Survey on Drug Use and Health

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Abstract

Objective—The Food and Drug Administration is considering regulation of menthol cigarettes. While persons with mental distress are known to smoke cigarettes at high rates, little is known about their use of menthol. The authors examined the association of psychological distress and menthol use in a national sample of adult smokers.

Methods—Data were from the 2008 and 2009 National Survey on Drug Use and Health. Past month smokers (N=24 157) were categorised for menthol or non-menthol use. Psychological distress was categorised as none/mild, moderate or severe on the Kessler six-item scale.

Results—The prevalence of menthol use was higher among individuals with severe psychological distress, women, young adults, African–Americans, Native Hawaiians/Pacific Islanders, persons with fewer years of education and lower income, and the unmarried and uninsured. In a multivariate model controlling for socio-demographic factors, smoking intensity and time to first cigarette, smokers with severe (adjusted OR (AOR) 1.23, 95% CI 1.04 to 1.46, p=0.02) but not moderate (AOR 1.03, 95% CI 0.92 to 1.15, p=0.58) psychological distress were significantly more likely to smoke menthols compared with smokers with none/mild distress.

Conclusion—An elevated prevalence of menthol use was found among persons with severe psychological distress, suggesting another group that could potentially benefit from the regulation of menthol cigarettes.

INTRODUCTION

The Tobacco Products Scientific Advisory Committee (TPSAC) concluded in a report to the Food and Drug Administration (FDA) that 'the availability of menthol cigarettes has an adverse impact on public health by increasing the number of smokers with resulting premature death and avoidable mortality.'[1] The TPSAC report states that the evidence is sufficient to conclude that the availability and marketing of menthol cigarettes increases the prevalence of smoking in the general population and particularly in African–Americans and youth, but the evidence is insufficient for Asian–Americans, Hawaiians/Pacific Islanders and women.

Menthol stimulates cold receptors, creating a subjective cooling sensation and has anaesthetic properties that mask the irritation of tobacco smoke.[2, 3] TPSAC also concluded that the pharmacological actions of menthol cigarettes reduce the harshness of smoke and irritation from nicotine.[1] These factors contribute to smokers' perceptions that menthol cigarettes are less harmful than non-menthols.[4] Menthol acts as a bronchodilator,[5] contributing to deeper inhalation[2] and prolonged breath holding of smoke.[6] Together, these factors are believed to explain why menthol smokers maintain higher blood levels of cotinine[7–9] despite smoking fewer cigarettes per day.[10]

Prior research has documented that menthol smoking is more common among women, racial/ethnic minorities, young adults, those with less education and income, unmarried persons and lighter smokers.[11–17] Menthol smoking among certain socio-demographic groups is associated with menthol-brand targeted marketing. Tobacco companies have aggressively marketed menthol cigarette brands to African–Americans, Native Hawaiian youth and in low-income urban communities[10, 18–20] and have purposely applied lower prices to menthol cigarettes relative to non-menthols in these communities.[21] Youth are more likely to initiate smoking using menthol cigarettes than non-menthol cigarettes,[22] suggesting that menthols are a starter tobacco product for adolescents.[23]

Smokers have an elevated prevalence of mental illness. One epidemiological study reported 40.6% of smokers met criteria for a mental disorder (excluding nicotine dependence) in the past month[24] compared with an 18% prevalence of a mental disorder in the past year for the general population.[25] In turn, smoking rates are elevated among smokers with mental illness, with a two to four times greater prevalence of tobacco use relative to the general population.[24, 26] Among persons with serious psychological distress, smoking prevalence is estimated to range from 30.1% to 59.1%.[27–29] With a greater tendency towards heavier smoking, it is estimated that smokers with co-occurring psychiatric or addictive disorders account for 44.3% (data from 1991 to 1992) to 46.3% (data from 2001 to 2002) of cigarettes sold in the USA.[24, 30]

Despite established associations between mental illness and smoking, little research has examined the relationship between mental distress and menthol use. We identified only two studies of menthol cigarette use among smokers with mental health concerns. The first, a small study in New Jersey, found that Caucasians with schizophrenia were more likely to smoke menthols relative to Caucasian smokers without schizophrenia.[9] In the second study,

an analysis of 2007 Behavioral Risk Factor Surveillance Survey data from the state of Florida,[31] smokers of menthols reported significantly more days of poor mental health in the past month compared with non-menthol smokers.[15] Mental health was assessed with a single item: 'Now think about your mental health, which includes stress, depression, and problems with emotions, for how many days in the past 30 days was your mental health not good?'[31]

In the USA, adults with serious mental illness have, on average, a 25-year shortened life expectancy and elevated rates of cardiovascular and respiratory diseases, which are causally linked to tobacco use compared with the general population with no mental illness.[32–34] Research is needed to identify intervention targets for reducing tobacco-related disparities. The FDA is actively considering regulation of menthol cigarettes. Given the important health consequences of menthol tobacco use and the dearth of research, findings at the population level are needed to further elucidate whether the association of menthol smoking with mental illness extends nationally.

The current study examined the association of mental distress and menthol use in a nationally representative sample of smokers. Mental distress was assessed using the Kessler Psychological Distress Scale (K6), a multi-item screening measure with demonstrated psychometric strengths found to discriminate people in the community with mental disorders from those with no mental disorder.[35] The K6 has demonstrated utility for studies of tobacco use[27–29]; however, no studies to date have used the K6 to examine the association of mental distress with menthol cigarette smoking.

METHODS

Data set and sample

The current study used publicly available cross-sectional data from the two most recently completed years (2008 and 2009) of the National Survey on Drug Use and Health (NSDUH). The NSDUH, conducted annually, is an in-person interview that collects data on tobacco, alcohol and illicit drug use and mental health status from the civilian non-institutionalised US population aged 12 years or older.[36] A multistage area probability sampling method was used to recruit respondents representative of the 50 states and District of Columbia.[37] The 2008 and 2009 NSDUH had a weighted screening response rate of 89.0% (N=142 938) and 88.8% (N=143 565), respectively, and a weighted interview completion rate of 73.3% (N=68 736) and 74.6% (N=68 700), respectively.[38] Respondents received US$30 for their participation. For the current study, analyses were limited to current smokers aged 18 years or older who answered the item on menthol use (unweighted N for study =24 157). Menthol use was assessed only in current smokers, and psychological distress was assessed only in respondents aged 18 years or older.

Cigarette smoking

Two separate items assessed current smoking in the past 30 days ('During the past 30 days have you smoked part or all of a cigarette?') and specifically menthol use ('Were the cigarettes you smoked during the past 30 days menthol?'). The number of cigarettes per day

(CPD) was assessed by the item, 'On the days you smoked cigarettes during the past 30 days, how many cigarettes did you smoke per day, on average,' and categorised in the public use data file as: <1 CPD, 1 CPD, 2–5 CPD, 6–15 CPD, 16–25 CPD, 26–35 CPD and >35 CPD. Nicotine dependence was assessed as time to first cigarette in the morning ('How soon after you wake up do you smoke your first cigarette?'),[39] which was categorised in the public use data set as within 30 min of awakening (proxy for nicotine dependence) and after 30 min of awakening (proxy for not being nicotine dependent).

Psychological distress

Psychological distress was assessed using the K6, a six-item brief measure of non-specific psychological distress in the past month.[35] The K6 includes six symptoms of distress (ie, felt nervous, hopeless, restless or fidgety, worthless, depressed and felt that everything was an effort). Each symptom is scored on a 5-point Likert-type scale using response choices that range from 'none of the time' (scored 0) to 'all of the time' (scored 4), which are summed to yield a K6 score between 0 and 24. The Cronbach's α for the sample was 0.89, indicating good internal consistency of the K6 items. The standard cut-point for severe mental distress on the K6 is 13,[40] and recently published cut-points were used to categorise K6 responses into three levels of distress: 'none or mild' (0–4), 'moderate' (5–12) and 'severe' (13–24).[41]

Socio-demographic characteristics

Socio-demographic characteristics included gender, age (categorised as 18–24, 26–34 and 35 years and older), race/ethnicity (Hispanic, non-Hispanic Caucasian, African–American, Native Hawaiian/Pacific Islander, Asian–American, Native American/Alaska Native or multiracial), education (categorised as less than high school, high school/graduate equivalency degree, some college or college/graduate degree), income (categorised as <US $20 000, US$20 000–US$49 999, US$50 000–US$74 999 and US $75 000 or more), marital status (categorised as never married; divorced, separated or widowed; and married) and health insurance coverage (categorised as 'Yes—has private insurance, Medicare or military insurance (ie, TRICARE, CHAMPUS, CHAMPVA or VA coverage)' or 'No—no health insurance coverage'). Category ranges were determined by the survey developers and released in the public use data file.

Data analysis

We combined the 2008 and 2009 NSDUH data sets to ensure that the proportions of racial/ethnic minority groups (ie, Native Hawaiians, Other Pacific Islanders, Native Americans and Alaska Natives) were large enough to examine effects for ethnic groups that are often not reported in population studies. Descriptive analyses were conducted to elucidate the distribution of socio-demographic factors, psychological distress and cigarettes per day (CPD) for the overall unweighted study sample and based on weighted population estimates. Pearson χ^2 tests compared menthol and non-menthol smokers according to psychological distress level and socio-demographic factors. Multivariate logistic regression analysis examined the independent associations of psychological distress, socio-demographic factors, CPD and time to first cigarette with menthol cigarette smoking. Studies have found that menthol preference is significantly associated with age, gender, race/ethnicity, education and income level, marital status, health insurance status, and CPD,[11–17] so these variables were

included in the logistic model as covariates. CPD was entered into the model as a continuous variable using the midpoint of categories. Participants who declined to report CPD (n=29) and health insurance status (n=52) were excluded from the logistic regression analysis. Analyses were conducted using Proc Surveyfreq and Proc Surveylogistic in SAS Software V.9.2.2 (SAS Institute), which calculated weighted population estimates, accounted for the stratified sampling method, and non-response patterns. All analyses were weighted using NSDUH sampling and stratification weights. Taylor series linearisation was used for variance estimation. To maintain proper weighting within subgroups, estimates were obtained using the 'domain' sub-command where the domain was defined by whether the respondent reported smoking (the sample used here) or not.

RESULTS

Table 1 includes the unweighted and weighted distribution of psychological distress socio-demographic characteristics and time to first cigarette for the overall sample. Among this sample of smokers, 57% reported none or mild psychological distress, 34.2% moderate and 8.8% severe distress. The median CPD category was 6–15 cigarettes for menthol and non-menthol smokers. Forty-nine per cent smoked within 30 min of waking up in the morning. The prevalence of menthol smoking among this national sample of current smokers was 33.3%.

Table 2 displays psychological distress and socio-demographic variables by menthol and non-menthol smoking status. The prevalence of menthol use was higher among individuals with severe psychological distress, women, young adults, African–Americans, Native Hawaiians/Pacific Islanders, persons with fewer years of education and lower income, the unmarried and uninsured.

Findings from the multivariate logistic regression model are shown in table 3. Respondents reporting severe distress in the past month had a 1.23 (95% CI 1.04 to 1.46) greater odds of menthol smoking compared with those reporting none or mild distress, controlling for socio-demographics and CPD. Moderate distress was not associated with a greater likelihood of menthol smoking compared with smokers with none or mild distress (AOR 1.03, 95% CI 0.92 to 1.15). Among the socio-demographic characteristics, menthol smoking was higher among women, smokers aged 18 to 25 years relative to persons aged 35 years or older, and among unmarried respondents. By race/ethnicity, African–Americans, Native Hawaiians/ Pacific Islanders, Hispanics, Asian–Americans and the multiracial group had significantly greater adjusted odds of smoking menthol cigarettes than Caucasians. Menthol smoking was also higher for persons with less than a high school education, a high school diploma or graduate equivalency degree and some college compared with those with a college degree. Persons with an annual household income of US$49 999 or less had a lower adjusted odds of menthol smoking than those making US $75 000 or more. Lastly, menthol use was associated with smoking within 30 min of awakening and smoking intensity. There was no association between menthol preference and health insurance status. We examined the interaction between race/ethnicity and psychological distress on menthol smoking, and the relationship was not significant.

DISCUSSION

The current analysis of representative data on US adult smokers indicated elevated prevalence of menthol use among those with severe psychological distress, a difference that held in a multivariate model controlling for socio-demographic factors, smoking intensity and nicotine dependence. Respondents reporting severe distress in the past month had a 23% greater odds of menthol smoking compared with smokers with none or minimal distress. This is a modest but statistically significant association, comparable with other published results. Webb-Hooper et al[15] reported an 8% increased odds of menthol smoking (95% CI 1.02 to 1.15) with each additional week within a month of poor mental health among smokers in Florida. The CI for our analysis is wider (95% CI 1.04 to 1.46) due to application of sample weights and strata in the analysis. The Webb-Hooper analysis used unweighted data from the BRFSS and, based on the authors, was 'not intended to generalise to the population level' (Webb-Hooper et al, p7).[15] The present study has the advantage that it is from a nationally representative sample.

Prior research found that the three level categorisation of K6 scores (none/mild, moderate and severe) related to smoking status and mental healthcare utilisation in a representative sample of adults in California.[41] The current study, limited to smokers, found that severe, but not moderate, distress was associated with greater menthol use relative to smokers with none/mild distress. Persons with severe psychological distress represent a vulnerable group with a high prevalence of tobacco use and a preference for menthol tobacco use.

This cross-sectional study prevents us from elucidating the cause of the elevated odds for menthol use in smokers with severe psychological distress, which may relate to stress, access issues, flavouring and sensation effects. Our research team is currently investigating the role of psychotropic medication side effects, preferred taste and smell sensations, and the importance of price in relation to menthol cigarette smoking among psychiatrically hospitalised smokers enrolled in an ongoing tobacco clinical trial. We hope to identify potential causes of incremental menthol use in this vulnerable patient population.

Menthol's anaesthetic and bronchial dilation effects may influence metabolism of psychotropic medications for persons with severe psychological distress taking medications. Studies in rats have shown that menthol modulates brain nicotinic acetylcholine receptors and nicotine metabolism.[42, 43] The tobacco industry has known that the amount of menthol in a cigarette is associated with how humans smoke cigarettes and reported cigarette satisfaction.[44] Further research is needed to determine whether persons with severe psychological distress smoke menthol cigarettes to influence physiological side effects of psychotropic medications.

Exposure to tobacco industry marketing practices to promote menthol cigarette brands among African–American smokers[10, 18] and Native Hawaiian youth[20] may influence menthol preferences of smokers from other socio-demographic groups with severe psychological distress. Consistent with prior studies, the prevalence of menthol smoking was significantly higher for African–Americans and Native Hawaiians/Pacific Islanders, young adults and women[11–17, 22] compared with Caucasians, older respondents and men,

respectively. We found the highest prevalence of menthol smoking for Native Hawaiians/ Pacific Islanders; however, this estimate should be interpreted with caution, as there was a small sample of Pacific Islander smokers in the study (unweighted n=108). Future studies should recruit a larger sample of Pacific Islanders and disaggregate Native Hawaiians and other Pacific Islander ethnic groups to capture a more reliable estimate of menthol prevalence among indigenous inhabitants of the Pacific Islands. Targeted marketing of mentholated tobacco products to Native Hawaiians/Pacific Islanders and perhaps persons with mental illness also deserves further investigation.

We acknowledge several study limitations. The NSDUH sampling method excluded some subgroups with high rates of smoking that may have a higher odds of severe psychological distress such as the homeless who do not use shelters and institutionalised psychiatric patients. Response rates for the 2008 and 2009 NSDUH varied some by race/ethnicity with weighted response rates of 78.8% and 80.7% for African–Americans, 74.6% and 78.7% for Hispanics, 74.4% and 75.1% for non-Hispanic Caucasians and 66.7% and 65.9% for Asian–Americans, Native Hawaiians/Pacific Islanders, Native Americans/Alaska Natives and the multiracial group, which were combined in the NSDUH documentation.[38] The under-reporting of cigarette smoking deserves attention. Subgroups that are poor, racial/ethnic minorities and young adults are more likely to have low representation in population surveys and have a high smoking prevalence.[45, 46] Racial/ethnic minorities are more likely to under-report smoking (when a biomarker suggests tobacco use)[47] and decline participation in epidemiological surveys.[48] The K6 was developed for population survey research[35] and is not a comprehensive measure of mental disorders. Future studies should assess mental health problems using comprehensive, structured diagnostic interviews and examine whether certain mental disorders have a stronger association with menthol smoking than others.

The NSDUH has a lower threshold for current smoking status (past 30 days) compared with other national surveys, which assess smoking as every day or some days; however, a prior analysis found comparable menthol smoking prevalence estimates using the NSDUH and other epidemiological surveys.[11] Another limitation is that the wording of the question assessing menthol smoking did not capture the combined use of menthol and non-menthol cigarettes. As mentioned earlier, the NSDUH is a cross-sectional survey, and we cannot make causal statements regarding the menthol–mental distress relationship. Lastly, the association between menthol smoking and income varied—more prevalent among persons of lower income in the univariate analysis but less prevalent in the multivariate model that controlled for other socio-demographic factors suggesting residual confounding. Studies using multivariate models have generally found a higher prevalence of menthol smoking among persons of higher income.[12, 49] A statistical model that considers the interdependence of socio-demographic factors may better represent menthol smokers.

CONCLUSIONS

This study provides evidence that menthol smoking is associated with severe psychological distress among US adults. Given the current controversy regarding the FDA's authority to regulate menthol products, our findings have public health policy implications. The TPSAC,

FDA's scientific advisory panel, concluded that 'removal of menthol cigarettes from the marketplace would benefit public health in the USA.'[1] The FDA is currently deciding what, if any, action to take regarding regulations to ban or restrict the inclusion of menthol in cigarettes. The current findings indicate that persons with severe mental distress smoke menthols at a higher rate and may benefit from the removal of menthol cigarettes from the marketplace, which could reduce the prevalence of menthol smoking and tobacco-related morbidity and mortality among this vulnerable group.[50] Finally, our findings suggest that tobacco treatments focused on menthol smoking cessation should consider addressing psychological distress.

Acknowledgments

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What is already known on this subject

The US Secretary of Health and Human Services is considering whether to take action on the availability and marketing of menthol cigarettes. Mental illness and tobacco use co-occur at high rates with serious health consequences. Epidemiological study at the national level on the link between menthol smoking and poor mental health is needed.

What this paper adds

Study findings indicate that menthol smoking prevalence is elevated in a representative sample of Americans with serious mental distress. These findings have implications for policy decisions regarding the availability and marketing of menthol cigarettes and smoking cessation and prevention interventions for persons with mental health problems.

Table 1

Characteristics of adult smokers participating in the 2008 and 2009 National Survey on Drug Use and Health

Respondent characteristics	Unweighted, n	Weighted, % (95% CI)
Total sample	24 157	100
Psychological distress (K6)[*]		
None or mild	12 473	57.0 (55.9 to 58.1)
Moderate	9183	34.2 (33.2 to 35.2)
Severe	2501	8.8 (8.3 to 9.4)
Gender		
Male	12 424	53.4 (52.3 to 54.5)
Female	11 733	46.6 (45.5 to 47.7)
Age (years)		
18–25	13 727	20.6 (20.0 to 21.2)
26–34	3897	21.3 (20.5 to 22.1)
35 or older	6533	58.1 (57.1 to 59.1)
Race/ethnicity		
Caucasian[†]	16 475	71.3 (70.3 to 72.4)
African–American[†]	2623	12.0 (11.2 to 12.7)
Hispanic	3017	12.0 (11.3 to 12.7)
Asian–American[†]	506	2.1 (1.7 to 2.4)
Native Hawaiian/Pacific Islander[†]	108	0.28 (0.1 to 0.4)
Native American/Alaska Native[†]	577	0.75 (0.6 to 0.9)
Multiracial[†]	851	1.5 (1.3 to 1.8)
Education		
<High school	5667	21.1 (20.2 to 22.0)
High school/GED	9272	37.4 (36.3 to 38.5)
Some college	6605	26.3 (25.3 to 27.2)
College graduate	2613	15.2 (14.3 to 16.1)
Income		
<US$20 000	7138	23.8 (22.9 to 24.7)
US$20 000–US$49 999	9163	37.3 (36.3 to 38.4)
US$50 000–US$74 999	3578	16.5 (15.6 to 17.3)
US$75 000 or more	4278	22.4 (21.4 to 23.4)
Marital status		
Never married	14 856	37.2 (36.3 to 38.2)
Divorced, separated or widowed	3248	23.5 (22.5 to 24.6)
Married	6053	39.2 (38.1 to 40.4)
Health insurance[‡]		
No	11 011	36.0 (35.0 to 37.0)
Yes	13 094	64.0 (63.0 to 65.0)
Time to first cigarette		

Respondent characteristics	Unweighted, n	Weighted, % (95% CI)
Within 30 min	10 542	49.0 (48.0 to 50.2)
After 30 min	13 615	50.9 (49.8 to 52.0)

[*]Psychological distress categories were derived from published cut-points[41] using the Kessler-6 (K6) measure of psychological distress.[35]

[†]Respondents were not Hispanic.

[‡]Includes Medicare, private or military insurance (ie, TRICARE, CHAMPUS, CHAMPVA or VA coverage).

GED, graduate equivalency degree.

Table 2

Psychological distress, socio-demographics and time to first cigarette for current smokers by menthol use (N=24 157)[*]

| | Cigarette type smoked in the past month | | | |
| | Menthol | | Non-menthol | |
Respondent characteristics	Weighted, % (95% CI)	Unweighted, n	Weighted, % (95% CI)	Unweighted, n
Total sample	33.3 (32.2 to 34.3)	9198	66.7 (65.7 to 67.8)	14 959
Psychological distress (K6)[*]				
None or mild (K6: 0–4)	32.2 (31.3 to 33.1)	4511	67.8 (66.7 to 68.9)	7962
Moderate (K6: 5–12)	34.0 (33.3 to 34.7)	3591	66.0 (65.1 to 66.9)	5592
Severe (K6: 13–24)	37.5 (37.2 to 37.8)	1096	62.5 (62.0 to 63.0)	1405
Gender				
Male	29.6 (28.8 to 30.4)	4307	70.4 (69.3 to 71.5)	8117
Female	37.5 (36.7 to 38.3)	4891	62.5 (61.5 to 63.5)	6842
Age (years)				
18–25	41.8 (41.5 to 42.1)	5829	58.2 (57.8 to 58.6)	7898
26–34	32.6 (32.1 to 33.1)	1325	67.4 (66.7 to 68.1)	2572
35 or older	30.5 (29.5 to 31.5)	2044	69.5 (68.3 to 70.7)	4489
Race/ethnicity				
Caucasian[†]	24.1 (23.3 to 24.9)	4786	75.9 (74.8 to 77.0)	11 689
African–American[†]	85.1 (84.4 to 85.8)	2267	14.9 (14.5 to 15.3)	356
Hispanic	35.3 (34.9 to 35.7)	1308	64.6 (64.0 to 65.2)	1709
Asian–American[†]	27.8 (27.7 to 27.9)	206	72.2 (71.9 to 72.5)	300
Native Hawaiian/Pacific Islander[†]	86.3 (86.2 to 86.4)	88	13.7 (13.7 to 13.7)	20
Native American/Alaska Native[†]	27.8 (27.7 to 27.9)	166	72.2 (72.0 to 72.4)	411
Multiracial[†]	39.1 (38.8 to 39.4)	377	60.9 (60.7 to 61.1)	474
Education				
<High school	35.7 (35.2 to 36.2)	2392	64.3 (63.5 to 65.1)	3275
High school/GED	34.4 (33.7 to 35.1)	3707	65.6 (64.6 to 66.6)	5565
Some college	34.9 (34.3 to 35.5)	2444	65.1 (64.3 to 65.9)	4161
College graduate	24.2 (23.7 to 24.7)	655	75.8 (75.0 to 76.6)	1958
Income				
<US$20 000	38.4 (37.8 to 39.0)	2999	61.6 (60.8 to 62.4)	4139
US$20 000–US$49 999	33.7 (33.0 to 34.4)	3424	66.3 (65.3 to 67.3)	5739
US$50 000–US$74 999	30.1 (29.6 to 30.6)	1234	69.9 (69.2 to 70.6)	2344
US$75 000 or more	29.5 (28.9 to 30.1)	1541	70.5 (69.6 to 71.4)	2737
Marital status				
Never married	40.8 (40.1 to 41.5)	6336	59.2 (58.4 to 60.0)	8520
Divorced, separated or widowed	30.6 (30.0 to 31.2)	1056	69.4 (68.5 to 70.3)	2192
Married	27.7 (26.9 to 28.5)	1806	72.3 (71.2 to 73.4)	4247
Health insurance[‡]				

| Respondent characteristics | Cigarette type smoked in the past month | | | |
| | Menthol | | Non-menthol | |
	Weighted, % (95% CI)	Unweighted, n	Weighted, % (95% CI)	Unweighted, n
No	38.1 (37.4 to 38.8)	4664	61.9 (61.0 to 62.8)	6347
Yes	30.5 (29.6 to 31.4)	4507	69.5 (68.4 to 70.6)	8587
Time to first cigarette				
Within 30 min	34.0 (33.2 to 34.8)	4085	66.0 (64.9 to 67.1)	6457
After 30 min	32.6 (31.8 to 33.4)	5113	67.4 (66.3 to 68.5)	8502

[*]Psychological distress categories were derived from published cut-points[41] using the Kessler-6 (K6) measure of psychological distress.[35]

[†]Respondents were not Hispanic.

[‡]Includes Medicare, private or military insurance (ie, TRICARE, CHAMPUS, CHAMPVA or VA coverage).

GED, graduate equivalency degree.

Table 3

Logistic regression predicting current menthol smoking from psychological distress and covariates for a nationally representative sample of Americans participating in the 2008 and 2009 National Survey on Drug Use and Health

Respondent characteristics	OR (95% CI)	p Value[*]
Psychological distress (K6)[†]		
None or mild	1.00 (reference group)	
Moderate	1.03 (0.92 to 1.15)	0.58
Severe	1.23 (1.04 to 1.46)	0.02
Gender		
Male	1.00 (reference group)	
Female	1.59 (1.42 to 1.77)	<0.0001
Age (years)		
35 or older	1.00 (reference group)	
18–25	1.62 (1.40 to 1.86)	<0.0001
26–34	1.07 (0.93 to 1.23)	0.37
Race/ethnicity		
Caucasian[‡]	1.00 (reference group)	
African–American[‡]	18.60 (14.63 to 23.64)	<0.0001
Hispanic	1.76 (1.51 to 2.06)	<0.0001
Asian–American[‡]	1.44 (1.01 to 2.05)	0.04
Native Hawaiian/Pacific Islander[‡]	16.70 (7.42 to 37.56)	<0.0001
Native American/Alaska Native[‡]	1.17 (0.76 to 1.80)	0.48
Multiracial[‡]	2.00 (1.40 to 2.86)	0.0002
Education		
College graduate	1.00 (reference group)	
<High school	1.39 (1.12 to 1.73)	0.003
High school/GED	1.48 (1.21 to 1.81)	0.0001
Some college	1.46 (1.19 to 1.79)	0.0003
Income		
US$75 000 or more	1.00 (reference group)	
<US$20 000	0.76 (0.65 to 0.89)	0.0009
US$20 000–US$49 999	0.84 (0.72 to 0.98)	0.02
US$50 000–US$74 999	0.87 (0.73 to 1.03)	0.11
Marital status		
Married	1.00 (reference group)	
Never married	1.19 (1.03 to 1.37)	0.02
Divorced, separated or widowed	1.03 (0.87 to 1.21)	0.74
Health insurance[§]		
No	1.00 (reference group)	
Yes	0.91 (0.81 to 1.02)	0.11

Respondent characteristics	OR (95% CI)	p Value[*]
Time to first cigarette		
After 30 min	1.00 (reference group)	
Within 30 min	1.30 (1.15 to 1.47)	<0.0001
Cigarettes per day	0.99 (0.99 to 1.00)	0.03

[*] Significance of Wald χ^2 test.

[†] Psychological distress categories were derived from published cut-points[41] using the Kessler-6 (K6) measure of psychological distress.[35]

[‡] Respondents were not Hispanic.

[§] Includes Medicare, private or military insurance (ie, TRICARE, CHAMPUS, CHAMPVA or VA coverage).

GED, graduate equivalency degree.