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# Cigarette smoking among those with mental disorders in the U.S. population: 2012–2013 update

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## Abstract

**Background:** Recent nationally representative estimates from the U.S. suggest the prevalence of cigarette smoking continues to be much higher among those with mental disorders compared to those without; however, prevalence estimates for current cigarette use by specific diagnoses are outdated.

**Methods:** We analyzed data from the National Epidemiological Survey on Alcohol and Related Conditions III (2012–2013). We estimated the prevalence of lifetime and past year smoking, lifetime and past year daily smoking, and lifetime smoking cessation among ever smokers (i.e., the quit ratio) among those with common mood, anxiety, and substance use disorders in comparison to those without these disorders.

**Results:** Across disorders, smoking prevalence was higher and the quit ratio was lower among those with common mental disorders compared to those without, with relative differences in odds of the magnitude of 2 to 6-fold.

**Conclusions:** Despite tobacco control advances since 2000 and resulting declines in smoking prevalence, smoking remains extraordinarily more common among those with mood, anxiety, and substance use disorders, with highest rates among those with bipolar and substance use disorders.

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## INTRODUCTION

In the United States, those with a history of mental disorders are disproportionately likely to smoke cigarettes.[1–4] Previous investigations have highlighted greater prevalence of lifetime smoking and current smoking, and lower likelihood of cessation for those with mental disorders, including substance use disorders, compared to those without.[1,3] Cigarette use is a primary contributor to the greater risk of morbidity and mortality among those with mental disorders relative to those without.[5–8]

The most recently published study of nationally-representative population-level estimates of smoking among those with a wide range of specific mood, anxiety, and substance use disorders in the U.S. used data from 2001–2002.[3] Smith and colleagues (2014) found past-year smoking prevalence estimates of 39.8% for depression, 42% for those with generalized anxiety disorder, 51% for those with an alcohol use disorder, and 66.7% among those with a past-year drug use disorder. Other more recent publications have provided U.S. representative estimates of the prevalence of cigarette use for specific mental disorders; however, these publications have been focused on one or a few specific disorders, rather than presenting information across a range of disorders (e.g., depression,[9] substance use disorders[10]). In 2013, the prevalence of past-month cigarette smoking was 25% among those who screened positive for depression in the U.S. National Survey on Drug Use and Health (NSDUH).[9] This is compared to estimates of approximately 18% in the general population at the time.[11] Data from the 2014 NSDUH showed smoking prevalence estimates of 55% among those with any past year substance use disorder, and 51% among those specifically with a cannabis use disorder.[12] U.S. national estimates for PTSD have ranged from 34–61%.[13]

In a related investigation, Chou and colleagues analyzed data from the National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC III; 2012–2013).[14] Their study examined associations between DSM-5 tobacco use disorder (TUD) status and specific mental disorder comorbidities. All examined comorbidities were associated with nicotine dependence, with the strongest association found for comorbid drug use disorder (adjusted odds ratio = 10.97). Prevalence estimates for TUD among those with specific mental disorders were not provided in the manuscript. The researchers concluded that those with a current mental disorder consumed 56.4% of all cigarettes in the U.S. This study provided relatively recent estimates of the relative differences in prevalence of tobacco use disorder among those with various mental disorders. However, the investigation did not provide estimates of prevalence of smoking for specific disorders or of the relative likelihood of smoking cigarettes among those with mental disorders compared to those without mental disorders. Estimating the prevalence of smoking, in addition to tobacco use disorder, is informative because all smokers are at increased risk for disease and death from smoking, even though not all meet criteria for tobacco use disorder.

In addition to the literature on specific mental disorders, studies have provided recent estimates of the prevalence of smoking in the U.S. using general mental health screening tools such as Kessler's K6. [15] There is great breadth in the symptomatology and severity of mental disorders as well as the strength of their association with cigarette smoking;[3]

therefore such prevalence estimates have limited utility when considering specific disorders. Using data from the 2012–2014 National Survey on Drug Use and Health, Lipari and Van Horn (2017) reported a past-month prevalence of smoking of 33.3% among those with mental health problems, compared to 20.7% among adults with no mental health problems.[16] Also concerning is a recent finding of increasing non-daily smoking rates among those with mental health problems.[17]

The extent of current differences in smoking prevalence between those with and without specific mental disorders is unclear. We used the NESARC III to estimate prevalence of past year and lifetime cigarette smoking, past year and lifetime daily smoking, and lifetime smoking cessation among ever smokers (i.e., the quit ratio) for those with specific mental disorders (mood disorders, anxiety disorders, PTSD, eating disorders, substance use disorders), in comparison to those without these common disorders. Based on prior analyses we anticipated higher prevalence of smoking and lower quit ratios among those with common mental disorders than among those without, with the highest prevalence of use and lowest quit ratio among those with substance use disorders.

## METHODS

We analyzed data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) III. Details of the NESARC III methodology can be found in the National Institute on Alcohol Abuse and Alcoholism's source and accuracy statement for the study.[18] NESARC III used a multi-stage sampling design to recruit a cross-sectional nationally representative sample of U.S. adults, weighted based on the 2010 census to be representative of the adult non-institutionalized population. In-home computer-assisted, standardized surveys were administered by rigorously trained interviewers during 2012 and 2013. The total sample size for NESARC III was $n$ = 36,309 resulting from a household response rate of 72%, a person-level response rate of 84%, and an overall response rate of 60%.

### Measures

**Past-year mental disorders—**Disorders were classified using the Diagnostic and Statistical Manual for Mental Disorders 5 (DSM-5)-based Alcohol Use Disorder and Associated Disabilities Interview Schedule – DSM-5 Version (AUDADIS-5). See previous publications for a detailed description of procedures and evidence of validity and reliability.[19–21] The following past-year disorders were included in the current study (both lifetime and past year): major depressive episode, dysthymia, bipolar disorder, specific phobia, social phobia, panic disorder, agoraphobia, generalized anxiety disorder, posttraumatic stress disorder, any eating disorder, alcohol use disorder, and drug use disorder. Schizophrenia and schizoaffective disorder were not included in the AUDADIS due to low population occurrence. In addition to these mental disorder variables, we created a 'dual diagnosis' (i.e. co-occurring) disorder variable representing the presence of a substance use disorder in combination with at least one non-substance mood or anxiety disorder.

**Cigarette smoking—**NESARC III respondents were asked about their use of cigarettes during the past year and during their lifetime. We created five cigarette use-related outcomes: any lifetime smoking, lifetime daily smoking, any past year smoking, past year daily smoking, and the proportion of ever smokers who had quit smoking in their lifetime (the quit ratio). Lifetime cigarette smokers were defined as those who smoked at least 100 cigarettes in their lifetime. Past year cigarette smokers were defined as those who smoked at least 100 cigarettes in their lifetime and smoked at least 1 cigarette during the year prior to their interview. Lifetime daily smokers were defined as those who smoked at least 100 cigarettes in their lifetime and reported ever smoking on a daily basis. Past year daily smokers were defined as those who smoked at least 100 cigarettes in their lifetime and smoked daily during the year prior to the interview. The quit ratio was defined as the proportion of lifetime smokers who did not report any smoking during the previous year at the time of the interview.

**Sociodemographic characteristics—**Respondents self-identified their gender as male or female. Age was recorded based on self-reported date of birth. Highest grade level was assessed on a scale ranging from 1 (no formal schooling) to 14 (completed master's degree or equivalent or higher graduate degree). Annual household income was reported on a scale from 1 (less than $5,000) to 21 ($200,000 or more). Race/ethnicity was grouped into the following self-reported categories: white/Caucasian (non-Hispanic), black/African American (non-Hispanic), American Indian/Alaska Native, (non-Hispanic), Asian/Native Hawaiian/other Pacific Islander (non-Hispanic), Hispanic/Latino.

## Statistical analyses

All estimates were calculated accounting for the survey design using Stata Statistical Software package version 13.1. Standard error estimates were calculated using Taylor-series linearization. Single-item variables with missing data included lifetime smoking status ($n$ = 44), and past year smoking ($n$ = 46). Those with missing data (~0.1% of the sample) were excluded from analyses). We first estimated unadjusted prevalence of smoking cessation outcomes among those without any of the included mental disorders, those with any disorder, and those with specific disorders. We then estimated adjusted prevalence estimates, controlling for age, gender, race/ethnicity, highest grade-level completed, and household income using logistic regression. Education and income were included in the model as continuous variables. We tested the assumption of a linear logit relationship between continuous independent variables and our dependent variables using procedures outlined by Hosmer and Lemeshow.[22] Results indicated education had an exponential logit relationship with lifetime and past year smoking and daily smoking, and a linear logit relationship with the quit ratio. Income had a linear logit relationship with all dependent variables. Age had an exponential logit relationship with past year smoking and daily smoking, and linear logit relationships with lifetime smoking, lifetime daily smoking, and the quit ratio. We then compared odds of smoking outcomes for those with mental disorders (any disorder and specific disorders) to those without any included disorders.

# RESULTS

## Prevalence of mental disorders among the general population and among cigarette smokers

The prevalence estimates for specific mental disorders among the general population and among current smokers are presented in Table 1. These estimates are provided to help scope the issue of cigarette smoking among those with mental disorders, by providing estimates of mental disorder prevalence. Among cigarette smokers, 50.9% were categorized with at least one of the included common mental disorders, compared to 32.8% in the general population. The most common disorder among both the general population and among cigarette smokers was alcohol use disorder (13.9% prevalence in the general population, 26.7% prevalence among cigarette smokers).

## Prevalence of smoking among those with specific mental disorders

Smoking prevalence estimates are presented in Tables 2–3. All estimates summarized in this section are adjusted for age, gender, race/ethnicity, education level, and income. Unadjusted prevalence estimates are provided in the tables. Among those with no disorder, past year smoking prevalence was 18.3% (Table 2). Among those with mental disorders, past year smoking prevalence ranged from 28.8% (any eating disorder) to 53.2% (drug use disorder). All comparisons between those with diagnoses and those without were statistically significant (95% CI > 1.0), with the strongest associations found for drug use disorder (OR=5.64, 6.14 for lifetime and past year smoking, respectively). The pattern of findings for past year daily smoking was identical, with somewhat attenuated prevalence and odds ratio estimates (Table 3).

## Smoking cessation among those with specific mental disorders

All estimates summarized in this section are adjusted for age, gender, race/ethnicity, education level, and income. With regard to former smoker status among lifetime smokers (i.e., quit ratio), all disorders were significantly associated with lower odds of having quit smoking (95% CI > 1.0), with the exception of those with any eating disorder (Table 4). The adjusted quit ratio was 47.1% among those without any included disorder, compared to a range of 44.5% (dysthymia) to 26.3% (drug use disorder) among those with mental disorders. The relative difference in odds of having quit smoking was greatest for those without any disorder and those with a drug use disorder (OR = 0.34, 95% CI = 0.28, 0.43).

# DISCUSSION

Our study provides estimates of the excess burden of cigarette smoking among those with common mental disorders in the United States. These results are consistent with and extend prior findings on this topic by using what is, to our knowledge, the most recently available data (2012–2013) that contains both well-measured specific mental disorders and cigarette use in a nationally representative sample. These results were consistent with data collected in the early 1990's and early 2000's.[1–3] All mental disorders examined were associated with greater prevalence of lifetime smoking, past year smoking, lifetime daily smoking, past year daily smoking, and were associated with lower likelihood of having quit smoking compared

to those without these relatively common mood, anxiety, and substance use disorders. These differences were on an order of magnitude from 2 to 6 times increased odds for prevalence and 0.76 to 0.35 times lower odds for smoking cessation.

Across all mental disorders, drug use disorder (illicit drugs only, not including alcohol or tobacco) was most strongly associated with higher prevalence of cigarette use and a lower quit ratio, both prior to and after adjusting for sociodemographic variables. For example, after adjusting for differences in sociodemographic characteristics, approximately 40% of those with any drug use disorder reported daily smoking in the past year, compared to 14% of those with without any of the disorders assessed. The quit ratio, defined as the proportion of lifetime smokers who had quit, among those without any mental disorder was nearly 50% while it was only 26% among those with drug use disorders. These findings are consistent with other recent data showing a lower quit rate among those with alcohol use disorders.[23] The quit ratio was only 15% among those with a dual (mood or anxiety, plus substance use) disorder. Such findings speak to the need for continued services for treatment of dual diagnoses (i.e., co-occurring disorders) and use of multiple substances. Those with dual diagnoses had a lifetime daily smoking prevalence of 62% and a past year daily smoking prevalence of 34%.

A qualitative comparison of our findings to those published from NESARC data collected in the early 2000's suggests there has been a small but consistent decline in smoking among those with mental disorders across the decade spanning from 2001–2002 to 2012–2013. For example, in 2001–2002, 40% of those with past year major depressive episode were past year cigarette smokers (based on unadjusted estimates),[3] compared to 37% (unadjusted) in the 2012–2013 data. This is consistent with other recent findings on trends in smoking among those with depression where there is a consistent decline, but the prevalence of smoking among those with depression remains much higher than among those without.[24] Among those with a drug use disorder, the prevalence estimate in 2001–2002 was 67%, compared to 63% in the 2012–2013 data. An exception was social phobia, with a prevalence of 32% in 2001–2002 and 38% in the 2012–2013 data. Studies specifically designed to quantitatively compare changes or lack of changes over time for those with specific disorders can provide more detailed discussion of this topic.

Our findings provide evidence suggesting that while the prevalence of smoking has declined slightly over the past decade among those with mental disorders, smoking remains much more common among those with common mood, anxiety, and substance use disorders, than among those without. Others have documented a growing disparity in the prevalence of smoking among those with mental disorders compared to those without.[25–27] There have been persistent calls to address cigarette smoking among those with mental disorders, especially given ample evidence that this vulnerable population is motivated and able to quit, that smoking may contribute to mental disorder onset and persistence (e.g.[28–30]), and that quitting smoking is associated with reduced mental disorder symptoms (e.g., [31]). Our findings suggest these efforts are still remarkably important and it may become difficult to continue progress in limiting smoking in the U.S. without reducing the prevalence among those with mental disorders. Fifty-one percent of all past year smokers were classified with at least one common mental disorder. This figure does

not include personality disorders (e.g., antisocial personality disorder) or nonaffective psychosis (e.g., schizophrenia, schizopaffective disorder), suggesting the tally is likely higher when considering all mental disorders. The evidence base for efficacious and effective interventions among those with mental disorders continues to grow, including among those with severe and persistent mental disorders;[32] however, there remains a disconnection between these smokers' interest in quitting and their likelihood of receiving treatment for smoking cessation.[33,34]

Furthermore, there has been little investigation of how population-based tobacco control efforts influence prevention, motivation to quit, or cessation among those with mental disorders. Cambell et al. (2016) report that among those in substance use treatment, susceptibility to tobacco ads was associated with likelihood of currently smoking, suggesting further limiting tobacco advertising could have an impact.[35] However, the cause-and-effect nature of their findings is unclear from the use of self-report cross-sectional data and it is not clear how generalizable findings from a clinical population are to the community, especially since the majority of persons with substance use disorders do not receive treatment. In a longitudinal U.S. population-based investigation, Smith et al. (2014) reported smoking bans in restaurants and bars were related to declines in smoking among men with alcohol use disorders and women with social phobia.[36] Tidey et al. (2016) suggest raising cigarette excise taxes and reducing cigarette outlets may increase the costs associated with smoking from a behavioral economics perspective, potentially driving down smoking among those with mental disorders, although this hypothesis remains empirically untested. It is worth considering that such policies are widespread in the U.S. without having substantially affected smoking prevalence among those with mental disorders.

Implementation science may be critical for removing barriers to smoking cessation among those with mental illness. Novel approaches such as the use of electronic nicotine delivery devices and reduced content nicotine cigarettes as a harm-reduction strategy among those who smoke warrant continued focus, to better understand both potential benefits and harms.[37–39] For example, an ongoing trial is examining the effectiveness and side effects of combining varenicline with e-cigarettes for smoking cessation among those with mental disorders.[40] Recent reviews on the use of e-cigarettes for cessation among vulnerable groups concluded there is insufficient evidence to determine effectiveness.[41,42] Findings have also demonstrated the relevance of contextual factors, including physical and social environment, as important barriers to address in smoking cessation efforts.[43,44] Studying the issue from a behavioral economics perspective may also hold promise as an innovative approach to smoking cessation among those with mental disorders.[39] A number of clinical strategies, including pharmacotherapy, behavioral interventions, and smoke free policies in psychiatric facilities have demonstrated effectiveness for smoking cessation among those in treatment for severe and acute mental disorders, despite a lack of implementation (see Prochaska et al., 2017 for a review[42]). Interventions in clinical settings are only available to those accessing treatment and many with mental disorders do not receive treatment (e.g.,[45,46]), increasing the need for population approaches. Potentially effective strategies include expanded healthcare coverage,[42] and novel population-based strategies including the reduction of point of sale marketing and tobacco outlet density.[42,47]

## Limitations

Only past-year cigarette use was available in the NESARC data as an indicator of current smoking. Investigations more commonly use indicators such as past-month use; however, NESARC is the most recent national dataset that includes diagnoses for specific mental disorders. Prevalence estimates are likely to be higher than they would be for past-month smoking.

The study was designed to estimate the prevalence of smoking outcomes and to estimate differences in prevalence among those with common mood, anxiety, and substance use disorders compared to those without. Such knowledge is helpful for gauging the relative burden of smoking among different population groups. Our analyses were designed to remove potential differences resulting from sociodemographic factors; however, we did not intend to fully account for all measured potential confounding variables, and therefore causal inference was not an objective and should not be drawn from the findings. Cross-sectional lifetime smoking cessation comparisons (i.e., the quit ratio) should be interpreted with caution. A primary limitation is that historical (but not current) group differences can influence the findings. To illustrate these limitations, Smith et al. (2014) used 2001–2002 and 2004–2005 NESARC data to study smoking cessation both cross-sectionally and longitudinally in association with mental disorders. There was little consistency between the cross-sectional and real-time longitudinal smoking cessation findings.

The mental disorders included in our investigation were limited to those more commonly present in the general U.S. population, and therefore it is important to qualify the interpretation of results based on the understanding that those in our reference group may have had less common mental disorders. Such disorders (e.g., schizophrenia, schizoaffective disorder, and sub-categories of bipolar disorder) were not included due to their low population prevalence. Smoking prevalence is likely to be particularly high, and cessation rates particularly low, among those with such disorders; for example, a review of 42 samples from 20 countries estimated a smoking prevalence of 62%.[48] Measurement error also leaves open the possibility of misclassification bias, whereby some of those classified with a disorder may not actually have a disorder, and some of those who actually have a disorder may have not been classified as such. Misclassification in either direction would have an effect of biasing the size of relative differences towards the null; therefore, our estimates of relative differences may be conservative. Given the number of hypothesis tests included in the analyses, it is possible that type I error occurred. This is unlikely to be a major concern, given the consistency of significant associations among mental disorders and smoking outcomes, as well as the sound expectation of such findings. For this reason, we elected not to adjust our hypothesis testing for multiple tests. Estimates were generated using data collected in 2012–2013 and therefore are not current. The AUDADIS measure has demonstrated reliability for substance use disorders; however, reliability for mood, anxiety, and trauma disorders was estimated to be fair to good.[49]

## Conclusions

As of 2012–2013, cigarette smoking remained highly prevalent among those with common mental disorders, suggesting smoking in this population will remain a relevant public health

and tobacco control issue for the foreseeable future. Novel and innovative approaches to preventing smoking and aiding smoking cessation hold promise; however, evidence suggests there is much work to be done in the implementation of already existing evidence-based interventions and tobacco control policies.

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## WHAT THIS PAPER ADDS

- Those with mental disorders are more likely to smoke cigarettes than those without, across disorders.
- The most recently published estimates of the prevalence of smoking across a broad range of mental disorders used data from 2001–2002.
- This paper suggests that the burden of past year prevalence of daily smoking ranges from 20.2% (any eating disorder) to 48.4% (drug use disorder), relative to 13.4% among those without mental disorders, as recently as 2012–2013.

**Table 1.**

Prevalence of mental disorders among the general U.S. adult population and among past year cigarette smokers

| Past year disorder (DSM-5) | Prevalence of disorder, general population (%) | Prevalence of disorder, past year cigarettes smokers (%) |
|---|---|---|
| Any listed disorder | 32.8 | 50.9 |
| Major depressive episode | 11.5 | 18.4 |
| Dysthymia | 3.7 | 6.6 |
| Bipolar disorder | 1.5 | 3.7 |
| Specific phobia | 5.7 | 7.5 |
| Social phobia | 2.9 | 4.6 |
| Panic disorder | 3.1 | 6.0 |
| Agoraphobia | 1.5 | 3.0 |
| Generalized anxiety disorder | 5.3 | 8.4 |
| Posttraumatic stress disorder | 4.7 | 8.3 |
| Any eating disorder | 1.1 | 1.3 |
| Alcohol use disorder | 13.9 | 26.7 |
| Drug use disorder | 3.9 | 10.4 |
| Dual disorder[b] | 7.9 | 21.5 |

[a] Past year smoking defined as having smoked at least 100 cigarettes in lifetime and having smoked at all during the past year.

[b] Dual disorder was defined as a substance use disorder in combination with at least one non-substance mood or anxiety disorder.

**Table 2.**

Prevalence of lifetime and past year smoking by psychiatric diagnoses

| | Lifetime smoking[a] | | | Past year smoking[a] | | |
|---|---|---|---|---|---|---|
| **Past year diagnosis (DSM-5)** | **Unadjusted prevalence** | **Adjusted prevalence[b]** | **AOR (95% CI)[b]** | **Unadjusted prevalence** | **Adjusted prevalence[b]** | **AOR (95% CI)[b]** |
| None[c] | 36.4 | 36.2 | Ref. | 17.2 | 18.3 | Ref. |
| Any | 53.6 | 54.1 | 2.25 (2.13, 2.38) | 36.5 | 33.3 | 2.42 (2.27, 2.59) |
| Major depressive episode | 53.4 | 54.0 | 2.26 (2.08, 2.46) | 37.6 | 33.8 | 2.48 (2.28, 2.71) |
| Dysthymia | 58.4 | 55.8 | 2.48 (2.14, 2.87) | 42.1 | 33.2 | 2.81 (2.44, 3.23) |
| Bipolar disorder | 68.7 | 67.5 | 4.34 (3.45, 5.47) | 55.7 | 46.9 | 4.63 (3.70, 5.79) |
| Specific phobia | 50.4 | 51.0 | 1.99 (1.73, 2.29) | 31.1 | 29.9 | 2.04 (1.79, 2.32) |
| Social phobia | 56.5 | 54.0 | 2.27 (1.92, 2.70) | 38.0 | 32.0 | 2.28 (1.97, 2.65) |
| Panic disorder | 60.9 | 61.4 | 3.20 (2.71, 3.79) | 45.8 | 40.0 | 3.32 (283, 3.88) |
| Agoraphobia | 62.8 | 62.0 | 3.31 (2.60, 4.21) | 45.8 | 39.4 | 3.27 (2.58, 4.13) |
| Generalized anxiety disorder | 56.3 | 55.0 | 2.37 (2.10, 2.67) | 37.1 | 34.5 | 2.58 (2.33, 2.87) |
| Posttraumatic stress disorder | 58.6 | 58.5 | 2.80 (2.51, 3.12) | 41.9 | 36.5 | 2.84 (2.48, 3.25) |
| Any eating disorder | 43.9 | 49.4 | 1.85 (1.41, 2.44) | 27.8 | 28.8 | 1.92 (1.43, 2.57) |
| Alcohol use disorder | 57.5 | 60.3 | 3.01 (2.77, 3.28) | 45.4 | 40.7 | 3.45 (3.16, 3.76) |
| Drug use disorder | 72.4 | 72.5 | 5.64 (4.80, 6.63) | 63.0 | 53.2 | 6.14 (5.27, 7.14) |

Note: AOR = adjusted odds ratio.

*a.* Lifetime smoking defined as having smoked at least 100 cigarettes in lifetime. Past year smoking defined as having smoked at least 100 cigarettes in lifetime and having smoked at all during the past year.

*b.* Adjusted prevalence and AOR were estimated using logistic regression, adjusting for age, gender, race/ethnicity, education, and household income.

*c.* Those without any listed past year diagnosis were the reference group for all odds ratio comparisons.

**Table 3:**

Prevalence of lifetime and past year daily smoking by psychiatric diagnoses

| | Lifetime daily smoking[a] | | | Past year daily smoking[a] | | |
|---|---|---|---|---|---|---|
| **Past year diagnosis (DSM-5)** | **Unadjusted prevalence** | **Adjusted prevalence[b]** | **AOR (95% CI)[b]** | **Unadjusted prevalence** | **Adjusted prevalence[b]** | **AOR (95% CI)[b]** |
| None[c] | 32.1 | 32.0 | Ref. | 13.4 | 14.3 | Ref. |
| Any | 48.4 | 48.6 | 2.18 (2.06, 2.32) | 27.7 | 25.0 | 2.14 (1.98, 2.31) |
| Major depressive episode | 49.2 | 49.3 | 2.27 (2.09, 2.47) | 29.4 | 25.6 | 2.22 (2.01, 2.46) |
| Dysthymia | 54.6 | 51.4 | 2.52 (2.17, 2.92) | 35.2 | 28.8 | 2.68 (2.30, 3.12) |
| Bipolar disorder | 65.8 | 64.2 | 4.59 (3.68, 5.72) | 47.3 | 38.3 | 4.37 (3.44, 5.55) |
| Specific phobia | 46.5 | 46.7 | 2.02 (1.76, 2.34) | 24.4 | 22.8 | 1.88 (1.65, 2.14) |
| Social phobia | 53.0 | 49.9 | 2.35 (1.99, 2.78) | 31.4 | 25.3 | 2.18 (1.85, 2.57) |
| Panic disorder | 57.3 | 57.3 | 3.29 (2.83, 3.82) | 39.8 | 33.2 | 3.39 (2.87, 4.00) |
| Agoraphobia | 57.9 | 56.5 | 3.18 (2.50, 4.06) | 38.4 | 31.6 | 3.11 (2.46, 3.92) |
| Generalized anxiety disorder | 51.8 | 50.1 | 2.36 (2.09, 2.67) | 30.6 | 27.5 | 2.48 (2.18, 2.83) |
| Posttraumatic stress disorder | 54.4 | 53.9 | 2.81 (2.49, 3.18) | 34.6 | 30.0 | 2.70 (2.32, 3.14) |
| Any eating disorder | 40.1 | 45.6 | 1.93 (1.46, 2.56) | 20.2 | 21.1 | 1.68 (1.23, 2.29) |
| Alcohol use disorder | 50.7 | 53.4 | 2.73 (2.51, 2.98) | 32.2 | 29.0 | 2.70 (2.45, 2.99) |
| Drug use disorder | 65.9 | 65.6 | 4.90 (4.15, 5.78) | 48.4 | 38.7 | 4.45 (3.83, 5.17) |
| Dual disorder | | | | | | |

Note: AOR = adjusted odds ratio.

[a] Lifetime daily smoking defined as having smoked 100+ cigarettes in lifetime and having ever smoked daily. Past year daily smoking defined as having smoked 100+ cigarettes during lifetime and having smoked daily in past year.

[b] Adjusted prevalence and AOR were estimated using logistic regression, adjusting for age, gender, race/ethnicity, education, and household income.

[c] Those without any listed past year diagnosis were the reference group for all odds ratio comparisons.

**Table 4:**

Prevalence of lifetime smoking cessation among ever smokers (i.e., quit ratio) by psychiatric diagnoses

| Past year diagnosis (DSM-5) | Unadjusted prevalence[a] | Adjusted prevalence[b] | AOR (95% CI)[b] |
|---|---|---|---|
| None[c] | 52.8 | 47.1 | Ref. |
| Any | 31.8 | 39.4 | 0.65 (0.59, 0.72) |
| Major depressive episode | 29.6 | 36.8 | 0.63 (0.54, 0.72) |
| Dysthymia | 27.9 | 33.5 | 0.53 (0.45, 0.63) |
| Bipolar disorder | 19.0 | 29.2 | 0.41 (0.29, 0.58) |
| Specific phobia | 38.3 | 39.7 | 0.76 (0.62, 0.92) |
| Social phobia | 32.7 | 39.7 | 0.76 (0.62, 0.93) |
| Panic disorder | 24.8 | 33.5 | 0.53 (0.40, 0.70) |
| Agoraphobia | 27.1 | 36.3 | 0.63 (0.45, 0.87) |
| Generalized anxiety disorder | 34.1 | 36.5 | 0.64 (0.53, 0.76) |
| Posttraumatic stress disorder | 28.4 | 36.7 | 0.64 (0.51, 0.80) |
| Any eating disorder | 36.6 | 43.8 | 0.96 (0.63, 1.45) |
| Alcohol use disorder | 21.1 | 32.9 | 0.47 (0.41, 0.54) |
| Drug use disorder | 13.0 | 26.8 | 0.35 (0.28, 0.43) |

Note: AOR = adjusted odds ratio.

*a.* Lifetime smoking cessation defined as the number of former smokers (100+ cigarettes in lifetime but not past year smoker) divided by number of lifetime smokers (100+ cigarettes in lifetime).

*b.* Adjusted prevalence and AOR were estimated using logistic regression, adjusting for age, gender, race/ethnicity, education, and income.

*c.* Those without any listed past year diagnosis were the reference group for all odds ratio comparisons.