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Non-medical use, abuse and dependence on sedatives and tranquilizers among U.S. adults: Psychiatric and socio-demographic correlates

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Abstract

Background—Non-medical use of sedatives and tranquilizers carries risks including development of abuse/dependence. Such use may correlate with psychiatric symptoms.

Methods—Cross-sectional survey, the 2002-2004 National Survey on Drug Use and Health. Respondents 18 years and older (n=92,020). Bivariate and multivariable associations were investigated.

Results—The prevalence of past-year non-medical use of sedatives or tranquilizers was 2.3%. Of those with non-medical use, 9.8% met criteria for abuse/dependence. On multivariable analysis, panic symptoms and elevated serious mental illness scores were associated with past-year non-medical use. Also, the following past-year socio-demographic and substance use covariates were associated with past-year non-medical sedative or tranquilizer use: female sex, white/Hispanic/other ethnicity, criminal arrest, uninsurance, unemployment, alcohol abuse or dependence, cigarette use, illicit drug use, younger age of initiating illicit substance use, and any history of IV drug use. Among those with sedative or tranquilizer use, those with abuse/dependence were more likely to have agoraphobic symptoms. In addition, they were more likely to be older, unmarried, have a low education level and have been arrested.

Conclusions—Non-medical use of sedatives and tranquilizers is common. Furthermore, nearly 10% of those with non-medical use meet criteria for abuse/dependence. Anxiety symptoms associated with non-medical use (panic symptoms) and abuse/dependence (agoraphobia) should alert clinicians to screen for these problems and consider alternate treatment or referral.

Keywords

anxiety; sedatives; misuse; dependence; logistic regression

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1. Introduction

Sedatives and tranquilizers are widely prescribed in the U.S. for a multitude of medical and psychiatric conditions by primary care physicians and psychiatrists alike (Romach et al., 1995). Though the vast majority of these medications are prescribed and used safely, sedatives and tranquilizers have significant addiction potential as well as dangerous side effects related to central nervous system depression, especially when taken in high doses or combined with alcohol (Laux and Puryear, 1984; O'Brien, 2005).

With today's heightened concern over prescription drug abuse, opioids receive most of the attention for reasons that likely include the perception of greater addiction liability, more widespread use and association with more stigmatized illicit drugs (Blakeslee, 2004). However, the misuse, or non-medical use, of sedatives and tranquilizers also has important clinical implications insofar as this behavior may be the precursor to the development of a substance use disorder.

The purpose of this study was to investigate the demographic and clinical characteristics associated with non-medical use of sedatives and tranquilizers in order to better understand potential risk factors for such behavior. Furthermore, among those with any past-year non-medical use, we sought to determine the characteristics associated with the diagnosis of sedative or tranquilizer abuse or dependence. Illuminating these associations may help clinicians be more effective in their use of these medications and more aware of potential risk factors for the development of pathological use patterns.

2. Methods

2.1 Data source and study population

We performed an analysis of the 2002-2004 National Survey on Drug Use and Health (NSDUH), a survey conducted by RTI International, sponsored by the Substance Abuse and Mental Health Services Administration, and formatted for public use by the Inter-University Consortium for Political and Social Research. The NSDUH is an annual survey of the civilian, non-institutionalized population aged 12 years and older designed to collect information on the prevalence of substance use and psychiatric comorbidity (Substance Abuse and Mental Health Services Administration and Office of Applied Studies, 2003). The survey employs a 50-state design with an independent, multistage area probability sample for each of the 50 states. Youths are over-sampled in order to create approximately equal samples sizes in the age groups 12-17, 17-25 and 26 and older. Data for the current analysis includes only those respondents over age 18. Three years of the survey (2002, 2003, and 2004) were combined in our analysis to increase statistical power. The year of survey implementation was included as an independent variable in logistic regression to test for the presence of independent survey-year effects.

2.2 Survey items

NSDUH questions are extensively evaluated for accuracy and reproducibility of results with special focus on non-ambiguity of syntax (Forsyth et al., 1992). The survey has been administered for 20 years and has undergone several rounds of refinement. Questions concerning past and current illicit drug use are tested for precision of answers and non-response is studied for patterns and homogeneity of non-responders.

2.3 Survey Administration

Survey items are administered by two methods: computer-assisted personal interviewing conducted by an interviewer and audio computer-assisted self-interviewing for content areas

requiring strict confidentiality, a method that enhances validity of responses (Substance Abuse and Mental Health Services Administration and Office of Applied Studies, 2003). Respondents received \$30 for a completed interview.

2.4 Study variables

In addition to covariates related to socio-demographics and co-occurring substance use, we included in our analysis independent variables related to anxiety and mood disorders (listed in the next section) since sedatives and tranquilizers have well-described anxiolytic effects (Carter et al., 2006; Helmus et al., 2005; Jackson et al., 2005; Zawertailo et al., 2003).

2.4.1 Mental health—General mental health was measured using a validated scale (Kessler et al., 2003) composed of the following six self-reported symptoms: feeling nervous, feeling hopeless, feeling restless or fidgety, feeling so sad or depressed that nothing could cheer you up, feeling everything was an effort, and feeling no good or worthless. Respondents were asked to rate the severity (0-4) of these symptoms during the one month of the past year when they were at their worst emotionally. As defined in NSDUH, a score exceeding 13 on this 24-point scale qualified as ‘serious mental illness.’ The 2004 survey changed the name of this variable to ‘serious psychological distress’; also, half of the 2004 survey participants were not asked this module and were therefore excluded from our analysis (Research Triangle Institute, 2006).

The NSDUH also gathers data regarding specific mood and anxiety disorders using questions based on the World Health Organization’s Composite Interview Diagnostic Interview-Short Form (CIDI-SF). The CIDI-SF is a structured interview designed to assess DSM-IV criteria for specific disorders (Kessler et al., 2003). In some instances, the NSDUH questions mirror DSM-IV criteria; in others, an abbreviated set of questions are used in order to provide information regarding clinically relevant symptomatology but not formal diagnoses in order to reduce subject burden.

For our analysis, we sought symptom-based variables that would have greater sensitivity with respect to formal psychiatric diagnoses and less specificity. Depression is defined as a report of depressed mood experienced most of the day for at least two weeks. Panic is defined as physical reactions such as sweating, shortness of breath, a racing heart, or dizziness in response to a sudden attack of fear that comes out of the blue. Generalized anxiety is defined as worrying a lot more than most people about everyday problems or being a lot more nervous or anxious than most people for half of the past year or more. Post-traumatic stress is defined as upsetting memories, feeling emotionally distant, having trouble sleeping or concentrating, or feeling jumpy or easily startled in reaction to an extremely stressful experience for more than four weeks of the past year. Agoraphobia is defined as being more nervous than most people about crowds, public places, traveling, or being away from home such that the fear or avoidance of the situation(s) affects the respondent’s life. Social phobia is defined as being more nervous than most people about social situations such that fear or avoidance of them affects the respondent’s life. Mania is defined as four days in a row of being so excited or hyper that the respondent got into trouble, people worried about the respondent or a doctor said the respondent was manic.

2.4.2 Mental Health Service Utilization—Respondents were asked if they had seen a clinician for emotions, nerves or mental health issues as well as if they had taken medications prescribed for them for mental health problems in the past year.

2.4.3 Substance use and substance use disorders—Data on frequency and type of substance use both lifetime and current were obtained via self-report. Past-year non-medical

use of sedatives and tranquilizers was assessed by the following question: “How long has it been since you last used [a sedative or tranquilizer] that was not prescribed for you or that you took only for the experience or feeling it caused?” Respondents were asked to indicate whether this use occurred within the past 30 days, more than 30 days ago but within the past 12 months, or more than 12 months ago. Respondents were considered to have no past-year non-medical use of sedatives or tranquilizers if their prior use occurred greater than 12 months preceding the interview.

Classification of alcohol, tranquilizer, or sedative *abuse* was based on a positive response to one of four questions derived from the Diagnostic and Statistical Manual (DSM)-IV criteria that are designed to make the distinction between substance use and substance use disorders, i.e. abuse and dependence (American Psychiatric Association, 1994). Classification of tranquilizer *dependence* was based on a positive response to three out of six questions matching dependence criteria from the DSM-IV. Classification of alcohol or sedative *dependence* was based on a positive response to three out of seven questions matching criteria from the DSM-IV.

Age of first illicit use was considered to be the lowest age of non-medical use of any of the following substances: marijuana, cocaine, crack, heroin, inhalants, hallucinogens, stimulants, and analgesics.

Report of use of specific sedative or tranquilizer medications was confined to lifetime use. In order to generate prevalence rates for individual medications, we combined generic and trade name medications. In some instances, survey questions ask about two medications together (e.g. alprazolam and lorazepam); therefore, we were not able to separate these in our analysis.

For our analysis, past-year illicit drug use was divided into stimulant-effect illicit drug use (cocaine, crack or non-medical prescription stimulant use), and all other illicit drug use (marijuana, heroin, inhalant, hallucinogen or non-medical prescription analgesic use). This division was made to account for the clinical observation that some non-medical use of sedatives and tranquilizers is aimed at blunting the pharmacologic effects of stimulant-effect drugs (O’Brien, 2005).

2.4.4 Categorization of Substances—As defined by the NSDUH, the sedative category included barbiturates, temazepam, chloral hydrate, Dalmane, Halcion, Placidyl and the tranquilizer category included benzodiazepines (except temazepam, Halcion, Dalmane), Atarax, Equanil, Flexeril, Limbitrol, meprobamate, Miltown, and Soma. Due to a high degree of correlation, their similar effects as central nervous system depressants, and the clinical observation that providers prescribe both classes for common conditions such as insomnia, sedatives and tranquilizers were combined in our analysis.

The category of the stimulants included amphetamines, methamphetamines, methylphenidate, Cylert, Ionamin, Mazanor, Plegine, Preludin, Sanorex, Tenuate; prescription analgesics included Darvon, Darvocet, Tylenol with codeine, Percocet, Percodan, Tylox, Vicodin, Lortab, Lorcet, codeine, Demerol, Dilaudid, Fioricet, Fiorinal, hydrocodone, methadone, morphine, OxyContin, propoxyphene, SK65, Stadol, Talacen, Talwin, TalwinNX and tramadol/Ultram.

Injection drug use was categorized as lifetime use, yes or no.

2.4.5 General Health—Overall health was based on the question, “Would you say your health in general is excellent, very good, good, fair or poor?” We dichotomized this variable into Excellent/Very Good/Good vs. Fair/Poor.

2.4.6 Socio-demographics—Age, gender, ethnicity, marital status, income, education, population density of residence, employment status, work absenteeism, insurance status, Medicaid coverage and arrest/booking for crime in the past year were included as covariates.

2.5 Statistical analysis

We restricted the sample to respondents 18 years of age and older since most of the mental health questions were asked only of adults. Data analysis proceeded in several steps. First, we evaluated bivariate associations between each independent variable of interest and past-year non-medical use of sedatives or tranquilizers using chi-square tests. Next, a correlation matrix was performed to ensure the absence of over-correlation between any two of the independent variables. Next, all independent variables were introduced into a logistic regression model; categorical variables were transformed into sets of binary dummy variables with reference categories assigned to those with the lowest prevalence of the dependent variable.

Next, in order to better examine variation in current non-medical use, the sample was restricted to those respondents who reported any past-year non-medical use of sedatives or tranquilizers. Another logistic regression model was created with the same independent variables as in the first model but with sedative or tranquilizer abuse or dependence as the dependent variable.

SAS version 9.1 (SAS Institute Inc, Cary, NC) and SUDAAN version 9.0.1 (Research Triangle Institute, Research Triangle Park, NC) were used to conduct all analyses. To account for the sampling methodology and non-response in the NSDUH, we used sample weights that normalized data to the distributions based on the 2000 census and used SUDAAN software for all measures of association in order to accurately estimate standard errors on model parameter estimates.

3. Results

3.1 Description of sample

As designed, the NSDUH’s overall sample is representative of the U.S. population: Fifty-two percent of respondents were female and ages ranged from 18 to 80. The majority of respondents was white, completed high school, reported a total family income above \$40,000, was employed, and had health insurance. Twenty-two percent of respondents were identified as residing in a rural area. 2.3% of the sample reported past-year, non-medical use of sedative or tranquilizers. Fifty-eight percent of the sample had never used an illicit drug whereas 3.2% and 12.7% had used a stimulant-effect or non-stimulant effect drug in the past year, respectively. The prevalence of past-year psychiatric symptoms ranged from 1.4% for manic symptoms to 10.0% for social phobic symptoms. Serious mental illness score > 13 had a 9.0 % past-year prevalence whereas 9.8% of respondents saw a clinician for mental health reasons in the past year.

3.2 Factors associated with past-year non-medical use of sedatives or tranquilizers

The results of the unadjusted, bivariate analysis are shown in Table 1. In the multivariable model (Table 1), two variables related to anxiety and mental health persisted as independent associations with past-year non-medical use of sedatives or tranquilizers after adjusting for other correlates: serious mental illness score > 13 (OR 1.4, 1.1-1.7) and panic (OR 1.3,

1.0-1.6). All of the substance use covariates were significantly and positively associated with sedative or tranquilizer use, with the exception of past-year alcohol use. Significant socio-demographic correlates included female sex (OR 1.5, 1.2-1.7); white/Hispanic/other ethnicity (OR for white ethnicity 3.2, 2.1-4.9), past-year uninsurance (OR 1.2, 1.0-1.4), unemployment (OR 1.6, 1.1-2.3) and past-year arrest/booking for crime (OR 1.3, 1.0-1.7).

3.3 Description of respondents with past-year non-medical use

Demographic and clinical characteristics of the sub-sample of 3,153 respondents with past-year, non-medical use of sedatives or tranquilizers are listed in Table 2.

3.3.1 Use of Specific Drugs—Among respondents with past-year non-medical use of sedatives or tranquilizers, we compiled percentages of respondents with any lifetime non-medical use of specific medications. Any lifetime non-medical use of Valium or diazepam was reported by 66.4% of the 3,153 respondents who reported past-year non-medical use of sedatives or tranquilizers. The other categories and their percentage of any lifetime use were as follows: Xanax, alprazolam, Ativan or lorazepam, 61.5%; Soma, 22.6%; Klonopin or clonazepam, 21.8%; methaqualone, Sopor, Quaalude, 16.3%; Flexeril, 15.3%; barbiturates such as Nembutal, 9.2%; Restoril or temazepam, 5.9%; Buspar, 5.4%; phenobarbital, 5.0%; Librium, 4.4%; tiunal, 4.3%; Halcyon, 4.1%; Placidyl, 3.4%; rohypnol, 2.9%. All other sedatives or tranquilizers not listed above had 2.1% lifetime non-medical use or less.

3.4 Risk factors associated with past-year sedative or tranquilizer abuse or dependence

Of those with a past-year history of use, 9.8% reported past-year sedative or tranquilizer abuse or dependence. The results of the unadjusted, bivariate analysis of correlates of abuse/dependence are shown in Table 2. In the multivariable model (Table 2), agoraphobic symptoms were the only mental health variable significantly associated with abuse/dependence (OR 2.0, 1.1-3.7). The only substance use covariate with significance was a protective effective of moderate alcohol use (OR 0.2, 0.1-0.4). Significant socio-demographic correlates included older age, low education, being unmarried (OR 2.0, 1.1-3.3) and past-year arrest/booking for crime (OR 1.9, 1.0-3.3).

4. Discussion

We have found a prevalence of past-year non-medical use of sedatives and tranquilizers of 2.3% among U.S. adults, approximately 5 million people. These medications can cause significant sedation, psychomotor slowing, anterograde amnesia (Roy-Byrne and Hommer, 1988) and thereby contribute significantly to motor vehicle accidents and falls (O'Hanlon et al., 1995; Ray et al., 1989; Ray et al., 1993), two of the most common causes of morbidity and mortality across the age spectrum (National Center for Health Statistics, 2003). When combined with alcohol, these deleterious effects can be severely magnified; withdrawal from some of these medications after habitual use can induce seizures (Roy-Byrne and Hommer, 1988). In addition, non-medical use of these medications may lead to abuse and dependence; indeed, we show that nearly 10% of those who report past-year non-medical use (approximately 490,000 people) meet criteria for abuse or dependence.

Analogous to the hypothesis that some non-medical use of opioids may be self-medication of pain (Jonasson et al., 1998; Joranson et al., 2000; Kreek and Koob, 1998), some sedative and/or tranquilizer misuse may be better understood as self-medication of clinically unrecognized psychological distress, especially anxiety (Chutuape and de Wit, 1995). If we postulate that such anxiety precedes non-medical use of these medications, our findings showing a correlation between panic and non-medical use as well as a correlation between

agoraphobia and abuse or dependence support this hypothesis. However, longitudinal data would be needed to rigorously test this hypothesis.

Some important socio-demographic associations deserve mention. Our results reveal that women have higher rates of past-year non-medical sedative and tranquilizer use. It is well known that women are more likely to have mood and anxiety disorders (American Psychiatric Association, 1994; Kessler et al., 1994) and are more likely to be prescribed psychotherapeutic medications (Gabe, 1993), so a higher rate of non-medical use may be a function of more frequent exposure. In contrast with our findings concerning non-medical use, we did not find that gender had a significant association with sedative or tranquilizer abuse or dependence. Also, we found that there was a significant association between sedative or tranquilizer abuse and dependence and age group 50-80. Since psychotherapeutic medications are widely prescribed to elderly patients (Aparasu et al., 2003), these data suggest the need for increased vigilance about possible progression from legitimate medical use to use disorder in this population.

Our findings should be cautiously compared to other studies (Conway et al., 2006; Goodwin and Hasin, 2002; Simoni-Wastila et al., 2004) given our exclusion of 12-18 year olds, the larger sample size we have employed and our focus on past-year rather than lifetime prevalence of substance use and psychiatric characteristics. One previous study concerning non-medical use of sedatives and tranquilizers showed that female gender was associated with non-medical tranquilizer but not sedative use (Simoni-Wastila et al., 2004). Our analysis does not differentiate between the two sub-types of medication. In addition, prior research found that white race, poor health, daily alcohol intake and illicit drug use were associated with non-medical use of both therapeutic sub-classes -- results that are similar to ours. It should be noted that this earlier study used the 1991 National Household Survey on Drug Abuse which was conducted greater than a decade earlier and contains a different definition of non-medical use than the 2002-2004 surveys.

A second study (Goodwin and Hasin, 2002) used the 1992 National Comorbidity Survey to assess demographic and clinical correlates of non-prescription use of sedatives and tranquilizers as well as self-perceived dependence on these medications among the general population; dependence was assessed using a single question. As with our study, alcohol dependence was found to correlate with non-medical use of sedatives or tranquilizers. In contrast, Goodwin and Hasin found that major depression, agoraphobia, low income and high education level also correlated with non-medical sedative or tranquilizer use. In their multivariable analysis of dependence, low education level and older age were correlated with sedative or tranquilizer dependence, consistent with our findings.

Conway et al (Conway et al., 2006) used the NESARC to compare lifetime DSM-IV mood and anxiety disorders with specific lifetime substance use disorders. Their finding that panic disorder with agoraphobia was more strongly associated with each specific drug use disorder (including sedative and tranquilizer abuse and dependence) than any other anxiety disorder corroborates our finding that agoraphobia was the only anxiety symptom with independent correlation with sedative or tranquilizer abuse or dependence.

There are limitations to our findings. First, the NSDUH cannot discriminate between those respondents who used someone else's sedative or tranquilizer prescription for a legitimate medical purpose and those who used the medication for euphoric effects. If there were a significant portion of the sample using others' prescriptions in an appropriate fashion, the result would likely be a bias away from an association between non-medical use of sedatives and tranquilizers and other illicit substance use. Given the results of our multivariable analysis, that bias does not appear to be present. Nonetheless, data regarding more detailed

reasons for non-medical use of sedatives or tranquilizers would be very useful in enhancing our understanding of this behavior.

Second, because these are cross-sectional data, causal pathways are impossible to determine, though clinical experience suggests that psychiatric distress, particularly anxiety, would lead to non-medical use of sedatives and not the other way around.

Furthermore, the NSDUH relies on self-report of demographic and clinical information and does not have the ability to corroborate data through other sources such as direct clinical assessment or collateral interviews. The potential stigma associated with self-report of licit and illicit drug use and other illegal behaviors may also lead to under-reporting. The true prevalence of these behaviors may be higher than our results indicate. However, the survey instrument has been revised extensively to optimize its validity; study procedures allow subjects to report particularly sensitive information directly to the computer. Thus, it is likely that the bias is not very large.

In addition, clinical populations may have a higher prevalence of substance use disorders compared to community-based samples. The results from this survey, having been obtained in a community-dwelling population, should be cautiously applied to clinical settings. Finally, epidemiologic risk assessments are meant to augment clinical decision-making but cannot supplant the information derived from individual clinician-patient interactions.

Our findings characterize potential factors associated with both non-medical use of and abuse/dependence on sedatives and tranquilizers in a large adult sample and raise several issues for further investigation. First, the causal associations between emotional distress and use of sedatives or tranquilizers need to be explored further. Emotional distress leading to medical or non-medical use of sedatives or tranquilizers is the most obvious pathway but ongoing use of these medications to avoid withdrawal reactions (Holbrook et al., 2000) (including anxiety) deserves attention as well. Also, non-medical sedative and tranquilizer users' patterns of healthcare utilization, typical medical and psychiatric complaints, and sources of these medications remain obscure. Finally, since so many of these medications are prescribed by non-psychiatrists, the best strategies for these providers to recognize and manage patients with sometimes subtle psychiatric distress need to be elucidated.

We believe our findings highlight the scope and further describe the important problem of non-medical use of sedatives and tranquilizers. Ultimately, we hope these data will assist clinicians in targeted screening and heightened surveillance of at-risk patients who may benefit from other modalities of treatment that address specific areas of psychiatric need.

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Table 1

Description of the sample, unadjusted and adjusted correlates of past year non-medical sedative or tranquilizer use in a community sample of US adults: Data from the 2002-2004 National Survey on Drug Use and Health.

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer use, N (weighted %)	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)*
Total sample	92 020 (100)	3 153 (2.3)		
<i>Sociodemographics, past year</i>				
Men	43 020 (48.1)	1 541 (2.4)	1	1
Women	49 000 (51.9)	1612 (2.3)	0.9 (0.8-1.1)	1.5 (1.2-1.7)
Age (years)				
18-21	23 333 (7.8)	1225 (5.5)	7.1 (5.1-9.9)	0.9 (0.6-1.3)
21-25	21 881 (7.1)	979 (4.7)	6.0 (4.3-8.3)	0.8 (0.6-1.2)
26-34	13 993 (16.5)	424 (3.4)	4.2 (3.0-5.9)	1.0 (0.7-1.5)
35-49	20 443 (30.5)	440 (2.3)	2.9 (2.0-4.0)	0.9 (0.6-1.3)
50-80	12 370 (38.1)	85 (0.8)	1	1
Race/ethnicity				
Non-Hispanic white	63 050 (70.8)	2 640 (2.8)	3.0 (1.9-4.6)	3.2 (2.1-4.9)
Non-Hispanic black	10 784 (11.2)	106 (1.0)	1	1
Hispanic	12 042 (12.2)	256 (1.5)	1.5 (0.9-2.6)	1.8 (1.0-3.1)
Other	6 144 (5.8)	151 (1.4)	1.4 (0.8-2.6)	2.0 (1.1-3.7)
Married	36 408 (56.2)	598 (1.4)	0.4 (0.3-0.4)	1.0 (0.8-1.2)
Not married	55 612 (43.8)	2555 (3.6)	1	1
Employment status				
Employed	66 909 (67.8)	2 268 (2.5)	1.7 (1.4-2.0)	2.2 (0.8-5.6)
Unemployed	5 185 (3.7)	327 (6.0)	4.2 (3.1-5.5)	1.6 (1.1-2.3)
Not in labor force	19 926 (28.5)	558 (1.5)	1	1
Missed at least one day of work last month for illness or absenteeism				
Yes, at least one day for each reason	3 347 (2.4)	246 (6.0)	3.1 (2.4-4.0)	1.3 (1.0-1.8)
Yes, at least one day for one of the reasons	16 318 (14.6)	729 (3.6)	1.8 (1.5-2.3)	1.3 (1.0-1.6)
No	47 540 (51.2)	1303 (2.0)	1	1
Education completed				
8 th grade or less	3 609 (6.1)	77 (1.2)	1	1
9 th 10 th or 11 th grade	13 073 (11.3)	601 (3.0)	2.7 (1.6-4.5)	1.0 (0.5-1.9)
12 th grade	31 208 (32.0)	1 041 (2.3)	2.0 (1.2-3.4)	1.0 (0.5-1.9)
Beyond 12 th grade	44 130 (50.7)	1 434 (2.3)	2.0 (1.2-3.4)	1.1 (0.6-2.0)
Annual Household Income				
20K	23 917 (20.0)	1007 (2.9)	1.4 (1.1-1.8)	0.9 (0.7-1.1)
20.1K – 40K	24 516 (25.3)	857 (2.5)	1.2 (1.0-1.6)	1.0 (0.8-1.4)

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer use, N (weighted %)	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)*
40.1K – 75K	26 397 (30.3)	775 (2.0)	1.0 (0.8-1.3)	0.9 (0.7-1.1)
>75K	17 190 (24.4)	514 (2.0)	1	1
Population density				
MSA > 1million	32 516 (44.7)	1032 (2.3)	1.1 (0.9-1.4)	1.2 (1.0-1.5)
MSA < 1 million	34 896 (33.3)	1346 (2.6)	1.3 (1.1-1.5)	1.1 (0.9-1.4)
Not an MSA	24 608 (22.0)	775 (2.0)	1	1
Uninsured	25 200 (19.4)	1335 (4.5)	2.6 (2.3-3.0)	1.2 (1.0-1.4)
Not uninsured	66 229 (80.6)	1795 (1.8)	1	1
Medicaid insured	9 147 (7.8)	341 (3.0)	1.3 (1.0-1.7)	1.0 (0.7-1.3)
no	82 426 (92.2)	2 799 (2.3)	1	1
Arrested and booked for crime	4 305 (2.7)	485 (11.5)	6.1 (4.8-7.8)	1.3 (1.0-1.7)
no	86 645 (97.3)	2 618 (2.1)	1	1
<i>Mental Health, past year</i>				
Serious mental illness score > 13	10 655 (9.0)	928 (7.3)	4.2 (3.5-4.9)	1.4 (1.1-1.7)
no	81 365 (91.0)	2 225 (1.9)	1	1
Panic	11 014 (9.9)	948 (6.3)	3.5 (2.9-4.1)	1.3 (1.0-1.6)
no	80 761 (90.2)	2 197 (1.9)	1	1
Major depressive episode	6 459 (5.3)	574 (7.7)	4.0 (3.4-4.9)	1.2 (0.9-1.6)
no	85 333 (94.8)	2 570 (2.0)	1	1
Mania	2 430 (1.8)	287 (9.8)	4.8 (3.6-6.4)	1.1 (0.8-1.6)
no	89 396 (98.2)	2 858 (2.2)	1	1
Social phobic symptoms	10 636 (10.0)	609 (4.6)	2.3 (1.9-2.8)	1.2 (0.9-1.6)
no	80 895 (90.0)	2 530 (2.1)	1	1
Agoraphobic symptoms	6 795 (6.7)	420 (4.5)	2.1 (1.7-2.6)	0.9 (0.6-1.3)
no	84 691 (93.3)	2 718 (2.2)	1	1
Generalized anxiety	2 100 (1.9)	197 (8.2)	3.9 (3.0-5.2)	1.1 (0.8-1.5)
no	89 096 (98.1)	2 928 (2.2)	1	1
Post-traumatic stress	3 439 (3.1)	276 (7.2)	3.5 (2.7-4.4)	1.1 (0.8-1.5)
no	88 172 (96.9)	2 866 (2.2)	1	1
Seen clinician, mental health issues	9 109 (9.8)	683 (5.6)	2.9 (2.5-3.5)	1.2 (0.8-1.7)
no	82 696 (90.2)	2 459 (2.0)	1	1
Prescribed medications, mental health reason	6 720 (7.6)	558 (6.0)	3.1 (2.5-3.7)	1.1 (0.7-1.7)
no	85 065 (92.4)	2 584 (2.0)	1	1
<i>General Health and Substance Use, past year</i>				
Excellent/Very Good/Good health	84 339 (87.5)	2860 (2.3)	1.0 (1.0-1.0)	1.0 (0.8-1.3)
Fair/Poor health	7 665 (12.5)	293 (2.3)	1	1
No alcohol use	23 187 (31.1)	172 (0.7)	1	1
Alcohol use	57 252 (61.1)	1670 (2.2)	3.4 (2.5-4.5)	1.2 (0.9-1.7)

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer use, N (weighted %)	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)*
Alcohol abuse/dependence	11 571 (7.8)	1311 (9.9)	16.2 (12.3-21.5)	1.6 (1.1-2.2)
Smoked cigarettes	37 168 (30.8)	2400 (5.2)	5.0 (4.3-5.8)	1.3 (1.0-1.5)
no	54 852 (69.2)	753 (1.1)	1	1
Used a stimulant-effect drug	5 206 (3.2)	1413 (25.9)	22.3 (19.2-25.8)	3.3 (2.8-3.9)
no	86 814 (96.8)	1740 (1.6)	1	1
Used a non-stimulant effect drug	20 464 (12.7)	2 674 (13.9)	24.8 (20.9-29.4)	7.9 (6.2-10.1)
no	71 556 (87.3)	479 (0.7)	1	1
Age of first illicit drug use				
Never used	41 173 (53.8)	139 (0.3)	1	1
12 or less	4 505 (3.5)	534 (10.3)	35.4 (25.4-49.3)	3.1 (2.1-4.8)
13-15	15 052 (10.9)	1325 (7.5)	25.1 (18.4-34.1)	3.3 (2.3-4.8)
16-18	20 266 (16.9)	880 (3.6)	11.6 (8.6-15.6)	2.4 (1.7-3.4)
19-25	9 179 (11.0)	235 (2.5)	8.0 (5.4-12.1)	2.5 (1.6-4.0)
26	1 740 (4.0)	39 (2.5)	7.8 (4.6-13.1)	2.7 (1.6-4.7)
injected drugs, lifetime	1 590 (1.8)	307 (15.5)	8.5 (6.7-10.8)	1.6 (1.2-2.1)
no	90 430 (98.2)	2 846 (2.1)	1	1

* bold indicates statistical significance

Table 2

Description of the sub-sample, unadjusted and adjusted correlates of past year nonmedical sedative or tranquilizer abuse and dependence in a community sample of US adults with reported past-year use

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer abuse or dependence (n, %)	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)*
Total sample	3 153(100)	302 (9.8)		
<i>Sociodemographics, past year</i>				
Men	1541 (49.5)	146 (10.1)	1	1
Women	1612 (50.5)	156 (9.5)	0.9 (0.6 – 1.5)	1.0 (0.7-1.4)
Age (years)				
18-21	1225 (18.4)	130 (10.9)	0.7 (0.3-1.6)	0.3 (0.1-0.7)
21-25	979 (14.3)	89 (10.4)	0.7 (0.3-1.6)	0.4 (0.2-0.9)
26-34	424 (23.7)	26 (8.3)	0.5 (0.2-1.5)	0.2 (0.1-0.5)
35-49	440 (30.3)	45 (7.9)	0.5 (0.2-1.1)	0.3 (0.1-0.5)
50-80	85 (13.4)	12 (14.9)	1	1
Race/ethnicity				
Non-Hispanic white	2640 (84.4)	240 (8.7)	1.1 (0.4-2.6)	1.1 (0.5-2.6)
Non-Hispanic black	106 (4.6)	13 (8.1)	1	1
Hispanic	256 (7.7)	30 (17.0)	2.3 (0.6-8.5)	1.5 (0.5-4.5)
Other	151 (3.4)	19 (24.1)	3.6 (0.9-15.2)	3.0 (1.0-8.8)
Married	598 (32.9)	45 (6.7)	0.4 (0.3-0.4)	0.5 (0.3-0.9)
Not married	2555 (67.2)	257 (11.4)	1	1
Employment status				
Employed	2268 (72.1)	190 (7.5)	0.5 (0.3-0.8)	3.8 (0.4-32.7)
Unemployed	327 (9.6)	36 (18.6)	1.4 (0.6-3.4)	1.1 (0.5-2.5)
Not in labor force	558 (18.4)	76 (14.4)	1	1
Missed at least one day of work last month for illness or absenteeism				
Yes, at least one day for each reason	246 (6.1)	23 (11.0)	1.8 (0.7-4.6)	1.4 (0.6-3.1)
Yes, at least one day for one of the reasons	729 (22.6)	67 (8.8)	1.4 (0.8-2.7)	1.3 (0.7-2.3)
No	1303 (43.7)	101 (6.4)	1	1
Education completed				
8 th grade or less	77 (3.0)	19 (37.5)	1	1
9 th 10 th or 11 th grade	601 (14.7)	64 (9.3)	0.2 (0.1-0.6)	0.2 (0.1-0.6)
12 th grade	1041 (31.7)	104 (12.2)	0.2 (0.1-0.8)	0.3 (0.1-0.9)
Beyond 12 th grade	1434 (50.7)	115 (6.8)	0.1 (0.0-0.4)	0.2 (0.1-0.7)
Annual Household Income				
20K	1007 (24.8)	117 (14.1)	3.1 (1.6-5.9)	1.3 (0.7-2.4)
20.1K – 40K	857 (27.4)	77 (11.5)	2.5 (1.3-4.8)	1.6 (0.8-3.1)

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer abuse or dependence (n, %)	Unadjusted odds ratio (95% CI)*	Adjusted odds ratio (95% CI)*
40.1K – 75K	775 (26.5)	64 (8.0)	1.6 (0.9-3.0)	1.2 (0.6-2.2)
>75K	514 (21.3)	44 (5.0)	1	1
Population density				
MSA > 1million	1032 (43.9)	98 (9.7)	0.7 (0.4-1.2)	0.8 (0.5-1.4)
MSA < 1 million	1346 (37.0)	130 (7.8)	0.5 (0.3-0.9)	0.7 (0.4-1.3)
Not an MSA	775 (19.1)	74 (14.0)	1	1
Uninsured				
Not insured	1795 (62.2)	173 (9.9)	1	1
Medicaid insured				
no	2799 (89.9)	243 (8.7)	1	1
Arrested and booked for crime	485 (13.2)	66 (19.5)	2.7 (1.4-5.2)	1.9 (1.0-3.3)
no	2 618 (86.8)	223 (8.2)	1	1
<i>Mental Health, past year</i>				
Serious mental illness score > 13	928 (28.0)	149 (17.3)	2.8 (1.8-4.4)	1.2 (0.7-2.1)
no	2 225 (72.0)	153 (6.9)	1	1
Panic				
no	2 197 (73.6)	152 (8.1)	1	1
Major depressive episode				
no	2 570 (82.6)	202 (7.5)	1	1
Mania				
no	2858 (92.3)	230 (8.9)	1	1
Social phobic symptoms				
no	2530 (80.3)	207 (7.7)	1	1
Agoraphobic symptoms				
no	2 718 (87.2)	218 (7.7)	1	1
Generalized anxiety				
no	2 928 (93.3)	273 (9.4)	1	1
Post-traumatic stress				
no	2 866 (90.5)	252 (9.4)	1	1
Seen clinician, mental health issue				
No	2 459 (76.6)	182 (7.8)	1	1
Prescribed medication, mental health reason				
no	2584 (80.5)	202 (8.1)	1	1
<i>General Health and Substance Use, past year</i>				
Excellent/Very Good/Good health	2860 (12.3)	52 (20.6)	1.9 (1.6-2.4)	0.9 (0.6-1.6)
Fair/Poor health	293 (87.7)	250 (8.3)	1	1
No alcohol				
	172 (8.9)	32 (24.3)	1	1

Characteristic	Total unweighted N (weighted %)	+ past-year non-medical sedative or tranquilizer abuse or dependence (n, %)	Unadjusted odds ratio (95% CI) *	Adjusted odds ratio (95% CI) *
Alcohol use	1670 (58.0)	82 (4.1)	0.1 (0.1-0.3)	0.2 (0.1-0.4)
Alcohol abuse/dependence	1311 (33.1)	188 (15.9)	0.6 (0.3-1.3)	0.6 (0.3-1.4)
Smoked cigarettes	2400 (68.1)	236 (9.9)	1.0 (0.6-1.8)	1.3 (0.8-2.1)
no	753 (31.9)	66 (9.7)	1	1
Used stimulant-effect drug	1413 (35.9)	148 (10.4)	1.1 (0.7-1.7)	0.7 (0.4-1.3)
no	1740 (64.1)	154 (9.5)	1	1
Used non-stimulant effect drug	2674 (75.8)	266 (9.3)	0.8 (0.4-1.6)	0.8 (0.5-1.5)
no	479 (24.2)	36 (11.4)	1	1
Age of first illicit drug use				
Never used	139 (7.4)	13 (11.9)	1	1
12 or less	534 (15.3)	83 (12.5)	1.1 (0.3-3.6)	1.8 (0.6-5.3)
13-15	1325 (35.0)	128 (9.8)	0.8 (0.3-2.7)	1.4 (0.5-3.8)
16-18	880 (26.3)	58 (8.0)	0.7 (0.2-1.9)	1.2 (0.5-3.1)
19-25	235 (11.9)	17 (12.3)	1.1 (0.2-4.6)	1.0 (0.3-3.1)
26	39 (4.2)	3 (2.0)	0.2 (0.0-0.9)	0.3 (0.1-1.8)
injected drugs, lifetime	307 (11.7)	53 (17.4)	2.2 (1.3-3.7)	1.2 (0.7-2.3)
no	2846 (88.3)	249 (8.8)	1	1

* bold indicates statistical significance