

Prevalence and Correlates of DSM-5 Cannabis Use Disorder, 2012–2013: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions–III

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Objective: Attitudes toward marijuana are changing, the prevalence of DSM-IV cannabis use disorder has increased, and DSM-5 modified the cannabis use disorder criteria. Therefore, updated information is needed on the prevalence, demographic characteristics, psychiatric comorbidity, disability, and treatment for DSM-5 cannabis use disorder.

Method: In 2012–2013, 36,309 participants ≥ 18 years old were interviewed in the National Epidemiologic Survey on Alcohol and Related Conditions–III. Psychiatric and substance use disorders were assessed with the Alcohol Use Disorders and Associated Disabilities Interview Schedule–5.

Results: The prevalences of 12-month and lifetime cannabis use disorder were 2.5% and 6.3%. Among those with 12-month and lifetime diagnoses, the mean days of marijuana use per year were 225.3 (SE=5.7) and 274.2 (SE=3.8). The odds of 12-month and lifetime cannabis use disorder were higher for men, Native Americans, unmarried individuals,

those with low incomes, and young adults (e.g., among those age 18–24 years versus ≥ 45 : odds ratio for 12-month disorder, 7.2; 95% confidence interval, 5.5–9.5). Cannabis use disorder was associated with other substance use disorders, affective disorders, anxiety, and personality disorders. Twelve-month cannabis use disorder was associated with disability. As disorder severity increased, virtually all associations became stronger. Only 13.2% with lifetime cannabis use disorder participated in 12-step programs or professional treatment.

Conclusions: DSM-5 cannabis use disorder is prevalent, associated with comorbidity and disability, and largely untreated. Findings suggest the need to improve prevention and educate the public, professionals, and policy makers about possible harms associated with cannabis use disorders and available interventions.

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Cannabis use and DSM-IV cannabis use disorders are associated with adverse consequences (1, 2), including cognitive decline (3–5), impaired educational or occupational attainment (6–8), impaired driving ability (9–13), emergency room visits (14), psychiatric symptoms (15–17), poor quality of life (18), other drug use (19), and risk of addiction or substance use disorders (1). Despite this, Americans increasingly view marijuana use as harmless (1, 20–22) and support its legalization (23). Reflecting these changing views, 23 states now have laws permitting marijuana use for medical purposes (of which four also legalized marijuana for recreational use). Marijuana use is more prevalent in these 23 states than in others (24–26). Consistent with these changes, marked increases have occurred in the U.S. prevalence of DSM-IV cannabis use disorder among

veterans (27) and adults in the general population (28, 29). Cannabis-related emergency room visits and fatal car crashes have also increased (11, 14).

Earlier studies conducted when cannabis use was less prevalent (and therefore more deviant) showed a high degree of comorbidity between cannabis use disorders and other common mental disorders (17, 30–33). However, the increased prevalence of adult cannabis use disorders may now include more individuals without vulnerability to other psychiatric disorders. If so, comorbidity patterns may have changed; thus, the increased prevalence of cannabis use disorder creates a need for updated information on its comorbidity.

Additionally, all knowledge regarding the U.S. prevalence of cannabis use disorders and their demographic and clinical correlates is based on DSM-IV definitions (17, 29, 30). In

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DSM-5, the diagnostic criteria for cannabis use disorder were revised (34) to combine dependence and abuse criteria into a single disorder (35), drop the legal problems criterion, and add craving, withdrawal, and a severity metric (mild, moderate, severe) (35). Therefore, new information on DSM-5 cannabis use disorder is needed.

To our knowledge, this report provides the first nationally representative information on DSM-5 cannabis use disorder using data from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions–III (NESARC-III). This includes current and lifetime prevalences, age at onset, frequency of cannabis use among people with the diagnosis, demographic correlates, psychiatric comorbidity, disability, and likelihood of participation in interventions including professional treatment and 12-step programs.

METHOD

Sample

The NESARC-III target population was the noninstitutionalized civilian population age ≥ 18 years in households and selected group quarters (36, 37). Respondents were selected through multistage probability sampling, including primary sampling units (counties/groups of contiguous counties), secondary sampling units (groups of census-defined blocks), and tertiary sampling units (households within secondary sampling units from which respondents were selected, with blacks, Asians, and Hispanics oversampled). Data were collected from April 2012 to June 2013 and were analyzed in May and June 2015. Data were adjusted for nonresponse and weighted to represent the U.S. population based on the 2012 American Community Survey (38). These weighting adjustments compensated adequately for nonresponse (37). The total sample size was 36,309; the household response rate was 72%, the person-level response rate was 84%, and the overall response rate was 60.1%, comparable to the rates in other current U.S. national surveys (39, 40). NESARC-III sample characteristics are presented elsewhere (37). Informed consent was electronically recorded; respondents received \$90.00 for participation. Institutional review boards at the National Institutes of Health and Westat (NESARC-III contractor) approved the study protocol.

Assessments

The NIAAA Alcohol Use Disorder and Associated Disabilities Interview Schedule–5 (AUDADIS-5) (41) was the diagnostic interview. AUDADIS-5 measures drug and alcohol use (e.g., onset, frequency), DSM-5 drug, alcohol, and nicotine use disorders, and selected psychiatric disorders in the last 12 months and prior to the last 12 months. The DSM-5 cannabis use disorder diagnosis requires at least two of 11 criteria within a 12-month period. Twelve-month and prior diagnoses were aggregated to form lifetime diagnoses. Consistent with DSM-5, cases of cannabis use disorder were classified as mild (2 or 3 criteria), moderate (4 or 5 criteria), or severe (≥ 6 criteria).

The test-retest reliability of 12-month and lifetime cannabis use was substantial ($\kappa=0.78, 0.77$, respectively) in a general population sample (42). The test-retest reliabilities of DSM-5 cannabis use disorder ($\kappa=0.41, 0.41$) and its dimensional criteria scales (intraclass correlation coefficients [ICC]=0.70, 0.71) were fair to substantial in a general population sample ($N=1,006$) (43). Procedural validity was assessed through blind clinician reappraisal using the semi-structured, clinician-administered Psychiatric Research Interview for Substance and Mental Disorders, DSM-5 version (PRISM-5) (44) in a separate general population sample ($N=712$). Concordance between AUDADIS-5 and PRISM-5 was moderate for cannabis use disorder ($\kappa=0.60, 0.51$) and substantial for its dimensional criteria scale (ICC=0.79, 0.78) (45).

Other Psychiatric Disorders

DSM-5 alcohol, nicotine, and drug disorder diagnoses were derived in a manner similar to that for cannabis disorder diagnoses. Test-retest reliabilities were moderate to substantial for these disorders ($\kappa=0.40\text{--}0.87$) and their criteria scales (ICC=0.45–0.84) (43). Concordance between AUDADIS-5 and PRISM-5 for alcohol, nicotine, and drug disorders and corresponding criteria scales was fair to substantial ($\kappa=0.36\text{--}0.66$; ICC=0.68–0.91) (45).

DSM-5 mood disorders included primary major depression, dysthymia, and bipolar I and bipolar II disorders. Anxiety disorders included panic, agoraphobia, social and specific phobias, and generalized anxiety. Consistent with DSM-5, primary mood and anxiety diagnoses excluded substance-induced and medically induced disorders. Posttraumatic stress disorder (PTSD) and schizotypal, borderline, and antisocial personality disorders were also assessed. The reliability and validity of these diagnoses were fair to moderate (43, 46).

Disability/Impairment

Current disability was measured by using the 12-item Short-Form Health Survey, version 2 (SF-12v2), a widely used survey measure (47). The SF-12v2 scales included mental health, social functioning, role–emotional functioning, and mental component summary. Each SF-12v2 norm-based disability score has a mean of 50, standard deviation of ± 10 , and range of 0–100; lower scores indicate greater disability.

Service Utilization

Utilization of services for problems with cannabis among individuals with cannabis use disorder was assessed for 14 modalities, including professional inpatient and outpatient treatment settings and peer support, e.g., 12-step programs such as Alcoholics Anonymous.

Statistical Analyses

Weighted means and percentages were computed for continuous and categorical correlates of 12-month and lifetime cannabis use disorder, overall and by severity level. Odds ratios from multivariable logistic regressions indicated associations between cannabis use disorder and each sociodemographic

TABLE 1. Prevalences of 12-Month and Lifetime DSM-5 Cannabis Use Disorder, by Sociodemographic Characteristics

Characteristic	Prevalence of Cannabis Use Disorder							
12-month cannabis use disorder	Any (N=972)		Mild (N=516)		Moderate (N=242)		Severe (N=214)	
	%	SE	%	SE	%	SE	%	SE
Total	2.54	0.11	1.38	0.07	0.59	0.05	0.57	0.05
Sex								
Male	3.5	0.19	1.9	0.12	0.8	0.08	0.8	0.10
Female	1.7	0.13	0.9	0.09	0.4	0.06	0.3	0.04
Race/ethnicity								
White	2.2	0.14	1.3	0.09	0.5	0.06	0.4	0.06
Black	4.5	0.39	2.1	0.21	1.2	0.15	1.2	0.21
Native American	5.3	1.45	2.7	1.31	0.9	0.36	1.7	0.72
Asian/Pacific Islander	1.3	0.28	0.4	0.18	0.4	0.18	0.4	0.17
Hispanic	2.6	0.21	1.2	0.16	0.7	0.13	0.7	0.12
Age (years)								
18–29	6.9	0.40	3.5	0.27	1.7	0.18	1.6	0.17
30–44	2.5	0.21	1.4	0.16	0.5	0.09	0.6	0.11
≥45	0.8	0.07	0.5	0.05	0.2	0.03	0.1	0.04
Marital status								
Married/cohabiting	1.3	0.10	0.7	0.07	0.3	0.05	0.3	0.06
Widowed/separated/divorced	1.9	0.21	1.1	0.18	0.4	0.08	0.4	0.10
Never married	6.4	0.36	3.3	0.26	1.6	0.17	1.4	0.14
Education								
Less than high school	3.2	0.30	1.6	0.20	0.8	0.18	0.8	0.15
High school	3.0	0.20	1.6	0.15	0.7	0.10	0.7	0.12
Some college or higher	2.2	0.14	1.2	0.10	0.5	0.06	0.5	0.06
Family income (dollars)								
0–19,999	4.9	0.30	2.5	0.19	1.1	0.14	1.3	0.15
20,000–34,999	2.5	0.23	1.5	0.18	0.5	0.08	0.6	0.11
35,000–69,999	2.1	0.16	1.2	0.12	0.5	0.10	0.4	0.07
≥70,000	1.2	0.14	0.7	0.10	0.3	0.08	0.2	0.05
Urbanicity								
Urban	2.7	0.12	1.5	0.09	0.6	0.06	0.6	0.06
Rural	1.8	0.21	1.0	0.13	0.4	0.08	0.5	0.11
Region								
Northeast	2.7	0.26	1.3	0.17	0.8	0.17	0.6	0.11
Midwest	2.3	0.23	1.2	0.17	0.5	0.08	0.6	0.14
South	2.3	0.20	1.2	0.12	0.5	0.08	0.5	0.09
West	3.1	0.22	1.8	0.14	0.7	0.10	0.6	0.09
Lifetime cannabis use disorder	Any (N=2,242)	Mild (N=1,002)		Moderate (N=529)		Severe (N=711)		
	%	SE	%	SE	%	SE	%	SE
Total	6.27	0.23	2.85	0.13	1.42	0.10	2.00	0.10
Sex								
Male	8.4	0.34	3.7	0.18	1.9	0.16	2.8	0.17
Female	4.3	0.23	2.1	0.15	1.0	0.10	1.3	0.10
Race/ethnicity								
White	6.7	0.30	3.2	0.17	1.5	0.14	2.0	0.14
Black	7.2	0.47	3.1	0.25	1.7	0.18	2.5	0.27
Native American	11.5	1.84	4.9	1.33	1.7	0.58	4.9	1.12
Asian/Pacific Islander	3.1	0.50	1.4	0.36	0.8	0.20	0.9	0.26
Hispanic	4.5	0.41	1.7	0.22	1.2	0.20	1.6	0.20
Age (years)								
18–29	11.0	0.56	4.7	0.35	2.9	0.25	3.5	0.24
30–44	7.4	0.38	3.2	0.23	1.5	0.15	2.8	0.23
≥45	3.7	0.19	2.0	0.13	0.8	0.09	1.0	0.10

continued

characteristic, adjusted for all others. Odds ratios of cannabis use disorder with psychiatric comorbidity were derived similarly. The relationship of 12-month cannabis use disorder to SF-12v2 scale scores was assessed by using linear regression controlling for sociodemographic characteristics. To account for the NESARC-III complex sample design, analyses utilized SUDAAN, version 11.0 (48).

RESULTS

Prevalence, Onset, and Frequency of Use

Table 1 shows the prevalences and standard errors of 12-month and lifetime DSM-5 cannabis use disorder for the entire sample and by sociodemographic characteristics. In addition, Figure 1 summarizes 12-month prevalence for the entire sample and by sex and age. As shown in Table 1, the prevalences of 12-month and lifetime DSM-5 cannabis use disorder were 2.54% and 6.27%, respectively. The 12-month and lifetime prevalences of mild, moderate, and severe cannabis use disorder were 1.38%, 0.59%, and 0.57% and 2.85%, 1.42%, and 2.00%, respectively.

The mean age at onset of cannabis use disorder was 21.7 (SE=0.23) years; the mean ages at onset of mild, moderate, and severe disorders were 23.1 (SE=0.38), 21.2 (SE=0.44), and 20.1 (SE=0.34) years.

Among participants with 12-month cannabis use disorder, the mean number of days cannabis was used in the prior 12 months was 225.3 (SE=5.69); among those with mild, moderate, and severe 12-month disorder, the mean days of use were 206.5 (SE=7.79),

243.5 (SE=10.60), and 252.2 (SE=14.03). Among those with lifetime cannabis use disorder, the mean number of days cannabis was used per year during the period of heaviest use was 274.2 (SE=3.76); among those with mild, moderate, and severe lifetime disorder, the mean days of use were 243.7 (SE=5.98), 284.2 (SE=6.36), and 310.4 (SE=4.48), respectively.

Sociodemographic Characteristics

Table 2 shows the adjusted odds ratios of DSM-5 cannabis use disorder by sociodemographic characteristics. Men had higher odds of cannabis use disorder than women, across timeframes and severity levels (OR=1.8–2.8).

Relative to the rates for whites, the 12-month odds of cannabis use disorder were higher in Native Americans and blacks but lower in Asians/Pacific Islanders and Hispanics. By severity, the 12-month odds were higher in blacks than whites at moderate and severe levels (OR=1.7–2.0) and lower in Asians/Pacific Islanders and Hispanics at low severity. Blacks did not differ from whites on odds of lifetime cannabis use disorder, but Asians/Pacific Islanders and Hispanics had lower odds than whites overall and across severity levels (OR=0.3–0.5).

Relative to the rates for respondents age ≥ 45 , the odds for 12-month cannabis use disorder were substantially higher in those ages 18–29 (OR=7.2) and 30–44 (OR=3.6) overall and across severity levels. For lifetime disorder, the odds were also significantly higher in those 18–29 and 30–44 than in those ≥ 45 (OR=1.9–3.6).

Compared with married respondents, those who were never married had higher odds for 12-month cannabis use disorder, overall and across severity levels (OR=1.5–2.3); those previously married had higher odds than married respondents but only at the mild severity level. Marital statuses and lifetime cannabis use disorder were weakly or not related.

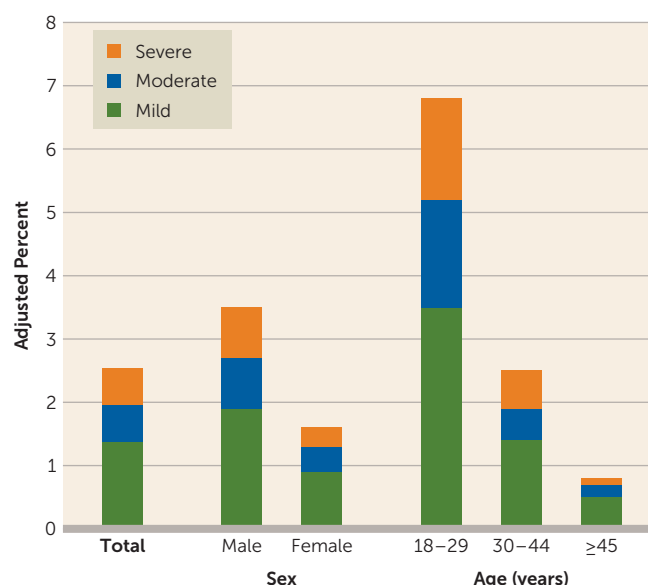
Education was largely unrelated to cannabis use disorder. However, compared with respondents at the highest income level, those with the lowest incomes had greater odds of 12-month and lifetime disorders, overall and across severity levels (OR=1.6–3.7). Comparing the odds for intermediate relative to highest income levels produced weaker and less consistent results.

Respondents in urban and rural areas did not differ. However, compared with those in the West, those in the Midwest or the South had significantly lower odds of 12-month and

TABLE 1, continued

Lifetime cannabis use disorder	Any (N=2,242)		Mild (N=1,002)		Moderate (N=529)		Severe (N=711)	
	%	SE	%	SE	%	SE	%	SE
Marital status								
Married/cohabiting	5.0	0.23	2.3	0.16	1.0	0.09	1.7	0.12
Widowed/separated/divorced	5.3	0.34	2.6	0.25	1.1	0.14	1.5	0.17
Never married	10.4	0.45	4.4	0.29	2.8	0.23	3.2	0.19
Education								
Less than high school	5.7	0.42	2.3	0.21	1.5	0.23	1.9	0.22
High school	7.4	0.40	3.5	0.25	1.6	0.18	2.3	0.19
Some college or higher	5.9	0.25	2.7	0.16	1.3	0.11	1.9	0.12
Family income (dollars)								
0–19,999	8.5	0.45	3.6	0.27	2.1	0.21	2.8	0.22
20,000–34,999	6.5	0.37	3.2	0.25	1.3	0.15	2.0	0.19
35,000–69,999	6.2	0.28	2.9	0.22	1.3	0.14	2.0	0.14
$\geq 70,000$	4.6	0.30	2.1	0.19	1.1	0.16	1.4	0.16
Urbanicity								
Urban	6.5	0.23	3.0	0.14	1.5	0.10	2.1	0.10
Rural	5.5	0.47	2.4	0.26	1.2	0.19	1.8	0.22
Region								
Northeast	7.0	0.45	3.0	0.34	1.5	0.24	2.5	0.19
Midwest	6.5	0.37	2.9	0.26	1.4	0.15	2.3	0.21
South	5.3	0.49	2.5	0.24	1.3	0.20	1.5	0.19
West	7.0	0.34	3.3	0.22	1.6	0.17	2.1	0.15

FIGURE 1. Prevalence of 12-Month DSM-5 Cannabis Use Disorder in the United States, by Severity^a



^a Prevalences reflect numbers adjusted for nonresponse and weighted to represent the U.S. population based on the 2012 American Community Survey. Total, N=36,309; males, N=15,862; females, N=20,447; age 18–29, N=8,126; age 30–44, N=10,135; age ≥ 45 , N=5,806.

lifetime cannabis use disorders (OR=0.5–0.8). These regional differences were most consistent at the low severity level.

Comorbidity

Twelve-month cannabis use disorder (Table 3) was associated with other substance disorders (OR=6.0–9.3), mood

TABLE 2. Adjusted Odds Ratios of 12-Month and Lifetime DSM-5 Cannabis Use Disorder in Relation to Sociodemographic Characteristics

Characteristic	Adjusted Odds of Cannabis Use Disorder ^a							
	Any		Mild		Moderate		Severe	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
12-month cannabis use disorder								
Sex								
Male	2.2*	1.84–2.68	2.2*	1.77–2.79	1.8*	1.26–2.51	2.8*	1.99–4.02
Female ^b	1.0		1.0		1.0		1.0	
Race/ethnicity								
White ^b	1.0		1.0		1.0		1.0	
Black	1.4*	1.11–1.79	1.1	0.88–1.47	1.7*	1.09–2.56	2.0*	1.20–3.30
Native American	2.1*	1.18–3.67	1.7	0.66–4.59	1.7	0.75–3.86	3.6*	1.41–9.36
Asian/Pacific Islander	0.4*	0.24–0.59	0.2*	0.08–0.46	0.6	0.27–1.47	0.8	0.33–1.87
Hispanic	0.7*	0.52–0.81	0.5*	0.35–0.64	0.8	0.46–1.40	1.1	0.69–1.83
Age (years)								
18–29	7.2*	5.45–9.51	6.5*	4.38–9.59	7.1*	4.58–10.98	9.7*	4.87–19.41
30–44	3.6*	2.71–4.75	3.5*	2.40–5.03	3.0*	1.84–4.82	4.8*	2.46–9.36
≥45 ^b	1.0		1.0		1.0		1.0	
Marital status								
Married/cohabiting ^b	1.0		1.0		1.0		1.0	
Widowed/separated/divorced	1.8*	1.30–2.49	1.8*	1.18–2.74	1.8	0.92–3.39	1.8	0.93–3.59
Never married	1.8*	1.48–2.24	1.8*	1.26–2.46	2.3*	1.53–3.52	1.5*	1.01–2.33
Education								
Less than high school	1.2	0.92–1.60	1.2	0.83–1.65	1.3	0.72–2.47	1.2	0.77–1.93
High school	1.1	0.95–1.38	1.1	0.86–1.46	1.2	0.80–1.67	1.2	0.79–1.83
Some college or higher ^b	1.0		1.0		1.0		1.0	
Family income (dollars)								
0–19,999	2.5*	1.89–3.34	2.4*	1.61–3.51	2.0*	1.05–3.79	3.7*	2.00–6.79
20,000–34,999	1.5*	1.07–2.06	1.6*	1.06–2.46	1.1	0.59–1.88	1.7	0.91–3.35
35,000–69,999	1.4*	1.03–1.83	1.4	0.96–2.06	1.4	0.71–2.73	1.3	0.70–2.31
≥70,000 ^b	1.0		1.0		1.0		1.0	
Urbanicity								
Urban	1.2	0.92–1.48	1.3	0.98–1.79	1.1	0.72–1.63	0.9	0.54–1.54
Rural ^b	1.0		1.0		1.0		1.0	
Region								
Northeast	0.8	0.65–1.06	0.7*	0.49–0.90	1.1	0.64–1.83	1.1	0.68–1.73
Midwest	0.6*	0.50–0.84	0.5*	0.39–0.77	0.7	0.41–1.06	1.0	0.58–1.72
South	0.6*	0.48–0.77	0.6*	0.43–0.73	0.6*	0.39–0.96	0.8	0.46–1.25
West ^b	1.0		1.0		1.0		1.0	
Lifetime cannabis use disorder								
Sex								
Male	2.1*	1.84–2.33	1.9*	1.64–2.18	2.1*	1.64–2.57	2.4*	1.93–2.95
Female ^b	1.0		1.0		1.0		1.0	
Race/ethnicity								
White ^b	1.0		1.0		1.0		1.0	
Black	0.9	0.74–1.09	0.8	0.64–1.00	0.9	0.64–1.26	1.1	0.77–1.43
Native American	1.7*	1.18–2.38	1.5	0.87–2.62	1.1	0.55–2.20	2.4*	1.42–3.94
Asian/Pacific Islander	0.3*	0.25–0.49	0.3*	0.20–0.58	0.4*	0.22–0.64	0.3*	0.20–0.60
Hispanic	0.4*	0.37–0.55	0.4*	0.29–0.47	0.5*	0.34–0.79	0.5*	0.39–0.71
Age (years)								
18–29	2.9*	2.53–3.40	2.4*	1.97–2.96	3.3*	2.41–4.51	3.6*	2.79–4.73
30–44	2.3*	1.96–2.62	1.9*	1.50–2.31	2.2*	1.65–2.95	3.1*	2.36–4.01
≥45 ^b	1.0		1.0		1.0		1.0	
Marital status								
Married/cohabiting ^b	1.0		1.0		1.0		1.0	
Widowed/separated/divorced	1.2*	1.02–1.36	1.2	0.96–1.54	1.3	1.00–1.79	1.0	0.79–1.34
Never married	1.2*	1.07–1.40	1.2	1.00–1.54	1.6*	1.26–2.05	1.0	0.79–1.22

continued

TABLE 2, continued

Characteristic	Adjusted Odds of Cannabis Use Disorder ^a							
	Any		Mild		Moderate		Severe	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Education								
Less than high school	1.0	0.82–1.16	0.9	0.73–1.14	1.1	0.74–1.58	1.0	0.73–1.31
High school	1.2*	1.04–1.35	1.2*	1.04–1.48	1.1	0.89–1.47	1.1	0.91–1.43
Some college or higher ^b	1.0		1.0		1.0		1.0	
Family income (dollars)								
0–19,999	1.7*	1.46–2.10	1.6*	1.26–2.16	1.6*	1.12–2.34	2.0*	1.43–2.81
20,000–34,999	1.4*	1.14–1.65	1.5*	1.19–1.92	1.1	0.76–1.52	1.4	1.00–1.97
35,000–69,999	1.3*	1.09–1.51	1.3*	1.05–1.69	1.1	0.79–1.62	1.3*	1.04–1.73
≥70,000 ^b	1.0		1.0		1.0		1.0	
Urbanicity								
Urban	1.2	0.98–1.40	1.3*	1.01–1.62	1.1	0.79–1.48	1.1	0.85–1.42
Rural ^b	1.0		1.0		1.0		1.0	
Region								
Northeast	0.9	0.80–1.10	0.8	0.65–1.10	0.9	0.60–1.25	1.1	0.92–1.43
Midwest	0.8*	0.68–0.92	0.7*	0.58–0.91	0.7	0.52–1.00	1.0	0.76–1.21
South	0.7*	0.53–0.83	0.7*	0.53–0.86	0.7	0.46–1.03	0.6*	0.47–0.85
West ^b	1.0		1.0		1.0		1.0	

^a Adjusted for all other sociodemographic characteristics.^b Reference category.* $p < 0.05$.

disorders (OR=2.7–5.0), anxiety disorders (OR=1.7–3.7), PTSD (OR=4.3), and personality disorders (OR=3.8–5.0). Lifetime cannabis use disorder (Table 3) was also associated with other substance disorders (OR=6.6–14.5), mood disorders (OR=2.6–3.8), anxiety disorders (OR=2.1–3.2), PTSD (OR=3.8), and personality disorders (OR=4.0–4.7). Across severity levels, 12-month and lifetime cannabis use disorders were associated with other disorders. Further, with few exceptions (12-month bipolar II, agoraphobia, and specific phobia), the associations became stronger (i.e., had progressively higher odds ratios) as the severity of cannabis use disorder increased. For example, the odds ratios for PTSD and 12-month mild, moderate, and severe cannabis use disorder were 2.1, 6.2, and 9.5; those for nicotine use disorder were 4.8, 7.3, and 10.5; and those for borderline personality disorder were 4.0, 4.9, and 8.8. Table S1 in the data supplement accompanying the online version of this article provides additional comorbidity information, i.e., 12-month and lifetime prevalences of DSM-5 cannabis use disorder (any, mild, moderate, severe) among participants with 12-month or lifetime diagnoses of each disorder in Table 3. Cannabis use disorder had higher prevalences among participants with other disorders than in the total sample. For any 12-month and lifetime cannabis use disorder, the prevalence ranged from 4.0% and 10.7% (specific phobia) to 22.5% and 34.9% (any drug use disorder).

Disability

Respondents with 12-month cannabis use disorder differed significantly from others ($p < 0.001$) on all disability components (Table 4), with disability increasing significantly as cannabis disorder severity increased. For those with severe levels, the mean score on the mental component summary of

the SF-12v2 was approximately 0.75 SD below the mean. The greatest impairment was found in the role-emotional functioning domain, with a score 0.85 SD below the mean. By the exact number of DSM-5 cannabis use disorder criteria, increasing disorder severity was also generally associated with greater disability (lower SF-12 scores).

Service Utilization

Among respondents with 12-month and lifetime DSM-5 cannabis use disorders, 7.2% and 13.7% received any type of service for cannabis problems (Table 5). For 12-month disorder, service utilization rates were 4.1%, 6.0%, and 15.7% for mild, moderate, and severe disorders; lifetime rates were 7.3%, 11.7%, and 24.3%. By type or source of intervention, individuals with 12-month cannabis use disorder were most likely to use physicians or other health care practitioners (4.8%), followed by 12-step groups (3.2%) and rehabilitation programs, outpatient clinics, inpatient facilities, detoxification programs, and family or social services (range, 0.9%–1.5%). Other settings were utilized less. Individuals with lifetime cannabis use disorder were most likely to use 12-step groups (8.0%), followed by physicians or other health care practitioners (5.2%) and rehabilitation programs, outpatient clinics, detoxification programs, family or social services, and inpatient facilities (range, 1.6%–5.0%). Other settings were used less. Across cannabis disorder severity levels, the most to least commonly used intervention sources were ordered similarly.

DISCUSSION

Among U.S. adults in 2012–2013, the 12-month prevalence of DSM-5 cannabis use disorder was 2.54%, representing

TABLE 3. Adjusted Odds Ratios of 12-Month and Lifetime DSM-5 Cannabis Use Disorder in Relation to Other Psychiatric Disorders

Comorbid Disorder	Adjusted Odds of Cannabis Use Disorder ^{a,b}							
	Any		Mild		Moderate		Severe	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
12-month cannabis use disorder								
Any other substance use disorder	9.3	7.70–11.21	7.4	5.92–9.34	12.2	7.76–19.31	13.1	7.86–21.98
Alcohol use disorder	6.0	5.10–6.97	5.1	4.14–6.27	7.7	5.06–11.60	6.8	4.61–10.01
Any other drug use disorder	9.0	6.65–12.19	6.6	4.30–10.01	11.5	7.18–18.42	13.4	8.26–21.66
Nicotine use disorder	6.2	5.24–7.34	4.8	3.86–5.97	7.3	5.11–10.41	10.5	7.35–15.05
Any mood disorder	3.8	3.10–4.56	2.8	2.21–3.48	3.5	2.55–4.75	8.1	5.74–11.40
Major depressive disorder	2.8	2.33–3.41	2.2	1.77–2.84	3.1	2.29–4.23	4.2	2.76–6.40
Bipolar I	5.0	3.65–6.75	3.4	2.16–5.47	4.1	2.29–7.22	10.1	6.32–16.08
Bipolar II	2.7	1.10–6.62	2.7 ^c	0.80–9.46	3.4 ^c	0.74–15.51	1.9 ^c	0.42–8.18
Any anxiety disorder	2.8	2.24–3.39	2.2	1.64–2.93	2.9	2.02–4.03	4.4	2.96–6.56
Panic disorder	3.3	2.50–4.48	2.5	1.58–3.84	2.8	1.60–5.04	6.6	3.74–11.58
Agoraphobia	2.6	1.64–4.06	2.4	1.44–4.07	3.5	1.39–9.08	2.0	1.02–3.97
Social phobia	2.3	1.61–3.27	1.3 ^c	0.74–2.21	3.5	1.96–6.27	3.9	1.85–8.18
Specific phobia	1.7	1.28–2.29	1.4 ^c	0.95–2.16	2.2	1.28–3.65	1.9	1.21–3.14
Generalized anxiety disorder	3.7	2.79–5.02	3.0	2.01–4.34	3.6	2.40–5.50	6.3	3.43–11.53
Posttraumatic stress disorder	4.3	3.26–5.64	2.1	1.34–3.30	6.2	3.98–9.59	9.5	6.18–14.75
Any personality disorder	4.8	3.96–5.75	4.1	3.30–4.99	4.4	3.01–6.31	7.9	4.98–12.59
Schizotypal	4.4	3.60–5.46	3.7	2.85–4.90	4.0	2.82–5.63	7.0	4.60–10.62
Borderline	5.0	4.13–6.10	4.0	3.13–5.15	4.9	3.30–7.12	8.8	5.83–13.41
Antisocial	3.8	3.05–4.75	3.5	2.61–4.62	3.9	2.44–6.19	4.6	2.95–7.18
Lifetime cannabis use disorder								
Any other substance use disorder	14.5	11.95–17.60	10.5	7.81–14.09	19.4	13.56–27.72	21.9	15.24–31.56
Alcohol use disorder	7.8	6.95–8.74	6.1	5.09–7.30	9.6	7.51–12.31	10.1	7.88–12.91
Any other drug use disorder	10.0	8.56–11.76	7.9	6.22–10.04	9.2	7.29–11.69	14.6	12.01–17.66
Nicotine use disorder	6.6	5.79–7.64	5.1	4.32–6.03	7.9	6.08–10.25	8.9	7.25–10.96
Any mood disorder	3.3	2.94–3.73	2.3	1.92–2.67	3.4	2.67–4.31	5.6	4.53–6.94
Major depressive disorder	2.6	2.26–2.95	2.0	1.65–2.47	2.6	2.05–3.33	3.6	2.97–4.34
Bipolar I	3.8	3.10–4.59	2.2	1.52–3.27	4.0	2.82–5.80	5.9	4.53–7.75
Bipolar II	2.8	1.51–5.23	2.3 ^c	0.80–6.81	3.3	1.35–8.24	3.1	1.34–7.26
Any anxiety disorder	2.9	2.54–3.31	2.3	1.87–2.73	3.0	2.29–4.05	3.9	3.16–4.86
Panic disorder	3.2	2.66–3.76	2.4	1.85–3.20	3.3	2.29–4.72	4.3	3.18–5.72
Agoraphobia	2.9	2.25–3.79	2.1	1.35–3.24	3.9	2.35–6.34	3.5	2.54–4.93
Social phobia	2.7	2.22–3.40	2.0	1.42–2.90	2.6	1.77–3.96	4.0	2.85–5.53
Specific phobia	2.1	1.73–2.46	1.4	1.04–1.91	2.9	2.00–4.07	2.6	2.01–3.24
Generalized anxiety disorder	3.2	2.75–3.74	2.5	2.01–3.10	3.4	2.51–4.47	4.3	3.26–5.64
Posttraumatic stress disorder	3.8	3.15–4.67	2.4	1.81–3.21	4.3	3.16–5.85	6.0	4.55–7.88
Any personality disorder	4.7	4.18–5.28	3.2	2.76–3.74	4.7	3.65–5.95	8.0	6.34–10.19
Schizotypal	4.0	3.46–4.72	2.7	2.16–3.35	4.3	3.26–5.60	6.2	4.84–7.98
Borderline	4.5	3.96–5.19	3.0	2.49–3.53	4.6	3.52–6.05	7.7	6.17–9.67
Antisocial	4.7	4.07–5.34	3.5	2.89–4.27	4.4	3.36–5.71	6.7	5.26–8.53

^a Adjusted for sex, age, race/ethnicity, marital status, education, family income, urban/rural, and region (Midwest, Northeast, South, West).^b All odds ratios are significant ($p < 0.05$) except as otherwise noted.^c Nonsignificant.

approximately 5,982,000 Americans, and the lifetime prevalence was 6.27%, representing about 14,757,000 Americans. Corresponding DSM-IV 12-month and lifetime rates in NESARC-III, 2.9% and 11.7% (29), showed that a substantial increase occurred since the 2001–2002 NESARC, in which the 12-month and lifetime rates were 1.5% and 8.5% (29), an increase apparently driven by greater prevalence of cannabis users (29).

The prevalence and odds of 12-month and lifetime cannabis use disorders were greater among men than women, consistent with findings in earlier surveys (17, 49, 50).

In NESARC-III, the odds for 12-month cannabis use disorder were higher among younger than older age groups, with striking differences between those age 18–29 and those ≥ 45 (OR=6.5–9.7). While the prevalence of cannabis use disorder increased across all age groups between the 2001–2002 NESARC and the 2012–2013 NESARC-III, the age differential in DSM-5 cannabis use disorder in NESARC-III is considerably more pronounced than in the NESARC (17). The general increases suggest the operation of a period effect, while the sharply increased age differential

TABLE 4. Relation of 12-Month Cannabis Use Disorder to Mental Disability Scores on the 12-Item Short-Form Health Survey (SF-12)

Cannabis Use Status	Norm-Based Score on SF-12v2 Mental Component							
	Mental Health		Social Functioning		Role–Emotional Functioning		Mental Component Summary	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
No cannabis use disorder	51.9	0.09	50.7	0.10	48.5	0.11	51.0	0.08
Cannabis use disorder								
Any	46.7 ^a	0.46	46.8 ^a	0.52	44.3 ^a	0.55	45.3 ^a	0.50
Mild	48.2 ^a	0.54	48.0 ^a	0.67	45.4 ^a	0.66	46.9 ^a	0.63
Moderate	46.1 ^a	0.95	46.9 ^a	0.91	44.3 ^a	0.88	44.5 ^a	0.92
Severe	43.7 ^a	0.98	43.6 ^a	1.15	41.5 ^a	1.12	42.2 ^a	0.95
Number of cannabis use disorder criteria								
0	51.9	0.09	50.8	0.09	48.6	0.12	51.1	0.08
1	48.8 ^a	0.51	48.3 ^a	0.47	47.2 ^b	0.45	47.7 ^a	0.49
2	48.2 ^a	0.72	48.0 ^b	0.82	45.5 ^a	0.80	46.9 ^a	0.80
3	48.3 ^a	0.89	48.0 ^a	0.95	45.1 ^a	0.93	46.9 ^a	0.87
4	46.4 ^a	1.06	47.0 ^b	1.11	44.7 ^b	1.18	44.8 ^a	1.03
5	45.7 ^a	1.61	46.7 ^b	1.58	43.7 ^a	1.40	44.0 ^a	1.61
6	44.6 ^b	2.23	44.1 ^b	2.42	43.8 ^c	2.04	44.9 ^a	1.66
7	46.5 ^a	1.31	44.3 ^b	2.06	43.3 ^c	2.23	44.5 ^b	1.80
8	43.0 ^a	2.26	46.4 ^c	2.04	40.7 ^a	1.80	41.4 ^a	1.76
9	38.7 ^a	2.22	40.5 ^b	3.09	39.9 ^a	1.82	37.3 ^a	2.21
10	41.7 ^a	2.44	41.0	5.30	33.9 ^a	3.47	36.9 ^a	2.77
11	44.9 ^c	3.65	38.9 ^b	5.10	37.0 ^b	5.53	37.4 ^b	5.55

^a Significantly different ($p < 0.001$) from score for individuals with no cannabis use disorder or zero cannabis use disorder criteria, after adjustment for socio-demographic characteristics.

^b Significantly different ($p < 0.01$) from score for individuals with no cannabis use disorder or zero cannabis use disorder criteria, after adjustment for socio-demographic characteristics.

^c Significantly different ($p < 0.05$) from score for individuals with no cannabis use disorder or zero cannabis use disorder criteria, after adjustment for socio-demographic characteristics.

suggests an additional cohort effect in the youngest adults. The general increase plus the sharp age differential in NESARC-III for DSM-5 cannabis use disorder are consistent with similar time trends among people favoring legalization of marijuana for recreational use (51). These trends all appear to reflect different manifestations of the increasingly accepting social attitudes toward marijuana use.

The odds of cannabis use disorder varied by race or ethnic group. For 12-month and lifetime disorders, odds were lower for Asians or Pacific Islanders and for Hispanics than for whites, but higher in Native Americans, consistent with the NESARC data (17). For blacks, the odds of 12-month cannabis use disorder were significantly higher than for whites, in contrast to findings in NESARC, in which blacks did not differ from whites. For lifetime cannabis use disorder, the odds did not differ between blacks and whites in NESARC-III, while in NESARC, blacks had significantly lower odds of lifetime cannabis use disorder than whites (17). Thus, the risk in blacks relative to whites has increased over the past decade. This is consistent with notable increases in the prevalence of cannabis use and cannabis use disorders among blacks (29, 52–54). While the reasons for this change are unclear, increasing economic disparity between blacks and whites since the 2008 economic recession (55, 56) may have exacerbated neighborhood factors (disorder, violence, visible drug dealing) that increase adolescent marijuana use (57), and they may function similarly in adults, an issue warranting investigation. Blacks may also differ from whites in their

attitudes toward marijuana, possibly viewing it as a natural and therefore safe substance (22). This also warrants investigation.

Participants with the lowest incomes had higher odds of cannabis use disorder than others. Cannabis outcomes are related to income disparities in distal and proximal forms, including early exposure to disadvantaged macroeconomic environments (58), low parental socioeconomic status as a moderator of the risk of family history of addiction (59), and current residence in high-unemployment neighborhoods (60). Cannabis disorders and concurrent economic disparity may be related if the stress of disadvantaged economic conditions leads to marijuana use as a coping mechanism, increasing the risk for cannabis use disorders among users with a vulnerability to such disorders. However, the relationship may be bidirectional, since early adolescent use of marijuana is associated with subsequent lower adult cognitive functioning (3–5), which could impair the chances for the educational and occupational achievement (6–8) that would bring higher incomes. This important yet complex relationship merits further study to inform policy and personal decisions regarding marijuana use.

Similar to the NESARC findings (17), 12-month and lifetime cannabis use disorders were strongly and consistently associated with other substance and mental disorders. Thus, despite the increasingly normative nature of marijuana use and the increased adult prevalence of cannabis use disorder, persons with cannabis use disorder continue to be vulnerable

TABLE 5. Cannabis-Specific Treatment or Intervention Among Individuals With 12-Month or Lifetime Cannabis Use Disorder

Treatment or Intervention Setting	Severity of Cannabis Use Disorder							
	Any		Mild		Moderate		Severe	
	%	SE	%	SE	%	SE	%	SE
12-month cannabis use disorder								
12-step program	3.17	0.79	1.07	0.45	3.79	1.79	7.63	2.90
Family or social services	0.86	0.35	0.78	0.48	0.36	0.36	1.57	1.05
Detoxification	1.04	0.55	0.27	0.27	0.15	0.15	3.80	2.30
Other inpatient facility	1.16	0.55	0.12	0.12	0.70	0.56	4.16	2.32
Outpatient clinic	1.46	0.56	0.39	0.29	0.71	0.50	4.81	2.31
Rehabilitation program	1.51	0.59	0.54	0.39	0.68	0.47	4.70	2.37
Methadone maintenance	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a
Emergency department	0.04	0.04	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a
Halfway house	0.06	0.06	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a
Crisis center	0.23	0.17	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a
Employee assistance program	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a	— ^a
Clergy	0.70	0.30	— ^a	— ^a	0.88	0.64	2.21	1.16
Physician or other health care practitioner	4.83	1.24	2.96	1.53	3.73	2.42	10.50	2.80
Other treatment or intervention	0.64	0.34	0.10	0.10	— ^a	— ^a	2.63	1.47
Any treatment or intervention	7.16	1.35	4.14	1.62	5.98	2.49	15.73	3.49
Lifetime cannabis use disorder								
12-step program	7.98	0.71	3.64	0.64	7.10	1.45	14.81	1.69
Family or social services	1.96	0.39	0.85	0.31	1.44	0.61	3.92	0.98
Detoxification	2.66	0.42	1.00	0.33	1.87	0.73	5.58	1.05
Other inpatient facility	1.62	0.32	0.36	0.17	1.33	0.50	3.62	0.92
Outpatient clinic	3.98	0.64	1.11	0.43	3.09	1.04	8.73	1.33
Rehabilitation program	4.98	0.56	2.17	0.55	4.53	1.19	9.32	1.30
Methadone maintenance	0.02	0.01	— ^a	— ^a	— ^a	— ^a	0.06	0.05
Emergency department	0.77	0.21	0.35	0.21	0.47	0.35	1.59	0.54
Halfway house	0.58	0.15	0.15	0.13	0.11	0.11	1.52	0.44
Crisis center	0.63	0.20	0.25	0.16	0.19	0.16	1.49	0.54
Employee assistance program	0.60	0.19	0.56	0.29	0.28	0.28	0.89	0.39
Clergy	1.46	0.27	0.52	0.28	1.71	0.61	2.63	0.60
Physician or other health care practitioner	5.18	0.59	2.78	0.84	4.67	1.38	8.96	1.11
Other treatment or intervention	1.04	0.26	0.66	0.25	0.45	0.27	1.98	0.71
Any treatment or intervention	13.69	0.86	7.26	0.90	11.72	1.86	24.27	1.91

^a Zero prevalence.

to other common mental disorders. In patient settings, those with both drug and psychiatric disorders often exhibit more persistent, severe, and treatment-resistant symptoms than patients with drug disorders only (61). Research indicates that the best treatment for such comorbid conditions is concurrent treatment for both disorders (61). Therefore, study findings indicate an increased need for settings that provide evidence-based treatments for both types of conditions. Further, multivariable investigation indicates two latent transdiagnostic domains of comorbidity, the internalizing and externalizing (62) domains. The externalizing domain is characterized by antisocial personality disorder and substance disorders; the internalizing domain is characterized by distress (major depression, dysthymia, generalized anxiety) or fear (panic, social phobia, specific phobia). These domains have been replicated across gender and racial/ethnic groups (63, 64). Given the changing legal and attitudinal climate in the United States regarding marijuana use, re-examining cannabis use disorders within this

transdiagnostic framework is warranted to better understand its relationship to other substance and psychiatric disorders, and to inform the development of more effective treatments.

Participants with cannabis use disorder experienced considerable disability across different domains. The level of disability, particularly among those with severe disorders, was consistent with the very frequent cannabis use reported (252.2 and 310.4 days per year among those with 12-month and lifetime severe cannabis use disorders). These disability and use patterns attest to the severity of the disorder, which clearly is not a benign or harmless condition. Further, the disability levels were greater than the corresponding levels associated with alcohol use disorder in NESARC-III (37). Previous research suggests that even after cannabis use disorders remit, disability persists (65). Whether this persistence is mediated by prolonged cognitive impairments associated with early marijuana use (3–5), by aspects of the disorder itself

(e.g., particular diagnostic criteria), or by other factors warrants investigation.

Relatively few participants with cannabis use disorder received any type of services, a situation unimproved since NESARC (17). For alcohol use disorders, factors predicting lack of service use include viewing alcohol problems as stigmatized (66) or not serious (67), preference for self-reliance, and beliefs that treatment is ineffective (67). Similar factors appear related to lack of service use for cannabis disorders (30, 68), a topic warranting further investigation. Evidence-based treatments (69–71) are available for cannabis use disorders (32). Public and professional education about treatment efficacy and availability that destigmatizes help seeking may encourage individuals with cannabis use disorders to seek treatment. Given the increased prevalence of these disorders among U.S. adults (27, 29), provision of such services and public education about treatment appear critically needed.

The DSM-5 diagnosis of cannabis use disorder differs from that in DSM-IV by the addition of criteria for craving and

cannabis withdrawal. Among participants with 12-month DSM-5 cannabis use disorder, 60.50% (SE=2.05) had craving for cannabis, 32.48% (SE=2.09) had cannabis withdrawal, and 23.06% (SE=1.84) had both. In NESARC-III, the prevalence of moderate to severe DSM-5 cannabis use disorder was higher than the rate for DSM-IV cannabis dependence, a difference attributed to the cannabis withdrawal criterion (72). Earlier studies showed how the craving and cannabis withdrawal criteria operate in the general population (35, 73, 74); for instance, the model fit of cannabis use disorder criteria improved after addition of withdrawal (75). While studies of DSM-5 cannabis use disorder in NESARC-III show good reliability and validity (43, 45), further nosological studies focused on craving and withdrawal should be conducted with the NESARC-III data.

NESARC-III findings of increased rates of cannabis use disorder (29) are inconsistent with the National Survey on Drug Use and Health, which found that the prevalence of cannabis use disorder was stable between 2002 and 2013 (7). However, the NESARC-III findings are consistent with other national indicators of increases in cannabis use disorders (27) and other serious cannabis-related problems, e.g., emergency room visits and fatal car crashes (11, 14). These increases are consistent with a changing landscape of increasingly permissive marijuana attitudes and laws. Changing laws may benefit society by reducing the harms of socially patterned drug arrests (76). However, the laws may affect public health adversely by leading to more marijuana users, including some vulnerable to cannabis use disorders. Continued surveillance of these trends is needed to monitor the balance of social costs and benefits and the needs for treatment.

Lifetime rates of DSM-5 cannabis use disorder were highest in those ages 18–29. This could be artifactual due to recall failure for earlier disorders among older individuals (77). However, this report and others (17) show that the risk for onset of cannabis use disorder peaks in late adolescence and early 20s, and remission often occurs within 3–4 years (17, 78). Given that, the finding of higher rates of lifetime disorders among those ages 18–29 may well be valid. Further studies are needed to address this issue.

Study limitations are noted. Only common psychiatric disorders were assessed. Some population segments were not included, e.g., prisoners, the homeless, and long-term inpatients. NESARC-III was also cross-sectional. Prospective surveys are needed to investigate the stability and causal directions of the relationships. The study also did not distinguish between associations explained by greater use of cannabis and those due to greater risk of a disorder given such use; future studies should address this issue. NESARC-III also had important strengths, including a large sample, reliable and valid measures, and rigorous field methodology. NESARC-III is also unique in providing current, comprehensive information on DSM-5 cannabis use disorder and its correlates and comorbidity in the U.S. adult general population.

In summary, DSM-5 cannabis use disorder is a highly prevalent, comorbid, disabling disorder that commonly goes

untreated. Numerous risk factors were identified that could stimulate further studies of differences in correlates of DSM-5 cannabis use disorder by sex, age, and race/ethnicity, which could inform additional hypothesis-driven studies. Most important, this study highlights the urgency of identifying and implementing effective prevention methods. The study also highlights the need to educate the public, professionals, and policy makers about the seriousness of cannabis use disorder and the need for public health efforts to destigmatize and encourage help seeking for cannabis use disorder among individuals who cannot reduce their use of marijuana on their own, despite substantial harm to themselves and others.

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