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Severity of DSM-5 cannabis use disorders in a nationally representative sample of sexual minorities

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Abstract

Background: Our study is the first using a national sample to examine the severity of *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) cannabis use disorder (CUD) in sexual minorities. Drawing from current literature we expected that bisexual individuals would have the highest prevalence of CUD and the most severe form of CUD.

Methods: The National Epidemiological Survey on Alcohol and Related Conditions-III (NESARC-III; 2012-2013) provides a nationally representative adult sample (N=36,309), including the largest sample of sexual minorities. The NESARC-III is large enough to compare subpopulations of sexual minorities on dimensions of substance use disorder severity.

Results: Lesbians and gay men were more likely to report mild CUD while bisexuals and respondents 'not sure' of their sexual identity were more likely to report severe CUD when compared with heterosexuals. Sexual minorities and heterosexuals who reported lifetime use of medical cannabis had higher odds of having a severe CUD. Sexual minorities had significantly higher odds of lifetime medical cannabis use (AOR=2.39, 95% CI=1.42-3.66, p<0.001) when compared to heterosexuals, with bisexuals having the highest odds (AOR=2.81, 95% CI=1.66-4.75, p<0.001).

Conclusions: Sexual minorities have the highest odds compared to heterosexuals of developing any CUD. Moreover, the higher rates of severe CUD among bisexuals and those 'not sure' have implications for drug prevention with these particularly high-risk groups. It appears that lifetime medical marijuana use may play a role in the development of CUD, although more rigorous measures of medical marijuana use are needed to determine the nature of the relations.

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Author contributions:

Drs. Boyd and Veliz designed the study; Drs. Boyd and McCabe conducted the literature searches; Dr. Veliz conducted the statistical analyses and assisted with data interpretation; Dr. Boyd wrote the first draft of the manuscript, and all authors contributed to the interpretation of the data and have approved the final manuscript.

Introduction

Along with alcohol and tobacco, cannabis (marijuana) is one of the most prevalent drugs used in the United States and cannabis users are more likely to also use alcohol and cigarettes[1] than non-users. This makes cannabis users more likely to be polysubstance users and at higher risk for a severe substance use disorder (SUD). In a study using 2005-2013 National Survey on Drug Use and Health (NSDUH) data (N=340,465), Wu and colleagues[2] reported that 13.9% of past year cannabis users met criteria for a cannabis use disorder (CUD): 4.58% for abuse and 8.81% for dependence. They did not include sexual orientation in their study.

Population-based research has consistently found that recreational cannabis use differs by sexual identity;[3,4] an estimated 30.7% of sexual minorities versus 12.9% of heterosexuals reported annual use in 2015.[5] Lesbian and bisexual women and women 'not sure' of their sexual identity had higher rates of cannabis use compared with their exclusively heterosexual female counterparts,[6] while gay men had higher rates than heterosexual males.[5,7] In 2015, 32.2% of sexual minority women used cannabis in contrast to 27.1% of sexual minority men.[5]

In their literature review, Green and colleagues[8] noted that bisexual identity and behaviors were related to increased risk for substance misuse, most often with cannabis as well as alcohol and tobacco. Trocki and colleagues[4] used data from the 2000 National Alcohol Survey (NAS), a population-based telephone survey of US adults, to examine patterns of cigarette and marijuana use among heterosexual and sexual minority individuals. Like other investigators, they found that bisexual women and heterosexual-identified women who reported same-sex partners had higher rates of marijuana and cigarette use compared to heterosexual women with only opposite sex partners. Marijuana and tobacco use were higher among gay men than heterosexual men. Kerridge et al. examined DSM-5 lifetime and 12-month SUDs among sexual minorities using the National Epidemiological Survey on Alcohol and Related Conditions-III (NESARC-III) data. They found that self-identified lesbian, bisexual women, and women 'not sure' had higher adjusted odds of having 12-month drug use disorder (DUD) when compared to heterosexual women, and this was also generally true for gay and bisexual men. They did not specifically report on cannabis use.[9,10]

Trocki et al.[4] found that rates of marijuana and tobacco use differed both by sex (male, female) and sexual identity. Bostwick and colleagues[11] contend that the higher rates of alcohol and drug use among bisexuals and 'not sure' individuals are likely related to not being part of a discernable community, as well as biphobia.

The purpose of this descriptive study was to examine severity of past 12-month CUD among lesbians, gay men, bisexuals, and 'not sure' individuals, as well as among heterosexuals, We also examined whether CUD was associated with a lifetime medical marijuana card or use of medical cannabis. If a respondent had a lifetime card for medical cannabis or had used medical cannabis, we use the term 'medical cannabis user' in this paper. We focused on CUD severity as defined in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5)[13] since severity is a better indicator of impairment and treatment needs

than simply treating CUD as binary.[12] Drawing from current literature, we hypothesized that bisexuals and 'not sure' individuals would have the highest prevalence of severe CUD.

Methods

The NESARC-III is a 2012-2013 nationally representative household survey (N=36,309) sponsored by the National Institutes of Health (NIH). It is the largest US probability adult sample of sexual minorities[14,15] that allows for DSM-5 diagnosis of severity of SUDs. The NESARC-III has some of the most well-validated cannabis, alcohol, and tobacco use measures that align with DSM-5.[13-15] The NESARC-III sample design, measures, response rates, and weighting procedures have been described elsewhere.[14,16,17] All protocols received institutional review board approval.

The NESARC-III includes reliable and validated measures that align with DSM-5 criteria for SUDs. It uses the National Institute on Alcohol Abuse and Alcoholism "Alcohol Use Disorder and Associated Disabilities Interview Schedule-5" (AUDADIS-5), a fully structured diagnostic interview. Between 38 to 40 items are included in the AUDADIS-5 that map onto the 11 DSM-5 symptom criteria for all SUDs.

First, a diagnosis of CUD, alcohol use disorder (AUD), and tobacco use disorder (TUD) was determined for any disorder and was defined as endorsing 2 or more items out of the 11 DSM-5 symptom criteria specific for cannabis, alcohol, and tobacco. Second, a diagnosis for severity was determined for mild (endorsing 2-3 criteria), moderate (endorsing 4-5 criteria), and severe (endorsing ≥ 6) criteria. Test-retest reliability for DSM-5 CUD, AUD, and TUD diagnoses was fair and dimensional criteria scales were fair to excellent.[14-16] Alcohol use disorder and TUD served as control variables in the multivariate analytic models because alcohol and tobacco products are often used by cannabis users.[1,12]

Medical use was determined with one question: "Have you ever been prescribed or used medical marijuana (yes/no)?" Although the public refers to medical marijuana as 'prescribed', the term is not accurate since marijuana is in Schedule 1. In this paper, we use the term medical marijuana card.

Sexual identity included three domains (identity, attraction, and behavior) that make up the construct of sexuality (sometimes referred to as sexual orientation). We used the identity domain by examining the answers to the question "Which of the categories on the card best describes you: (1) heterosexual (straight), (2) gay or lesbian, (3) bisexual, or (4) not sure?"

Sociodemographic characteristics included age (18-34 years; 35-54 years; 55 years and older); sex (male, female); education (high school degree or less; some college; college degree or higher); and race/ethnicity (White, African-American, Hispanic, other). These sociodemographic characteristics served as control variables in the multivariate analytic models.

We used binary and multivariate logistic regression—controlling for age, sex, education, race/ethnicity, AUD, and TUD—to assess the unique associations of CUD and sexual orientation. We used STATA 15.0 (Version 15.0; StataCorp LP, College Station, Texas) to

estimate the models. The NESARC-III design included stratification and clustering of the target population so analytic techniques were design-based using sampling weights to calculate estimates of population parameters. Specialized variance estimation techniques were used to accommodate the complex design features of the sample when estimating standard errors. All estimates provided in Tables 1 and 2 used the sampling weights and accounted for the complex sampling design.

Results

Lifetime use of cannabis for the entire sample was 32.1% (past year=9.5%), with heterosexuals reporting 31.4% (past year=9%), lesbians/gay men reporting 54.0% (past year=20.3%), bisexuals reporting 58.4% (past year=31.1%), and those ‘not sure’ of their identity reporting 41.4% (past year=22.3%). Approximately 1.6% (n=582) of the sample reported lifetime medical cannabis use. Of the lifetime users of medical cannabis, 76% had used in the past year.

Although the odds varied by subgroups, the use of medical cannabis put respondents at higher risk for a severe CUD. Heterosexuals who used medical cannabis had lower odds of a severe CUD (AOR=1.95, 95% CI=1.04-3.65, p<0.001) compared with bisexuals (AOR=16.2, 95% CI=4.20-41.6, p<0.001) and those ‘not sure’ of their identity (AOR=27.0, 95% CI=4.16-175.5, p<0.001). We must be cautious, however, in our interpretation of the AOR for ‘not sure’ and bisexual individuals because the confidence intervals were large. We examined the mild, moderate, and severe disorder levels of CUD (See Table 1) and found that sexual minorities who had used medical cannabis and had a severe CUD were statistically different from all other groups (i.e., heterosexuals, heterosexuals who used medical cannabis, and sexual minorities who did not use cannabis).

Sexual minorities had significantly higher odds of using medical cannabis (AOR=2.39, 95% CI=1.42-3.66, p<0.001) when compared to heterosexuals, with bisexuals having the highest odds (AOR=2.81, 95% CI=1.66-4.75, p<0.001) (Data combining males and females is not depicted in Table 2). Bisexual, lesbian, and those women ‘not sure’ of their identity had higher odds of using medical cannabis when compared to heterosexual women. Gay and bisexual men had higher odds of medical cannabis use compared to heterosexual men. (See Table 2)).

Sexual minorities using medical cannabis had higher odds of having any CUD (AOR=12.5, 95% CI=4.97-31.6, p<0.001), contrasted with heterosexuals using medical cannabis (AOR=8.27, 95% CI=6.27-10.8, p<0.001) (Data assessing any past-year CUD is not depicted in Table 2). The confidence interval for sexual minorities was larger than the confidence interval for heterosexuals. Notably, sexual minority women generally had higher odds of using medical cannabis, with lesbian and bisexual women having similar odds (AOR=3.36, 95% CI=1.38-8.17, p<0.01; AOR=3.19, 95% CI=1.67-6.07, p<0.001; respectively) (See Table 2).

Discussion

Kerridge and colleagues examined the gender-specific profiles of those with DSM-5 CUD during the past 12-months using the NESARC-III. They reported that CUD is highly prevalent among men and women, although greater among men (3.5% versus 1.7%). However, Kerridge et al. did not report on sexual minorities and CUD nor on the use of medical marijuana.[10] We believe this is the first study using a national probability sample to examine medical cannabis use and DSM-5 CUD in a sample of sexual minorities and heterosexuals. Just as Kerridge and colleagues found in their study of sexual minorities and DUDs, we found bisexual respondents and those 'not sure' of their sexual identity showed some of the highest odds of severe CUD, placing these individuals at very high risk for negative health and social outcomes. Our data are also consistent with other studies that have found higher rates of cannabis use among sexual minorities, particularly bisexual individuals.

One of the most notable weaknesses in previous studies is the lack of attention to the severity of CUD or its relation to medical cannabis use. In the past, investigators used surrogates for severity (e.g., frequency of consumption in past 30 days), but they did not use formal DSM-5 diagnostic criteria. Further, there are no published studies using national data on the use of lifetime medical cannabis among sexual minorities and whether it is associated with CUD among sexual minorities. This study extends the data from past research by examining the severity of CUD in relation to medical cannabis use.

We found that sexual minorities were more likely to have a severe CUD. Although a mild CUD has implications for early intervention, it is the harder-to-treat severe CUD that has implications for longer-term sexual minority health.[12] We found that bisexuals or 'not sure' individuals who had a medical marijuana "card" or used medical cannabis had the highest odds of having a severe CUD. Additional research is needed to better understand the meaning of 'not sure' and the characteristics of individuals who choose this response, including how 'not sure' is linked to medical marijuana use and CUD. Future research should also examine age and cohort interactions as well as multiple co-occurring SUDs.

Despite the strengths of using a large nationally representative sample such as NESARC-III there are some limitations. The NESARC-III study design is cross-sectional and causality cannot be determined nor can results be generalized outside of the US. Institutionalized individuals were also not included in the NESARC-III sample and this likely leads to underestimation of cannabis use. Although NESARC-III includes a large US sample of sexual minorities, the sample size was not large enough to permit examination of multivariate relationships among the minority subgroups. Moreover, NESARC-III did not assess sexual assignment at birth nor gender identity; thus, sex (male or female) was assessed as binary and gender minority status was not assessed. Undeniably, the exclusion of questions about transgender identity limits our understanding of gender minorities. Future studies should endeavor to include the two-step question recommended by the Williams Institute, first asking about sex assigned at birth and then about current identity.[18] And finally, it is possible that those 'not sure' of their sexual identity may not have understood the question, or alternatively, gave a more socially-desirable response.

Conclusion

Notwithstanding the above limitations, our findings still provide strong evidence that among medical cannabis users there is a higher proportion of sexual minorities that develop a severe CUD, particularly bisexuals and individuals who are ‘not sure’ of their sexual identity. Our findings demonstrate the possible role of medical cannabis in relation to the development of CUD and this is a topic in need of further investigation.

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Table 1.

Assessing the association between sexual identity, medical marijuana use, and past-year cannabis use disorder (CUD)

	CUD 2-3 (Mild) n = 35,967			CUD 4-5 (Moderate) n = 35,967			CUD 6+ (Severe) n = 35,967			CUD 2-3 (Mild) n = 35,852		CUD 4-5 (Moderate) n = 35,852		CUD 6+ (Severe) n = 35,852	
	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Sexual identity															
Heterosexual	1.2	Reference		0.5	Reference		0.5	Reference		Reference		Reference		Reference	
Heterosexual (med. marijuana use)	14.3	14.0***	10.3, 19.1	7.8	16.2***	11.2, 23.5	3.4	7.01***	4.03, 12.1	6.69***	4.52, 9.90	6.07***	3.93, 9.37	1.95*	1.04, 3.66
Sexual minority	3.0	2.62***	1.79, 3.83	1.7	3.44***	2.05, 5.78	1.0	2.03***	1.10, 3.76	1.65	0.906, 2.14	1.52	0.877, 2.65	0.845	0.456, 1.56
Sexual minority (med. marijuana use)	9.4	8.67***	3.56, 21.1	9.5	20.1***	7.38, 55.2	14.5	33.4***	11.2, 98.8	3.95**	1.49, 10.4	7.21**	2.13, 24.4	13.2***	4.20, 41.6
Sexual identity															
Heterosexual	1.2	Reference		0.5	Reference		0.5	Reference		Reference		Reference		Reference	
Heterosexual (med. marijuana use)	14.3	14.0***	10.3, 19.1	7.8	16.2***	11.2, 23.5	3.4	7.01***	4.03, 12.1	6.68***	4.51, 9.90	6.07***	3.93, 9.37	1.95*	1.04, 3.66
Lesbian/gay	2.4	2.07*	1.12, 3.82	1.4	2.66*	1.13, 6.26	0.4	0.734	0.171, 3.14	1.30	0.675, 2.53	1.51	0.620, 3.72	0.364	0.082, 1.61
Lesbian/gay (med. marijuana use)	15.2	15.0***	4.45, 50.9	6.3	12.9***	2.87, 58.4	8.3	17.8***	3.77, 83.8	8.83***	2.39, 32.5	4.79	0.682, 33.7	5.95	0.884, 40.1
Bisexual	3.6	3.13***	1.80, 5.43	2.6	5.10***	2.73, 9.52	1.4	2.75**	1.28, 5.88	1.36	0.743, 2.49	1.78	0.878, 3.63	0.910	0.374, 2.21
Bisexual (med. marijuana use)	7.1	6.36**	1.74, 23.2	10.9	23.6***	5.32, 104.6	14.2	32.5***	8.75, 121.1	2.87	0.715, 11.5	9.86**	1.99, 48.6	16.2***	3.80, 69.6
Not sure	3.4	2.91	0.916, 9.28	0.8	1.45	0.475, 4.47	2.0	4.02*	1.12, 14.4	1.76	0.482, 6.48	0.665	0.206, 2.15	2.09	0.591, 7.45
Not sure (med. marijuana use)	0.0	---		13.9	31.0**	3.37, 284.9	37.0	115.5***	13.4, 992.3	0.0	---	5.69	0.267, 121.6	27.0***	4.16, 175.5

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

All odds ratios (OR) and adjusted odds ratios (AOR) control for age (18 to 34; 35 to 54; 55 and older), sex (male, female), educational level (high school degree or less; some college; college degree or higher), race (White, African-American, Hispanic, other), past year DSM-5 alcohol use disorder (2 or more symptoms), past-year DSM-5 tobacco use disorder (2 or more symptoms), and DSM-5 cannabis use disorder (2 or more symptoms). Sample sizes vary due to missing data.

Table 2.

Assessing the association between lifetime medical marijuana use and sexual identity among men and women

	Males Lifetime medical marijuana use n = 15,724			Males Lifetime medical marijuana use n = 15,636			Females Lifetime medical marijuana use n = 20,271			Females Lifetime medical marijuana use n = 20,216	
	% (n)	OR	95% CI	AOR	95% CI		% (n)	OR	95% CI	AOR	95% CI
Sexual identity						**Sexual identity**					
Heterosexual (n = 15,190)	1.7 (323)	Reference		Reference		Heterosexual (n = 19,454)	1.0 (195)	Reference		Reference	
Sexual minority (n = 534)	4.1 (21)	2.39***	1.43, 3.98	1.99*	1,17, 3.37	Sexual minority (n = 817)	4.7 (43)	4.97***	3.24, 7.61	2.95***	1.68, 5.17
Sexual identity						**Sexual identity**					
Heterosexual (n = 15,190)	1.7 (323)	Reference		Reference		Heterosexual (n = 19,454)	1.0 (195)	Reference		Reference	
Gay (n = 321)	3.0 (12)	1.71*	1.06, 2.77	1.68*	1.04, 2.70	Lesbian (n = 265)	5.0 (13)	5.27***	2.55, 10.8	3.36**	1.38, 8.17
Bisexual (n = 144)	6.5 (7)	3.92**	1.56, 9.81	2.64	0.914, 7.65	Bisexual (n = 422)	5.1 (23)	5.44***	3.32, 8.93	3.19***	1.67, 6.07
Not sure (n = 69)	4.1 (2)	2.39	0.450, 12.7	1.76	0.368, 8.44	Not sure (n = 130)	2.8 (7)	2.91*	1.19, 7.09	1.57	0.551, 4.48

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

All odds ratios (OR) and adjusted odds ratios (AOR) control for age (18 to 34; 35 to 54; 55 and older), sex (male, female), educational level (high school degree or less; some college; college degree or higher), race (White, African-American, Hispanic, other), past year DSM-5 alcohol use disorder (2 or more symptoms), past-year DSM-5 tobacco use disorder (2 or more symptoms), and DSM-5 cannabis use disorder (2 or more symptoms). Sample sizes vary due to missing data.