Severity of Alcohol, Tobacco, and Drug Use Disorders Among Sexual Minority Individuals and Their “Not Sure” Counterparts

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Abstract

Purpose: Sexual minority individuals have heightened risk for substance use; however, previous studies have not assessed *severity* of alcohol use disorders (AUDs), tobacco use disorders (TUDs), and drug use disorders (DUDs) among lesbian/gay and bisexual individuals and those “not sure” of their sexual identity compared with heterosexual individuals. This study examined how three dimensions of sexual orientation (identity, attraction, and behavior) relate to severity of AUD, TUD, and DUD.

Methods: This study used cross-sectional national data ($N=36,309$) from the National Epidemiologic Survey on Alcohol and Related Conditions-III, and well-validated alcohol, tobacco, and drug measures that align with *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* criteria. Data were collected through in-person interviews in 2012–2013.

Results: Sexual minority respondents, based on sexual *identity*, had higher odds of severe AUD or TUD than heterosexual respondents. Opposite- and same-sex *behavior* was a predictor of severe AUD (adjusted odds ratio [AOR]=2.44; 95% confidence interval [CI]=1.24–4.79) and TUD (AOR=2.16; 95% CI=1.19–3.93), but not DUD. Those “not sure” of their sexual identity had higher odds of severe AUD, TUD, and DUD: AUD (AOR=5.05; 95% CI=2.78–9.16), TUD (AOR=4.18; 95% CI=2.29–7.64), and DUD (AOR=4.40; 95% CI=1.72–11.2), than heterosexual respondents. There were few significant differences between “not sure” and bisexual respondents.

Conclusions: These findings provide strong evidence that bisexual and “not sure” U.S. adults are more likely to have a severe AUD and TUD. They also demonstrate the importance of treatment strategies that address sexual minority-specific risks, particularly for bisexual individuals and those “not sure” of their sexual identity.

Keywords: alcohol use, dimensions of sexual orientation, drug use, DSM-5 disorders, sexual orientation, tobacco use

Introduction

RESEARCH INDICATES THAT those with a sexual minority identity are at heightened risk for substance use.^{1–11} Although less attention has been paid to individuals who are unsure of their sexual identity, this group also appears to be at greater risk for negative substance use outcomes than heterosexual individuals.^{6,12} Indeed, sexual minority individuals are represented disproportionately among the 30

million U.S. adults who meet *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5)¹³ criteria for substance use disorder. Most prevalent are alcohol use disorders (AUDs) and tobacco use disorders (TUDs), followed by other drug use disorders (DUDs).^{14–17}

Hughes et al.⁶ examined a sample of heterosexual and sexual minority respondents in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-II.) They found that odds of substance use disorders were

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generally higher among sexual minority respondents ($n=747$) than among heterosexual respondents ($n=33,598$). Using more recent data from the NESARC-III, Slater et al.¹² examined substance use among 1351 respondents. More than a quarter (25.9%) of lesbian/gay, 30.2% of bisexual, and 25.3% of “not sure” respondents met criteria for DSM-5 AUD. DSM-5 TUD was seen in 28.9% of lesbian/gay, 37.6% of bisexual, and 31.2% of “not sure” respondents. Fewer respondents were found to have a DSM-5 DUD: 7.4% of lesbian/gay, 11.0% of bisexual, and 10.7% of “not sure” respondents.

Despite important insights into substance use among sexual minority individuals afforded by the aforementioned studies,^{6,12} there is a notable gap in national probability studies on substance use. None of the studies assessed *severity* of substance use disorders. The lack of attention to the severity of a substance use disorder obscures important information about impairment, which has implications for substance use treatment.

Studies on sexual orientation and substance use often assess only one dimension of sexual orientation (e.g., identity or behavior), or do not distinguish among the dimensions. Sexual identity is understood as the self-concept around which individuals organize their sexual attraction, often resulting in the self-label of lesbian, gay, bisexual, or heterosexual.¹⁸ Although identity and behavior or attraction are often assumed to be overlapping (e.g., that lesbian women only have sex with women), it is important to recognize that these dimensions do not always align. For instance, a man may identify himself as heterosexual, yet may also be sexually attracted to and sexually active with men. Thus, we chose to examine substance use across the three major sexual orientation dimensions.

Although most people indicate their sexual identity on drug and alcohol surveys, some are unsure. One advantage of the 2012–2013 NESARC-III is that in addition to the response options of lesbian/gay, bisexual, or heterosexual, respondents were given the option of indicating that they were unsure of their sexual identity.¹⁹ A respondent’s choice of “not sure” can mean a number of things, including, but not limited to, not understanding the question, not feeling that they fit into the categories provided (for example, the absence of queer or other labels as response options), or actually being unsure of one’s sexual identity.

Objective

We focused on DSM-5 severity of impairment because it allows us to target the health consequences of AUD, TUD, and DUD. We based our definition of severity on the 11 items that comprise the four impairment domains in the DSM-5. Drawing from current literature, we expected that bisexual and “not sure” respondents would have higher prevalence of severe AUD, TUD, and DUD than heterosexuals or lesbian/gay individuals.

Methods

There are few well-designed studies that include large enough subsamples of sexual minority individuals—including those “not sure” of their sexual identities—to assess the *severity* of substance use disorders meaningfully. One exception is

the NESARC-III nationally representative household survey sponsored by the National Institutes of Health.^{14,15}

Our study used NESARC-III data collected from April 2012 through June 2013. The primary source of information was the general U.S. civilian noninstitutionalized population of individuals 18 years of age and older. Data were collected through in-person interviews. Response rates were 72% (by household), 84% (by person), and 60% (overall). Respondents ($N=36,309$) were given \$90.00 for their participation in the survey. The NESARC-III sample design, response rates, and weighting procedures have been described elsewhere.^{20,21} All NESARC-III procedures received full human subjects review and institutional review board (IRB) approval before data collection. The IRB of the first author’s institution determined that this secondary analytic study with deidentified data is exempt.

The NESARC-III includes reliable and validated measures that align with the DSM-5¹³ criteria for substance use disorders and allows a determination of AUD, TUD, and DUD severity among lesbian, gay, and bisexual respondents according to all three major dimensions of sexual orientation (identity, attraction, and behavior).²² It uses the National Institute on Alcohol Abuse and Alcoholism’s “Alcohol Use Disorder and Associated Disabilities Interview Schedule-5” (AUDADIS-5), a fully structured diagnostic interview. Depending on the substance, 38 to 40 items are included in the AUDADIS-5 that map onto the 11 DSM-5 symptom criteria. Those 11 criteria make up the four domains reflecting impairment: (1) impaired control, (2) social impairment, (3) risky use, and (4) tolerance/withdrawal. According to the DSM-5 and regardless of type of impairment, a mild disorder is indicated by endorsement of 2–3 criteria, moderate disorder is indicated by endorsement of 4–5 criteria, and severe disorder is indicated by endorsement of 6–11 criteria.

Past-year AUD, TUD, and DUD and severity level

For past-year AUD and TUD: (1) “any disorder” was defined as endorsing 2 or more of the 11 DSM-5 symptom criteria specific to alcohol or tobacco use and (2) “severe disorder” was defined as endorsing 6 or more of the 11 DSM-5 symptom criteria. DUD diagnosis was similar to that for AUD and TUD except that multiple drugs were included, and a diagnosis required endorsement of at least two symptoms for the same drug class (i.e., sedative/tranquilizer, cannabis, amphetamine, cocaine, nonheroin opioid, heroin, hallucinogen, club drugs, and solvents/inhalants). Test–retest reliability for DSM-5 AUD, TUD, and DUD diagnoses was fair and dimensional criteria scales were fair to excellent.^{15,23,24}

Past-year substance use impairment based on the DSM-5

Eleven symptom criteria were mapped onto four domains of impairment and were assigned to only one domain per criterion. The DSM-5 domain assignments were (1) Impaired Control (four symptoms such as “had times when you ended up using a substance more, or longer, than you intended”); (2) Social Impairment (three symptoms such as “continued to use a substance even though it was causing trouble with family and friends”); (3) Risky Use (two symptoms such as “continued to use a substance even though it was adding to a health problem”); and (4) Tolerance/Withdrawal (two symptoms

such as “had to use a substance more in order to get the desired effect”). If a respondent endorsed one symptom within an impairment domain, they were determined to have endorsed the domain.

Reliability and validity of the DSM-5-based diagnoses of substance use disorder have been established in prior psychometric studies.^{23,24}

Sexual minority and sexual orientation

The variable “sexual minority” is a composite using the three dimensions of sexual orientation: identity (i.e., gay or lesbian, bisexual, or not sure), attraction (i.e., males and females “equally attracted to females and males”; males who were “only” or “mostly” attracted to males; females who were “only” or “mostly” attracted to females), and behavior (i.e., males and females who had sex with “both males and females”; males who had sex with “only males”; females who had sex with “only females”). *Sexual identity* was assessed by asking, “Which of the categories on the card best describes you: (1) heterosexual, (2) gay or lesbian, (3) bisexual, or (4) not sure?” *Sexual attraction* was assessed by asking, “People are different in their sexual attraction to other people. Which category on the card best describes your feelings: (1) only attracted to females, (2) mostly attracted to females, (3) equally attracted to females and males, (4) mostly attracted to males, or (5) only attracted to males?” Sexual attraction was recoded to reflect three attraction-based groups: (1) predominantly attracted to the opposite sex, (2) predominantly attracted to the same sex, and (3) attracted equally to opposite and same sex. *Sexual behavior* was assessed by asking all respondents whether they had ever had sex (lifetime). If they responded affirmatively to the question about lifetime sex, respondents were asked, “During the last 12 months, did you have sex with (1) only males, (2) only females, or (3) both males and females?” Sexual behavior in the past 12 months was recoded to reflect four behavior-based groups: same-sex behavior only, opposite-sex behavior only, same- and opposite-sex behavior, and no sexual behavior.

Sociodemographic characteristics

Sociodemographic characteristics included age (18–34, 35–54, and 55 years and older); sex (male and female); and race/ethnicity (White, African American, Hispanic, and other). These sociodemographic characteristics served as control variables in the analytic models outlined hereunder.

Data analyses

We examined the overall prevalence of any past-year AUDs, TUDs, and DUDs (e.g., two or more symptoms), severe substance use disorders, and the four impairment domains among heterosexual and sexual minority respondents. Second, we assessed differences in the AUD, TUD, and DUD outcomes separately based on identity, attraction, and behavior, controlling for age, sex, and race/ethnicity. We used binary logistic regression to assess the unique association within the three dimensions of sexual orientation. Third, we assessed differences in AUD, TUD, and DUD, incorporating each sexual orientation dimension simultaneously (controlling for age, sex, and race/ethnicity) to determine which dimension had the strongest overall

associations. We do not present the results of the multiple logistic regression analyses assessing the four domains of substance use disorders due to notable similarities with the analytic models assessing past-year any and severe AUD, TUD, and DUD.

We used STATA 15.0 (Version 15.0; StataCorp LP, College Station, TX) to estimate the models outlined above. We controlled for potentially confounding factors (i.e., age, sex, and race/ethnicity) and report adjusted odds ratios (AORs) and 95% confidence intervals (CIs). Because the NESARC-III design included stratification and clustering of the target population, analytic techniques were design based using sampling weights to calculate estimates of population parameters and specialized variance estimation techniques to accommodate the complex design features of the sample when estimating standard errors. All estimates provided in the tables used the sampling weights and accounted for the complex sampling design. However, unweighted sample sizes are provided to show the actual number of respondents within each subpopulation included in the analyses. Because preliminary analyses showed no statistically significant differences between sexual minority men and women with respect to substance use disorders and to preserve

TABLE 1. SAMPLE CHARACTERISTICS
FROM THE NATIONAL EPIDEMIOLOGIC SURVEY
ON ALCOHOL AND RELATED CONDITIONS-III,
UNITED STATES, 2012–2013

<i>Sociodemographics</i>	<i>Total (N = 36,309) n (%)</i>
Sexual identity	
Heterosexual	34,644 (96.7)
Gay or lesbian	586 (1.5)
Bisexual	566 (1.3)
Not sure	199 (0.5)
Sexual attraction	
Opposite-sex attraction	34,114 (95.3)
Same-sex attraction	1278 (3.3)
Opposite- and same-sex attraction	582 (1.4)
Sexual behavior (past year)	
Opposite-sex behavior	24,525 (71.4)
Same-sex behavior	971 (2.5)
Opposite- and same-sex behavior	227 (0.5)
No sex (past-year/lifetime)	9812 (25.6)
Sex	
Male	15,862 (48.1)
Female	20,447 (51.9)
Race	
White	19,194 (66.2)
African American	7766 (11.8)
Hispanic	7037 (14.7)
Other race	2312 (7.3)
Age	
18 to 34	11,755 (30.3)
35 to 54	13,150 (35.7)
55 and older	11,404 (34.0)

Sample sizes vary due to missing data. Unweighted sample sizes are provided.

Percentages incorporate survey weights provided by the NESARC-III.

power, we chose to conduct the analyses by controlling for rather than stratifying by sex. We used listwise deletion to handle the missing data given the small overall percentage of respondents (2.6%) who would be excluded based on missing data.

Results

Approximately 6.4% ($n = 2335$) of the sample was categorized as sexual minority. Table 1 summarizes the distribution of the three sexual orientation dimensions (identity, attraction, and behavior) and Table 2 summarizes the four domains of impairment (impaired control, social impairment, risky use, and tolerance/withdrawal), and severity of AUD, TUD, and DUD. In this study, all three dimensions of sexual orientation were separately predictive of severity of AUD, TUD, and DUD; however, when incorporated into the analytic models simultaneously, identity was the most strongly predictive of severity.

As shown in Table 2, not only was severity of AUD, TUD, and DUD higher among sexual minority respondents than among heterosexual respondents, but sexual minority respondents were also significantly more likely to meet criteria on the four impairment domains for alcohol, tobacco, and drugs. The most prevalent impairments for anyone with AUD and TUD were “impaired control” and “risky use,” but this was not true for those with DUD; “impaired control”

and “tolerance/withdrawal” were the two most prevalent impairments for respondents with DUD.

We also examined sexual attraction, when controlling for sexual identity, sexual behavior, and other sociodemographic variables. We found that respondents who endorsed same-sex attraction had lower odds of any past-year TUD than opposite-sex attracted respondents (Table 3). Those who indicated both opposite- and same-sex behavior (i.e., bisexual behavior) compared with those who reported either exclusively heterosexual or exclusively same-sex behavior had higher odds of reporting any past-year AUD or TUD. Indeed, respondents who indicated both opposite- and same-sex behavior had almost two times the odds of any past-year AUD and TUD as respondents who reported either exclusively heterosexual or exclusively same-sex behavior. Notably, those who reported “no sex” had significantly lower odds of AUD than any other behavioral group (i.e., only opposite-sex behavior, only same-sex behavior, and both opposite- and same-sex behavior). Moreover, those individuals who reported “no sex” had lower odds for TUD and DUD than individuals who reported only opposite-sex behaviors, or who reported opposite- and same-sex behaviors.

Table 4 shows associations between the three dimensions of sexual orientation and past-year severe AUD, TUD, and DUD.

Sexual minority respondents, based on sexual identity, had higher odds of severe AUD and TUD than heterosexual

TABLE 2. SUBSTANCE USE OUTCOMES AMONG HETEROSEXUAL AND SEXUAL MINORITY RESPONDENTS

<i>Substance use outcomes</i>	<i>Total (N = 36,309) n (%)</i>	<i>Heterosexual^a (n = 33,708)^a, n (%)</i>	<i>Sexual minority^a (n = 2335)^a, n (%)</i>
AUD			
Any AUD (mild, moderate, or severe)	4957 (13.4)	4397 (12.8)	525 (21.5)
Severe AUD	1232 (3.1)	1044 (2.9)	179 (7.2)
Impaired control	6524 (17.7)	5847 (17.2)	631 (26.4)
Social impairment	1972 (5.2)	1713 (4.9)	243 (9.6)
Risky use	3893 (10.9)	3444 (10.5)	416 (17.1)
Tolerance/withdrawal	3684 (9.7)	3260 (9.3)	396 (15.7)
TUD			
Any TUD (mild, moderate, or severe)	6260 (17.4)	5664 (17.0)	553 (23.6)
Severe TUD	1749 (4.9)	1546 (4.6)	191 (8.1)
Impaired control	7721 (21.1)	7002 (20.7)	661 (27.9)
Social impairment	2371 (6.6)	2135 (6.5)	219 (9.2)
Risky use	5180 (14.3)	4710 (14.1)	439 (18.4)
Tolerance/withdrawal	2673 (7.4)	2382 (7.1)	273 (11.6)
DUD			
Any DUD (mild, moderate, or severe)	1547 (4.0)	1354 (3.8)	186 (7.7)
Severe DUD	419 (1.1)	363 (1.1)	54 (2.0)
Impaired control	1731 (4.4)	1507 (4.1)	215 (9.0)
Social impairment	647 (1.7)	560 (1.6)	84 (3.0)
Risky use	1328 (3.6)	1173 (3.4)	152 (6.6)
Tolerance/withdrawal	1435 (3.8)	1243 (3.5)	185 (8.2)

Unweighted sample sizes are provided. Percentages incorporate survey weights provided by the NESARC-III.

^aThe bivariate analysis assesses the overall prevalence of past-year substance use disorders (e.g., two or more symptoms), severe substance use disorders, and impairment domains among heterosexual and sexual minority respondents based on a composite measure using the three dimensions of sexual orientation: identity (i.e., gay or lesbian, bisexual, or not sure), attraction (i.e., males and females “equally attracted to females and males”; males who were “only” or “mostly” attracted to males; females who were “only” or “mostly” attracted to females), and behavior (i.e., males and females who had sex with “both males and females”; males who had sex with “only males”; females who had sex with “only females”). Differences (using binary logistic regression) between heterosexual and sexual minority respondents were all significant at the 0.001 alpha level (controlling for sex, race/ethnicity, and age).

AUD, alcohol use disorder; DUD, drug use disorder; TUD, tobacco use disorder.

TABLE 3. ANY ALCOHOL USE DISORDER, TOBACCO USE DISORDER, AND DRUG USE DISORDER BY DIMENSIONS OF SEXUAL ORIENTATION

	Any AUD (mild, moderate, or severe) n = 35,409 ^a		Any TUD (mild, moderate, or severe) n = 35,356 ^a		Any DUD (mild, moderate, or severe) n = 35,415 ^a	
	% ^b	AOR (95% CI) Model 1 ^c	% ^b	AOR (95% CI) Model 2 ^c	% ^b	AOR (95% CI) Model 3 ^c
Identity						
Heterosexual	12.9 ^{def}	Reference ^{def}	17.0 ^{def}	Reference ^{def}	3.8 ^{def}	Reference ^f
Lesbian/gay	25.4 ^g	2.03 (1.49–2.77)^g	24.6 ^{eg}	1.80 (1.27–2.56)^g	7.8 ^g	1.62 (0.880–2.99)
Bisexual	29.9 ^g	1.94 (1.34–2.79)^g	33.4 ^{dg}	1.72 (1.22–2.43)^g	11.5 ^g	1.69 (0.932–3.07)
Not sure	24.7 ^g	2.68 (1.62–4.40)^g	29.3 ^g	2.41 (1.59–3.65)^g	10.3 ^g	2.81 (1.50–5.25)^g
Attraction						
Opposite sex	13.1 ^{de}	Reference	17.2 ^e	Reference ^d	3.9 ^{de}	Reference
Same sex	17.8 ^{eg}	0.857 (0.595–1.23)	18.0 ^e	0.665 (0.497–0.889)^{eg}	5.8 ^{eg}	1.09 (0.625–1.92)
Opposite and same sex	22.4 ^{dg}	0.975 (0.679–1.40)	28.8 ^{dg}	1.21 (0.874–1.69) ^d	9.7 ^{dg}	1.35 (0.819–2.24)
Behavior						
Opposite sex	15.6 ^{def}	Reference ^{ef}	18.8 ^{ef}	Reference ^{ef}	4.5 ^{def}	Reference ^f
Same sex	21.9 ^{efg}	1.08 (0.794–1.49) ^{ef}	21.1 ^{ef}	1.12 (0.811–1.55) ^e	6.7 ^{efg}	0.949 (0.586–1.53) ^e
Opposite and same sex	43.2 ^{dfg}	2.00 (1.29–3.10)^{dfg}	44.2 ^{dfg}	1.98 (1.29–3.06)^{dfg}	17.9 ^{dfg}	1.86 (0.989–3.50) ^{df}
No sex	5.9 ^{deg}	0.520 (0.460–0.588)^{deg}	12.9 ^{deg}	0.843 (0.773–0.918)^{eg}	2.1 ^{deg}	0.703 (0.562–0.879)^{eg}

Any disorder (i.e., 2+ symptoms).

Significant differences in reference to heterosexual (identity), opposite-sex only (attraction), and opposite-sex only (behavior) respondents are in bold for the full analytical models.

^aSample sizes vary due to missing data. Unweighted sample sizes are provided.

^bThe percentages provide the differences with respect to the bivariate associations (controlling for sex, race/ethnicity, and age).

^cModels 1 through 3 incorporate sexual identity, attraction, and behavior simultaneously to estimate AORs and 95% CIs (including controls for sex, race/ethnicity, and age); the AORs presented use (identity), opposite-sex only (attraction), and opposite-sex only (behavior) as the reference category.

^d $p < 0.05$ using lesbian/gay respondents as the reference group (identity); same-sex respondents as the reference group (attraction); same-sex respondents as the reference group (behavior).

^e $p < 0.05$ using bisexual respondents as the reference group (identity); opposite- and same-sex respondents as the reference group (attraction); opposite- and same-sex respondents as the reference group (behavior).

^f $p < 0.05$ using not sure as the reference group (identity); no sex respondents as the reference group (behavior).

^g $p < 0.05$ using heterosexual respondents as the reference group (identity); opposite-sex respondents as the reference group (attraction); opposite-sex respondents as the reference group (behavior).

AOR, adjusted odds ratio; CI, confidence interval.

respondents. Opposite- and same-sex behaviors were predictive of severe AUD (AOR = 2.44; 95% CI = 1.24–4.79) and TUD (AOR = 2.16; 95% CI = 1.19–3.93), but not DUD. Respondents who were “not sure” of their sexual identity had higher odds for all severe substance use disorders (AUD [AOR = 5.05; 95% CI = 2.78–9.16], TUD [AOR = 4.18; 95% CI = 2.29–7.64], and DUD [AOR = 4.40; 95% CI = 1.72–11.2]) than heterosexual respondents. We found few significant differences between “not sure” and bisexual respondents. No significant differences for severity were seen between men and women when categorized by either sexual attraction or behavior.

Discussion

This study, using a national probability sample, is the first to examine the relationships among the dimensions of sexual orientation and AUD, TUD, and DUD severity. It is also the first study to examine the four DSM-5 domains of impairment across sexual identity, attraction, and behavior. As such, this study broadens our understanding of the severity and types of impairment experienced by sexual minority individuals.

Our results demonstrated that U.S. adults who identified as lesbian/gay and bisexual had greater odds of

reporting AUD and TUD, but not DUD, than heterosexual respondents. This finding is consistent with that of Slater et al.¹² Only respondents who identified as “not sure” had greater odds of any past-year DUD than heterosexual respondents. Furthermore, we found no statistically significant differences among the three dimensions of sexual orientation between men and women with respect to AUD, TUD, and DUD (data not shown, available on request).

We found differences among sexual minority respondents. Those who indicated both opposite- and same-sex behavior were found to have higher odds of reporting any past-year AUD and TUD than respondents with same-sex behavior only. In their review of the literature on substance use among lesbian, gay, and bisexual individuals, Green and Feinstein⁴ found that bisexual identity or behavior was related to increased risk for substance use. Other studies have found that bisexual women and men were more likely to report alcohol and drug use than both lesbian/gay and heterosexual identified respondents.^{9,25,26} Moreover, our study showed that not only was severity of AUD, TUD, and DUD higher for sexual minority respondents than for heterosexual respondents, indicators of impairment were also more prevalent.

TABLE 4. SEVERE ALCOHOL USE DISORDER, TOBACCO USE DISORDER, AND DRUG USE DISORDER BY DIMENSIONS OF SEXUAL ORIENTATION

	<i>Severe AUD</i> n = 35,409 ^a		<i>Severe TUD</i> n = 35,356 ^a		<i>Severe DUD</i> n = 35,415 ^a	
	% ^b	AOR (95% CI) Model 4 ^c	% ^b	AOR (95% CI) Model 5 ^c	% ^b	AOR (95% CI) Model 6 ^c
Identity						
Heterosexual	2.9 ^{def}	Reference ^{def}	4.7 ^{ef}	Reference ^{def}	1.1 ^{ef}	Reference ^f
Lesbian/gay	7.1 ^{fg}	2.36 (1.17–4.74) ^{fg}	7.5 ^{ef}	2.22 (1.19–4.13) ^g	1.4 ^f	0.704 (0.196–2.52) ^f
Bisexual	11.4 ^g	3.08 (1.44–6.58) ^g	13.3 ^{dg}	2.51 (1.29–4.88) ^g	3.5 ^g	1.55 (0.538–4.49) ^f
Not sure	11.5 ^{dg}	5.05 (2.78–9.16) ^{dg}	14.4 ^{dg}	4.18 (2.29–7.64) ^g	4.8 ^{dg}	4.40 (1.72–11.2) ^{deg}
Attraction						
Opposite sex	2.9 ^{de}	Reference	4.8 ^e	Reference	1.1 ^e	Reference
Same sex	4.6 ^{eg}	0.589 (0.269–1.29)	5.1 ^e	0.625 (0.382–1.02)	1.6	0.951 (0.320–2.82)
Opposite and same sex	7.7 ^{dg}	0.777 (0.443–1.36)	10.6 ^{dg}	0.926 (0.523–1.64)	2.9 ^g	1.25 (0.393–4.01)
Behavior						
Opposite sex	3.5 ^{def}	Reference ^{ef}	5.2 ^e	Reference ^e	1.3 ^{ef}	Reference ^f
Same sex	6.3 ^{efg}	1.53 (0.866–2.70) ^f	5.9 ^e	1.00 (0.666–1.52) ^e	2.2 ^f	1.66 (0.752–3.69) ^f
Opposite and same sex	18.5 ^{dfg}	2.44 (1.24–4.79) ^{fg}	19.4 ^{dfg}	2.16 (1.19–3.93) ^{dfg}	6.4 ^{fg}	2.18 (0.897–5.30) ^f
No sex	1.5 ^{deg}	0.672 (0.538–.840) ^{deg}	3.7 ^e	0.962 (0.827–1.11) ^e	0.4 ^{deg}	0.453 (0.277–.741) ^{deg}

Severe disorder (i.e., 6+ symptoms).

Significant differences in reference to heterosexual (identity), opposite-sex only (attraction), and opposite-sex only (behavior) respondents are in bold for the full analytical models.

^aSample sizes vary due to missing data. Unweighted sample sizes are provided.

^bThe percentages provide the differences with respect to the bivariate associations (controlling for sex, race/ethnicity, and age).

^cModels 4 through 6 incorporate sexual identity, attraction, and behavior simultaneously to estimate AORs and 95% CIs (including controls for sex, race/ethnicity, and age); the AORs use heterosexual (identity), opposite-sex only (attraction), and opposite-sex only (behavior) as the reference category.

^d $p < 0.05$ using lesbian/gay respondents as the reference group (identity); same-sex respondents as the reference group (attraction); same-sex respondents as the reference group (behavior).

^e $p < 0.05$ using bisexual respondents as the reference group (identity); opposite- and same-sex respondents as the reference group (attraction); opposite- and same-sex respondents as the reference group (behavior).

^f $p < 0.05$ using not sure as the reference group (identity); no sex respondents as the reference group (behavior).

^g $p < 0.05$ using heterosexual respondents as the reference group (identity); opposite-sex respondents as the reference group (attraction); opposite-sex respondents as the reference group (behavior).

We found some variation in the odds of severe AUD, TUD, and DUD across the three dimensions of sexual orientation. For instance, respondents who indicated that they were “not sure” of their sexual identity had significantly greater odds than lesbian/gay and bisexual respondents of meeting criteria for severe DUD. Bostwick and Hequembourg²⁷ suggest that the higher rates of substance use among bisexual individuals may be related to biphobia or the stigma of not finding an identifiable community. This may also be true for those who are “unsure” of their identity.

Few researchers to date have included the response option “not sure” in their studies or they have excluded this group from their analyses. It is possible that individuals who are unsure of their sexual identity also face minority stress in the form of stigma and marginalization. It is also possible that individuals who chose “not sure” to describe their sexual identity may be grappling with their sexual minority identity and may use alcohol or other drugs to cope. It is important to understand whether respondents who indicate that they are unsure of their sexual identity either lack cognitive understanding of the question or are providing a more socially desirable response than lesbian/gay or bisexual. Additional research is needed to better understand the meaning of “not sure,” the characteristics of respondents who choose this response, and how being “not sure” is linked to substance use. Those who are either “unsure” or discordant in

their orientation (e.g., their identity does not match their attraction or behavior) may experience social stress, which is, in turn, related to substance use.

Limitations

Despite numerous strengths of NESARC-III, there are some limitations that should be considered. The data are cross-sectional and only from U.S. respondents, limiting international generalizability and understanding of causality. Institutionalized respondents (e.g., incarcerated) were not included in the NESARC-III sample and this likely leads to underestimation of substance use. Although NESARC-III includes a large U.S. sample of sexual minority respondents, the sample size was not large enough to permit examination of multivariate relationships among the minority subgroups separately for men and women with respect to severe substance use disorders. This is an important limitation given findings that show substantial differences in risk for sexual minority men and women. For example, in contrast to findings from the general population, sexual minority women appear to be at substantially higher risk than sexual minority men for AUDs.²⁸ Finally, NESARC-III did not assess sex assignment at birth nor gender identity. Sex (male or female) was assessed as binary. Questions regarding transgender identity, a group at particularly high risk for substance use disorders, were not

included in NESARC-III. The exclusion of questions about transgender identity is a notable limitation. Future studies should endeavor to include the two-step question recommended by the Williams Institute that first asks about sex assigned at birth and then about current identity.²⁹

Conclusion

Our findings provide strong evidence that a higher proportion of sexual minority individuals, particularly bisexual individuals and individuals who are “not sure” of their sexual identities, have severe AUDs and TUDs, and those “not sure” also have severe DUDs. Higher rates of severe substance use disorders among sexual minority individuals pose unique challenges for the treatment community and signify substantial health disparities. Our findings demonstrate the importance of designing treatment programs that target sexual minority individuals and their unique risks.

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Disclaimer

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Author Disclosure Statement

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