Sexual Orientation-Related Disparities in High-Intensity Binge Drinking: Findings from a Nationally Representative Sample

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Abstract

Purpose: The purpose of this study was to assess sexual orientation differences in high-intensity binge drinking using nationally representative data.

Methods: Data were from the National Epidemiologic Survey on Alcohol and Related Conditions III ($N=36,309$), a nationally representative sample of U.S. adults collected in 2012–2013. Sex-stratified adjusted logistic regression models were used to test sexual orientation differences in the prevalence of standard (4+ for women and 5+ for men) and high-intensity binge drinking (8+ and 12+ for women; 10+ and 15+ for men) across three dimensions of sexual orientation: sexual attraction, sexual behavior, and sexual identity.

Results: Sexual minority women, whether defined on the basis of sexual attraction, behavior, or identity, were more likely than sexual majority women to engage in high-intensity binge drinking at two (adjusted odds ratios [aORs] ranging from 1.52 to 2.90) and three (aORs ranging from 1.61 to 3.27) times the standard cutoff for women (4+). Sexual minority men, depending on sexual orientation dimension, were equally or less likely than sexual majority men to engage in high-intensity binge drinking.

Conclusion: This study is the first to document sexual orientation-related disparities in high-intensity binge drinking among adults in the United States using nationally representative data. The results suggest that differences in alcohol-related risk among sexual minority individuals vary depending on sex and sexual orientation dimension.

Keywords: alcohol use, disparities, high-intensity binge drinking, lesbian, gay, and bisexual, sexual minority

Introduction

THERE HAS BEEN increased attention to the health needs of lesbian, gay, and bisexual people given that their experiences with stigma, discrimination, and victimization place them at increased risk for poor mental, behavioral, and physical health outcomes.^{1–5} One area of particular concern is the disproportionate rate of alcohol use among sexual minority youth and adults relative to heterosexual peers, particularly among women.^{4,6} Compared with heterosexual individuals, sexual minority individuals demonstrate elevated rates of alcohol use across multiple indicators of risk, including early initiation,⁷ frequency of use,⁸ heavy episodic drinking,⁹ alcohol-related problems,¹⁰ and alcohol use disorders.^{3,11} Given the link to related health morbidity¹² and mortality,¹³ excessive alcohol use is a vital public health concern in the general population and among sexual minority individuals, in particular.^{6,14}

Binge or heavy episodic drinking, typically defined as consuming four or more drinks in a row for women and

five or more drinks in a row for men within a 2-hour time frame¹⁵ is an important health indicator given the short-term (e.g., alcohol poisoning and injury) and long-term (e.g., alcohol dependence and liver damage) health consequences.^{16,17} Recently, researchers have argued that the 4+/5+ threshold for binge drinking obfuscates higher degrees of risk,¹⁸ given that a substantial proportion of binge drinkers, particularly young adults, consume two and three times the standard 4+/5+ defined amount.^{19–21}

Furthermore, an emergent body of literature delineates meaningful differences in the correlates (e.g., sex and age), antecedents (e.g., day of the week, positive and negative drinking expectations, and drinking contexts), and consequences (e.g., injury, blackouts, and driving after drinking) related to higher levels of alcohol use,^{17,20–22} thus illuminating important and unique prevention and intervention strategies targeting high-intensity binge drinkers.

Despite a robust and growing literature documenting sexual orientation-related disparities in alcohol use,^{6,14} researchers have not fully examined sexual orientation

differences in binge drinking at these higher level cutoffs. Although not nationally representative, the first study to document high-intensity binge drinking disparities between heterosexual and sexual minority individuals²³ found that sexual minority women were more likely than heterosexual women to report high-intensity binge drinking at two times the standard rate; sexual minority men were no more likely than heterosexual men to indicate binge or high-intensity binge drinking. These recent findings are in line with the general literature, which shows that sexual orientation-related disparities in alcohol use vary by sex, whereby sexual minority women demonstrate more consistent and sizable differences in heavy alcohol use relative to their heterosexual peers than do sexual minority men.^{4,6} These patterns, however, are cause for concern given women's elevated physiological and cognitive vulnerability to alcohol use relative to men.^{13,24}

In an effort to examine whether sexual orientation-related disparities in high-intensity binge drinking exist, this study estimated the prevalence of binge drinking (4+/5+ drinks for women and men, respectively) and high-intensity binge drinking (8+/10+ drinks and 12+/15+ drinks for women and men, respectively) among a U.S.-representative sample of heterosexual and sexual minority adults. Given sex differences in sexual orientation-related disparities in alcohol use,⁶ sexual orientation differences in high-intensity binge drinking were examined separately for men and women. Informed by previous research³ models were also designed to test differences in sexual orientation-related disparities in high-intensity binge drinking across three dimensions of sexual orientation—sexual attraction, sexual behavior, and sexual identity.

Methods

Data source and sample

Data were from the National Epidemiologic Survey on Alcohol and Related Conditions III (NESARC III),²⁵ a nationally representative cohort sample of noninstitutionalized civilian adults in the United States aged 18 years and older collected in 2012–2013 ($N=36,309$). Data were collected via computer-assisted personal interviews using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-5, by trained interviewers. The NESARC protocol was originally approved by the U.S. Census Bureau and the U.S. Office of Management and Budget. For the purposes of the current study, respondents were required to provide valid data for measures of high-intensity binge drinking and sexual orientation ($n=34,587$). This study was deemed to be exempt by the University of Texas and the University of Maryland Institutional Review Boards given the secondary analysis of de-identified data.

Measures

Prevalence of standard and high-intensity binge drinking. Participants provided a numerical response to the question “During the last 12 months, what was the largest number of drinks that you drank in a single day?” Responses were recoded to reflect whether participants drank at the standard binge drinking threshold as well as two and three times the standard threshold (i.e., high-intensity binge drink-

ing), for a total of three drinking thresholds for women (4+, 8+, and 12+ drinks; coded yes = 1, no = 0) and three drinking thresholds for men (5+, 10+, and 15+ drinks; coded yes = 1, no = 0).

Sex. Participants were asked “What is your sex” with response options of “male” and “female.”

Sexual orientation. Sexual attraction was measured by asking “People are different in their sexual attraction to other people. Which category on the card best describes your feelings?” Response options included “only attracted to women,” “mostly attracted to women,” “equally attracted to women and men,” “mostly attracted to men,” and “only attracted to men.” By referencing participants self-reported sex, responses were recoded to reflect *exclusively other-sex attraction* (reference), *mostly other-sex attraction*, *attraction to both men and women*, and *mostly/exclusively same-sex attraction*. There is precedent for collapsing mostly/exclusively same-sex attracted people, particularly when cell sizes are small.^{26–28} Mostly other-sex attracted is retained as a separate category as this group has shown unique risk relative to exclusively other-sex attracted people, as well as those attracted to both men and women.^{7,29,30}

Lifetime sexual behavior was measured via the question “In your lifetime, have you had sex with only men, only women, both men and women, or have you never had sex.” Response options were “only men,” “only women,” “both men and women,” and “never had sex.” By referencing participants self-reported sex, responses were recoded to characterize lifetime sexual partners as *exclusively other-sex* (reference), *exclusively same-sex*, and *both men and women*.

Sexual identity was assessed with a single item asking participants to indicate “Which of the following best describes you” with response options of “heterosexual (straight),” “gay or lesbian,” “bisexual,” and “not sure.” Participant responses were coded to reflect *heterosexual* (reference), *gay/lesbian*, and *bisexual* identities.

Due to the small proportion of people reporting “no lifetime sexual partners” (<2%) and “not sure” sexual identities (<0.05%) and their low endorsement of binge drinking and high-intensity binge drinking, these participants were excluded from analyses to aid in model estimation.

Covariates. Analyses were adjusted for several known confounders of alcohol use, including age, race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic Asian or Pacific Islander, and non-Hispanic American Indian), education (less than high school, completed high school, some college, and college degree or higher), employment status (working full-time at ≥ 35 hours a week, part-time at <35 hours a week, and not currently working), annual income (\$19,999 or less, \$20,000 to \$34,999, \$35,000 to \$69,999, and \$70,000 or higher), and marital status (married, divorced, separated, widowed, and never married). Study sample demographic characteristics are presented in Table 1.^{31–34}

Data analysis

First, initial bivariate analyses were conducted using Rao–Scott chi-square tests to examine the association between the

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS IN THE NATIONAL EPIDEMIOLOGIC SURVEY ON ALCOHOL AND RELATED CONDITIONS III, 2012–2013 (N=34,587)

	Women, n=19,490 (51.91%)			Men, n=15,097 (48.09%)		
	n	%w	95% CI	n	%w	95% CI
Age, years						
18–24	2038	10.70	10.08–11.35	1771	11.90	11.21–12.63
25–44	7578	34.34	33.52–35.16	5698	35.44	34.30–36.60
45+	9874	54.96	53.88–56.04	7628	52.66	51.41–53.91
Race/ethnicity						
White, non-Hispanic	10,188	66.12	64.40–67.80	8153	66.95	65.33–68.53
Black, non-Hispanic	4414	12.47	11.04–14.05	3033	11.08	9.92–12.35
Hispanic	3737	14.18	12.87–15.60	2949	15.23	13.89–16.68
Asian or Pacific Islander, non-Hispanic	866	5.47	4.59–6.51	765	5.42	4.58–6.40
American Indian, non-Hispanic	285	1.76	1.45–2.14	197	1.32	1.11–1.57
Marital status						
Married	8835	57.41	56.12–58.69	7684	62.52	61.33–63.70
Divorced, separated, widowed	6088	25.12	24.19–26.07	3119	14.87	14.15–15.61
Never married	4567	17.47	16.44–18.56	4294	22.61	21.62–23.64
Employment status						
Working full-time (≥35 hours/week)	7472	37.50	36.49–38.52	7835	53.39	51.89–54.88
Working part-time (<35 hours/week)	2847	15.38	14.65–16.14	1590	10.20	9.57–10.85
Not working	9171	47.12	46.02–48.22	5672	36.42	35.11–37.74
Annual income (U.S. \$)						
≤19,999	10,298	52.20	50.91–53.49	5495	33.12	31.88–34.39
20,000–34,999	4380	20.91	20.21–21.64	3429	21.01	20.20–21.84
35,000–69,999	3616	19.55	18.80–20.33	3912	26.79	25.94–27.66
≥70,000	1196	7.34	6.75–7.96	2261	19.08	17.90–20.32
Education						
Less than high school	2879	12.46	11.59–13.39	2339	13.21	12.28–14.19
Completed high school	5083	24.72	23.50–25.97	4227	26.68	25.55–27.84
Some college	6790	34.74	33.76–35.74	4724	31.06	29.85–32.30
College degree or higher	4738	28.08	26.41–29.81	3807	29.05	27.34–30.81
Sexual attraction						
Exclusively other-sex	17,649	90.96	90.28–91.60	14,004	93.39	92.82–93.91
Mostly other-sex	840	4.20	3.77–4.69	383	2.46	2.17–2.77
Both men and women	392	1.83	1.56–2.15	110	0.60	0.49–0.75
Mostly/exclusively same-sex	609	3.00	2.68–3.37	600	3.55	3.20–3.95
Sexual behavior						
Exclusively other-sex	18,206	93.84	93.37–94.27	14,206	94.75	94.24–95.21
Exclusively same-sex	330	1.66	1.43–1.93	508	2.90	2.59–3.24
Both men and women	954	4.50	4.13–4.91	383	2.35	2.05–2.70
Sexual identity						
Heterosexual	18,838	97.03	96.67–97.34	14,653	97.44	97.11–97.74
Gay/lesbian	252	1.16	0.99–1.37	305	1.76	1.51–2.05
Bisexual	400	1.81	1.58–2.07	139	0.79	0.65–0.97
Threshold						
4+/5+ drinks	5203	27.15	25.99–28.33	5991	39.50	38.33–40.70
8+/10+ drinks	1449	7.60	7.00–8.25	2774	18.42	17.50–19.38
12+/15+ drinks	603	3.01	2.69–3.37	1087	7.13	6.62–7.69

CI, confidence interval; %w, weighted percentage.

three dimensions of sexual orientation at 4+, 8+, and 12+ and 5+, 10+, and 15+ high-intensity binge drinking thresholds for women and men, respectively. Second, logistic regression models were estimated to test the association between the three dimensions of sexual orientation and high-intensity binge drinking thresholds, adjusting for demographic covariates (i.e., age, race/ethnicity, education level, employment status, annual income, and marital status). All analyses were designed adjusted and applied sampling weights to provide na-

tionally representative estimates of sexual orientation disparities in high-intensity binge drinking. Data management and analyses were conducted with Stata 15.1.³⁵

Results

The prevalence of past-year standard and high-intensity binge drinking in the overall sample is presented in Table 1. Just over 27% of women reported drinking at the

standard 4+ drink threshold and 7.6% and 3.0% reported having consumed 8 or more and 12 or more drinks, respectively. Comparatively, 39.5% of men reported consuming 5 or more drinks, 18.4% consumed 10 or more drinks, and 7.1% consumed 15 or more drinks. Sociodemographic differences by sexual identity, sexual attraction, and sexual behavior among men and women are presented in Supplementary Tables S1–S6.

Results of Rao–Scott chi-square tests are shown in Table 2. All subgroups of sexual minority women—on the basis of sexual attraction, behavior, and identity—were statistically more likely than exclusively other-sex attracted, other-sex behavioral, and heterosexual-identified women to report binge drinking and high-intensity binge drinking at $p < 0.001$. The prevalence of high-intensity binge drinking among sexual minority women was often two to three times that of heterosexual-identified women as well as women who reported exclusively other-sex sexual attraction and behavior.

In contrast to women, comparisons among men found that sexual minority men—depending on sexual orientation dimension—were equally or less likely than sexual majority men to report binge drinking and high-intensity binge drinking on the basis of sexual attraction ($p = 0.034$ for 5+, $p < 0.001$ for 10+, and $p = 0.214$ for 15+), sexual behavior

($p = 0.003$ for 5+, $p < 0.001$ for 10+, and $p = 0.022$ for 15+), and sexual identity ($p = 0.052$ for 5+, $p = 0.158$ for 10+, and $p = 0.422$ for 15+). Only 10.17% of men reporting mostly/exclusively same-sex attraction, for example, reported drinking at the 10+ drink threshold compared with 18.63% of men reporting exclusively other-sex attraction. Generally, mostly/exclusively same-sex attracted, exclusively same-sex behavioral, and gay-identified men had the lowest prevalence of high-intensity binge drinking.

Results from adjusted logistic regression models, shown in Table 3, indicated that sexual minority women were more likely than sexual majority women to report binge drinking and high-intensity binge drinking across all dimensions of sexual orientation at $p < 0.05$, with the exception of bisexual-identified women at the 12+ high-intensity binge drinking threshold, $p = 0.409$.

Adjusted models also showed that sexual minority men were no more likely than sexual majority men to report standard or high-intensity binge drinking, regardless of sexual orientation dimension. In fact, mostly/exclusively same-sex attracted and exclusively same-sex behavioral men were less likely than exclusively other-sex attracted and behavioral men, respectively, to report binge drinking across all thresholds, $p < 0.001$ for 5+ and 10+ thresholds and

TABLE 2. PAST-YEAR BINGE DRINKING AND HIGH-INTENSITY BINGE DRINKING AMONG WOMEN AND MEN BY SEXUAL ATTRACTION, SEXUAL BEHAVIOR, AND SEXUAL IDENTITY IN THE NATIONAL EPIDEMIOLOGIC SURVEY ON ALCOHOL AND RELATED CONDITIONS III, 2012–2013

	4+/5+ Threshold			8+/10+ Threshold			12+/15+ Threshold		
	n	%w	95% CI	n	%w	95% CI	n	%w	95% CI
Women									
Sexual attraction		$\chi^2 = 49.07, p < 0.001$			$\chi^2 = 50.95, p < 0.001$			$\chi^2 = 25.62, p < 0.001$	
Exclusively other-sex	4395	25.44	24.26–26.65	1142	6.70	6.12–7.32	462	2.64	2.31–3.00
Mostly other-sex	374	46.10	41.06–51.21	131	15.92	12.64–19.86	56	5.60	3.83–8.11
Both men and women	170	43.96	37.11–51.05	66	15.35	11.93–19.54	36	7.56	5.28–10.72
Mostly/exclusively same-sex	264	42.14	36.63–47.86	110	18.61	14.72–23.24	49	8.01	5.84–10.89
Sexual behavior		$\chi^2 = 79.64, p < 0.001$			$\chi^2 = 107.29, p < 0.001$			$\chi^2 = 60.55, p < 0.001$	
Exclusively other-sex	4568	25.74	24.58–26.94	1187	6.77	6.20–7.39	479	2.62	2.31–2.96
Exclusively same-sex	139	41.00	33.46–48.98	58	17.23	12.58–23.13	28	8.81	5.77–13.22
Both men and women	496	51.26	46.74–55.76	204	21.42	18.40–24.79	96	9.11	7.17–11.52
Sexual identity		$\chi^2 = 82.52, p < 0.001$			$\chi^2 = 63.29, p < 0.001$			$\chi^2 = 23.17, p < 0.001$	
Heterosexual	4854	26.30	25.11–27.53	1313	7.19	6.60–7.84	543	2.86	2.54–3.22
Gay/lesbian	130	48.68	41.80–55.62	58	20.69	15.88–26.49	26	8.17	5.34–12.33
Bisexual	219	58.48	51.96–64.71	78	21.12	16.46–26.69	34	7.76	5.21–11.40
Men									
Sexual attraction		$\chi^2 = 2.99, p = 0.034$			$\chi^2 = 6.55, p < 0.001$			$\chi^2 = 1.51, p = 0.214$	
Exclusively other-sex	5593	39.74	38.51–40.98	2613	18.63	17.68–19.63	1022	7.19	6.64–7.79
Mostly other-sex	162	41.18	35.58–47.01	76	21.33	16.37–27.29	31	8.62	5.60–13.04
Both men and women	45	39.84	28.69–52.15	23	22.32	13.93–33.77	8	7.49	2.64–19.50
Mostly/exclusively same-sex	191	32.17	27.29–37.46	62	10.17	7.64–13.43	26	4.43	2.89–6.74
Sexual behavior		$\chi^2 = 6.02, p = 0.003$			$\chi^2 = 11.30, p < 0.001$			$\chi^2 = 4.07, p = 0.022$	
Exclusively other-sex	5670	39.67	38.43–40.92	2650	18.65	17.68–19.66	1041	7.25	6.69–7.84
Exclusively same-sex	158	30.79	26.21–35.77	48	8.80	6.54–11.75	17	3.18	1.91–5.23
Both men and women	163	43.61	37.46–49.97	76	21.22	16.32–27.11	29	7.43	4.62–11.74
Sexual identity		$\chi^2 = 3.03, p = 0.052$			$\chi^2 = 1.87, p = 0.158$			$\chi^2 = 0.85, p = 0.422$	
Heterosexual	5789	39.32	38.10–40.55	2687	18.37	17.43–19.34	1051	7.08	6.55–7.65
Gay	137	46.53	39.65–53.55	55	17.80	13.38–23.29	22	8.19	5.07–12.96
Bisexual	65	46.99	36.79–57.46	32	26.41	17.54–37.70	14	10.97	4.85–22.95

All Rao–Scott chi-square tests of independence between sexual attraction, sexual behavior, and sexual identity and outcomes were significant at $p < 0.001$.

TABLE 3. ADJUSTED ESTIMATES OF PAST-YEAR BINGE DRINKING AND HIGH-INTENSITY BINGE DRINKING AMONG WOMEN AND MEN BY SEXUAL ATTRACTION, SEXUAL BEHAVIOR, AND SEXUAL IDENTITY: NATIONAL EPIDEMIOLOGIC SURVEY ON ALCOHOL AND RELATED CONDITIONS III, 2012–2013

	4+/5+ Threshold			8+/10+ Threshold			12+/15+ Threshold		
	aOR	95% CI	p	aOR	95% CI	p	aOR	95% CI	p
Women									
Sexual attraction									
Exclusively other-sex	1.00			1.00			1.00		
Mostly other-sex	2.05	1.69–2.49	<0.001	1.94	1.49–2.53	<0.001	1.61	1.06–2.44	0.025
Both men and women	1.77	1.27–2.46	0.001	1.52	1.10–2.11	0.011	1.63	1.05–2.52	0.028
Mostly/exclusively same-sex	1.90	1.50–2.39	<0.001	2.90	2.13–3.94	<0.001	2.83	1.90–4.20	<0.001
Sexual behavior									
Exclusively other-sex	1.00			1.00			1.00		
Exclusively same-sex	1.81	1.33–2.45	<0.001	2.64	1.81–3.84	<0.001	3.27	1.99–5.36	<0.001
Both men and women	2.21	1.78–2.74	<0.001	2.49	2.01–3.08	<0.001	2.39	1.77–3.23	<0.001
Sexual identity									
Heterosexual	1.00			1.00			1.00		
Gay/lesbian	1.87	1.40–2.49	<0.001	2.46	1.75–3.47	<0.001	2.20	1.34–3.62	0.002
Bisexual	2.33	1.69–3.20	<0.001	1.62	1.15–2.29	0.007	1.23	0.75–1.99	0.409
Men									
Sexual attraction									
Exclusively other-sex	1.00			1.00			1.00		
Mostly other-sex	1.04	0.82–1.31	0.760	1.14	0.83–1.57	0.424	1.13	0.70–1.83	0.610
Both men and women	0.94	0.57–1.56	0.811	1.17	0.69–2.00	0.558	0.95	0.31–2.91	0.928
Mostly/exclusively same-sex	0.63	0.50–0.80	<0.001	0.43	0.31–0.60	<0.001	0.56	0.34–0.92	0.022
Sexual behavior									
Exclusively other-sex	1.00			1.00			1.00		
Exclusively same-sex	0.61	0.48–0.77	<0.001	0.37	0.26–0.53	<0.001	0.39	0.23–0.68	0.001
Both men and women	1.08	0.81–1.44	0.596	1.08	0.75–1.55	0.680	0.95	0.54–1.67	0.864
Sexual identity									
Heterosexual	1.00			1.00			1.00		
Gay	1.07	0.80–1.42	0.658	0.75	0.52–1.09	0.135	0.99	0.56–1.74	0.966
Bisexual	1.05	0.67–1.64	0.824	1.21	0.71–2.06	0.487	1.14	0.43–3.06	0.786

Models were adjusted for race/ethnicity, age, marital status, employment status, annual income, and education.
aOR, adjusted odds ratio.

$p=0.022$ and $p=0.001$ for the 15+ threshold for attraction and behavior, respectively. There were no differences among men classified by sexual orientation identity for standard or high-intensity binge drinking.

Discussion

This is the first study to examine sexual orientation-related differences in high-intensity binge drinking (i.e., drinking at two and three times the rate of the standard 4+/5+ binge drinking cutoff) using nationally representative data.

Among women, the results provide compelling evidence for disparities in the prevalence of binge drinking and high-intensity binge drinking across all three dimensions of sexual orientation. Compared with sexual majority women, women reporting any same-sex attraction or behavior or a sexual minority identity were 1.52–2.90 times more likely to report high-intensity binge drinking at 2 times the standard threshold and 1.61–3.27 times more likely at 3 times the standard threshold, with the exception of bisexual women at the 12+ threshold. Sexual minority men, however, were generally equally or less likely than exclusively other-sex attracted, exclusively other-sex behavioral, and heterosexual-identified men to participate in standard or high-intensity binge drinking in the previous 12 months.

One of the more notable findings was the difference in the pattern of disparities for high-intensity binge drinking between men's and women's sexual orientation dimension comparisons. Not unlike previous studies that document consistent disparities in excessive alcohol use and alcohol use disorders among sexual minority women,^{4,6,14,36} our sample of sexual minority women was more likely than sexual majority women to consume 4+, 8+, and 12+ drinks across all three dimensions of sexual orientation.

Our findings regarding the lower prevalence of standard and high-intensity binge drinking levels among sexual minority men compared with sexual majority men are also in line with previous research.^{3,6,14,23} Specifically, sexual minority men on the basis of identity were no more likely, and men who reported mostly/exclusively same-sex attraction or exclusively same-sex behavior were less likely, than sexual majority men to report having 5, 10, and 15 or more drinks in a single day at least once in the last year.

Elevated risk for alcohol abuse among sexual minority women, relative to sexual minority men, is often attributed to sexual minority women's rebuke of traditional gender roles,⁶ although not much research has explored why sexual minority men may not differ from their heterosexual counterparts. Sexual minority men, however, still evidence disparities in other forms of substance use and abuse.^{3,4}

Some population-based studies indicate risk for alcohol dependence among sexual minority relative to heterosexual men, but not heavy drinking.³ As such, there may be something unique about the pattern of alcohol-related behaviors and consequences among sexual minority men that contributes to well-established sex differences in sexual orientation-related disparities in heavy alcohol use and abuse.

Results from this study extend previous research in both the areas of high-intensity binge drinking and sexual orientation-related disparities in alcohol use and abuse.^{3,4,6,20,21,23} The findings build on research on high-intensity binge drinking by suggesting that high-intensity binge drinking varies systematically for specific subpopulations that have been considered high-risk for alcohol use and alcohol use disorders. With regard to the literature on sexual orientation-related disparities in alcohol use, the findings support previous work that demonstrates elevated risk for women. However, they indicate that disparities in high-intensity binge drinking are more pronounced for women with mostly/exclusively same-sex attraction and exclusively same-sex behavior as well as those who identify as lesbian.

These findings are unique, in that sexual orientation-related health disparities, including alcohol use, are often more robust for bisexual relative to gay/lesbian subgroups.^{4,10,36,37} Importantly, these findings related to elevated risk among lesbian-identified women replicate those of the only other known study on sexual orientation-related disparities in high-intensity binge drinking.²³ The consistency of the results across studies suggests that there may be unique factors that contribute to lesbian women's vulnerabilities for high-intensity binge drinking.

Future work in the area of sexual minority alcohol-related disparities should continue to explore high-intensity binge drinking as a risk factor for health and wellbeing, and whether this pattern of prevalence is present in other samples, and among youth. Generally, investigations of sexual orientation differences in excessive alcohol use should use graduated thresholds of risk considering the acute and long-term consequences of high-intensity binge drinking. For example, research has established a link between alcohol use and suicidality.^{38,39} Given that studies have shown that sexual minority individuals display elevated risk for suicidal ideation and behavior,^{40,41} assessing risk for high-intensity binge drinking may provide additional suicide prevention strategies for this population.

Along with attempts to replicate the findings presented in this article, researchers should also examine the pathways through which these disparities emerge. Experiences of sexual orientation disclosure, minority stress, and victimization play a key role in health and health disparities for sexual minority populations,^{11,42} but rates of alcohol use may also be attributable to community connections, social circles, and bar culture.^{6,43} Future studies should attempt to better address and untangle the role of minority stress and community factors that may help to explain not only why sexual minority individuals are at risk for high-intensity binge drinking but also why there is variability in this risk for sexual minority women and men.

The findings regarding the sex and sexual orientation subgroup differences in the prevalence of binge drinking and high-intensity binge drinking, for example, suggest that mechanisms for high-intensity binge drinking may differ for (1) men and women and (2) mostly/exclusively same-

sex attracted, exclusively same-sex behavioral, and lesbian-identified women. Previous research has highlighted differences in rates of alcohol and other substance use disorders for sexual minority individuals on the basis of sex^{4,6,14} and identity,^{4,10,36,37} suggesting different pathways to substance use and abuse for different sexual minority subpopulations. The identification of mechanisms that drive these sex and sexual orientation differences would provide critical information for targeted prevention and intervention efforts to reduce high-intensity binge drinking among sexual minority individuals.

Limitations

Despite its strengths, the current study has limitations that should be mentioned. First, the measure of high-intensity binge drinking used in this study is not ideal. Binge drinking is often defined as drinking the specified amount of drinks in a 2-hour time frame,¹⁵ and studies of high-intensity binge drinking typically use measures that specify that drinks are consumed "in a row."^{20,44} The NESARC, however, asks participants to report the largest number of drinks consumed in a single day. Future research should explore sexual orientation-related disparities in high-intensity binge drinking using more specific time metrics.

Second, although the NESARC did ask participants how frequently they consumed the reported amount of drinks, the assessment of a relatively low-prevalence behavior (i.e., high-intensity binge drinking) in a minority subsample of the general population (i.e., sexual minority individuals) precluded the ability to meaningfully test the frequency with which these behaviors occurred. Considering that each event of high-intensity binge drinking increases short- and long-term morbidity and mortality,^{17,21} the estimation of high-intensity binge drinking frequency may therefore elucidate important health differences that were not examined in this study. Similarly, some of the sexual orientation comparisons at the 10+/15+ level included small subgroups. Although these findings replicate previous work, future studies should continue to test these differences to help substantiate these findings.

Third, our measure of high-intensity binge drinking requested retrospective reports over a long period of time (i.e., the last 12 months). Data collected on reports from more proximal time periods (i.e., past 30 days or in the last 2 weeks) might yield more precise estimates for rates of high-intensity binge drinking among sexual minority individuals. Finally, correlates of sexual orientation disparities in high-intensity binge drinking were not explored. Mechanistic investigations of high-intensity binge drinking among sexual minority people should garner attention moving forward, particularly for sexual minority women.

Conclusion

This investigation of high-intensity binge drinking provides a different perspective on the risk of alcohol use and excessive alcohol use among sexual minority populations. Disparities at high rates of alcohol consumption (i.e., two and three times the standard binge drinking threshold) have negative health implications with regard to short- and long-term health, morbidity, and mortality. These findings should alert public health practitioners to the importance of assessing

different degrees of risk that have been previously obscured by the standard binge drinking threshold.

More accurate assessments of excessive alcohol use provide opportunities for developing programs that meet the needs of this population and alert researchers to potential differences in this high-risk and potentially deadly behavior. Public health professionals play a critical role in combating alcohol use disparities through screening and intervention. Assessing and educating at-risk people and populations on the dangers of high-intensity binge drinking may help to prevent the associated health consequences for a population already vulnerable to poor health and wellbeing across the life course.

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Disclaimer

The content is solely the responsibility of the author and does not necessarily represent the official views of the National Institutes of Health.

Author Disclosure Statement

No competing financial interests exist.

Supplementary Material

Supplementary Table S1
Supplementary Table S2
Supplementary Table S3
Supplementary Table S4
Supplementary Table S5
Supplementary Table S6

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