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Victimization and substance use disorders in a national sample of heterosexual and sexual minority women and men

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ABSTRACT

Context There is consensus in the research literature that substance use disparities exist among sexual minority women and men; however, few studies have examined risk factors that may contribute to these disparities. **Aims** To compare reports of life-time victimization experiences in a US national sample of adult heterosexual and sexual minority women and men and to examine the relationships between victimization experiences and past-year substance use disorders. **Design, participants, measurements** The secondary data analyses used 2004–05 (wave 2) National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) data collected in structured diagnostic face-to-face interviews in the United States. Substance use disorders (SUDs) were defined according to DSM-IV criteria and included past-year alcohol abuse, alcohol dependence, drug abuse and drug dependence. The sample consisted of 34 653 adults aged 20 years and older; approximately 2% of the respondents self-identified as sexual minority (lesbian, gay or bisexual). **Findings** Results showed strong associations between victimization and any past-year SUDs and confirmed findings from several previous studies indicating that, compared with heterosexuals, sexual minority women and men are at heightened risk for life-time victimization. However, prevalence of the seven victimization experiences and the degree of association between individual victimization experiences and SUDs varied substantially across sexual minority subgroups. The childhood victimization variables—especially childhood neglect—showed the strongest and most consistent associations with SUDs. Odds of SUDs were generally higher among both female and male respondents, regardless of sexual identity, who reported multiple (two or more) victimization experiences than among those who reported no life-time victimization, suggesting a possible cumulative effect of multiple victimization experiences. **Conclusions** Higher rates of life-time victimization, particularly victimization experienced in childhood, may help to explain higher rates of substance use disorders among sexual minorities. However, more research is needed to understand better the complex relationships among sexual orientation, victimization and substance use.

Keywords DSM-IV substance use disorders, epidemiology, sexual identity, sexual orientation, victimization.

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INTRODUCTION

Growing evidence points to heightened risk of substance use and substance use disorders (SUDs) among sexual minority (lesbian, gay, bisexual) women and men [1–6]. Drabble and colleagues [2] found that lesbians were 11 times as likely as heterosexual women to meet criteria for alcohol dependence and eight times as likely to have sought help for alcohol-related problems. Similarly, Wilsnack *et al.* [6] found that lesbians were more than twice as likely as heterosexual women to report past concerns about their drinking, and nearly five times as likely to have received help for alcohol-related problems. In recent analyses from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), gay men had significantly higher odds than heterosexual men of

past-year marijuana use, other drug use, alcohol dependence and drug dependence [3]. One compelling explanation for this heightened risk is sexual minorities' exposure to multiple chronic stressors that may have cumulative effects. Such exposure often begins with early victimization, especially sexual and physical abuse [7–10], and continues with revictimization in adulthood [11–14].

Childhood sexual abuse (CSA) and childhood physical abuse (CPA) are major early life stressors that have been linked consistently with adverse mental health consequences, including substance use and SUDs [15–20]. However, risks of adverse consequences vary considerably among individuals [21,22], and many questions remain about which population subgroups are at greatest risk. Ample research shows that sexual minorities are more likely than heterosexuals to report both childhood victimization [9–11,13,23–25] and SUDs [2,4,26]. Differences in childhood victimization prevalence aside, the relative risk for SUDs associated with victimization may differ because of sexual orientation-related factors. For example, given that stigma, shame and secrecy often surround both CSA and early recognition of same-gender attraction, coping with CSA may be particularly burdensome for sexual minorities [27,28].

Individuals victimized in childhood are much more likely to be revictimized [29]. In one of the few studies of revictimization among sexual minorities, Heidt *et al.* [12] found that nearly 63% of study participants reported life-time sexual assault. Those who were revictimized scored significantly higher on measures of psychological distress than did non-victims or victims of CSA or adult sexual assault (ASA) only, suggesting a cumulative effect of revictimization. Efforts to assess effects of combined childhood and adult victimization have demonstrated the enduring nature of early trauma and the impact of additional life-time stressors [30–34]. Despite evidence of the impact of specific traumatic experiences on mental health, few researchers have examined the combined effects of such stressors across the life-span; even fewer have focused upon sexual minorities. Such information may provide important clues to understanding substance use and mental health disparities in this population.

We tested two hypotheses related to victimization and SUDs: first, that sexual minority women and men will report more life-time victimization experiences than heterosexual women and men; and secondly, that victimization will be associated positively with past-year SUDs. Although there is insufficient information to derive explicit hypotheses, it is plausible that sexual minority-specific stressors (e.g. anti-gay bias and discrimination) may compound the impact of victimization. Therefore, we also explored interactions between individual victimization experiences and sexual identity in models predicting SUDs. We tested these hypotheses using data from the 2004–05 wave 2 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

METHODS

Study design

The target population was the civilian, non-institutionalized population of the United States, aged 20 years and older. Our analyses focus upon a representative sample from this population, first interviewed in 2001–02. Data were collected in face-to-face interviews conducted in respondents' homes. The NESARC study design includes stratification and clustering of the target population. Sampling weights were computed for wave 2 respondents to offset unequal probabilities of selection, differential non-response and post-stratification of the population. Response rates were 81.0% for wave 1 and 86.7% for wave 2, a cumulative response rate of 70.2% [35–37]. The University of Michigan Institutional Review Board approved the current study.

Measures

SUDs were assessed using the Alcohol Use Disorders and Associated Disabilities Interview Schedule DSM-IV (AUDADIS-IV) symptom questions to operationalize DSM-IV abuse and dependence for 10 substances (alcohol, marijuana, cocaine, hallucinogens, inhalants, heroin, sedatives, tranquilizers, pain medications and stimulants). A diagnosis of past-year substance abuse requires absence of a diagnosis of dependence and presence of at least one of four DSM-IV abuse criteria in the past 12 months. A dependence diagnosis is based on the presence of at least three of seven DSM-IV dependence criteria in the preceding 12 months. Reliability and validity of SUD diagnoses have been established in numerous psychometric studies [38–48].

Life-time victimization experiences

CSA and ASA were derived from the question: 'Were you ever sexually assaulted, molested or raped or did you ever experience unwanted sexual activity?'. Follow-up questions asked about age at the first and most recent experience. Experiences that occurred (i) prior to age 18 were considered CSA and (ii) those after age 18, ASA. (iii) CPA was defined based on the question: 'Before you were 18 years old, were you physically attacked or badly beaten up or injured by either of your parents or any other people who raised you?'. (iv) Childhood neglect was assessed by asking: 'Before you were 18 years old, were you seriously neglected by either of your parents or any other people who raised you?'. (v) Partner violence was assessed by asking: 'Were you ever physically attacked or badly

beaten up by your spouse or romantic partner?'. (vi) A similar question asked about non-partner violence: 'Were you ever physically attacked or badly beaten up or injured by someone else?'. (vii) A final question about assault with a weapon asked: 'Were you ever mugged, held up or threatened with a weapon?'.

Demographic and background characteristics

Sexual identity was assessed by asking: 'Which of the categories on the card best describes you? (i) heterosexual (straight) (ii) gay or lesbian (iii) bisexual, or (iv) not sure?'. Other demographic characteristics included age, sex, race/ethnicity, educational level and employment status [19,49–54]. In the multivariate analyses we also controlled for history of alcohol or other drug problems in the home (lived with a parent or other adult who had problems with alcohol or drugs when growing up); age of drinking onset (age first started drinking, not counting small tastes or sips of alcohol); age of first sexual intercourse; and PTSD (DSM-IV life-time diagnosis assessed by the AUDADIS-IV symptom questions, consistent with previous research [37]).

Data analysis

We used specialized variance estimation techniques (e.g. Taylor series linearization) and procedures for analysis of complex sample survey data provided in the SUDAAN software package (version 10.0.1) to accommodate the complex sample design. We computed weighted estimates of parameters describing the demographic distribution of the target population. We compared the prevalence of each of the seven victimization experiences and SUDs across four sexual identity subgroups (heterosexual, lesbian/gay, bisexual, not sure) separately for women and men. We computed prevalence estimates and design-based confidence intervals of past-year SUDs cross-classified by past victimization experiences and current sexual identity.

We conducted multivariate analyses to examine sexual identity and victimization (and their interactions) as predictors of past-year SUDs. Design-based logistic regression models were fitted separately for women and men to the four SUD outcome variables. Independent variables were binary indicators of sexual identity and the seven victimization experiences. To explore the potential moderation effects of sexual identity by victimization, interaction terms between the individual victimization experiences and sexual identity were included in the models and tested for significance one at a time [55].

RESULTS

Demographic characteristics

As shown in Table 1, the sample (n = 34 653) represented a population that was approximately 52% female, 71% white, 11% black, 4% Asian, 12% Hispanic and 2% Native American; about 2% of respondents (n = 577) identified as lesbian, gay or bisexual. The sexual minority subsample (data not shown) closely resembled the overall sample.

Past-year substance use disorders and life-time victimization among women

Table 2 (left) summarizes the weighted prevalence estimates for any past-year SUD and the individual victimization experiences among women. Those who identified as

Table 1 Weighted estimates of demographic characteristics of NESARC wave 2 target population (n = 34 653).

	n^a	% (SE)[b]
Sex		
Male	14 564	47.92 (0.34)
Female	20 089	52.08 (0.34)
Age (years)		
20–24	2 183	7.61 (0.23)
25–44	13 333	38.47 (0.40)
45–64	11 960	34.61 (0.32)
65 and older	7 177	19.31 (0.34)
Race/ethnicity		
White	20 161	70.91 (1.54)
Black	6 587	11.05 (0.66)
Native American	578	2.19 (0.18)
Asian or Pacific Islander	968	4.27 (0.52)
Hispanic	6 359	11.58 (1.19)
Education level		
Less than high school	5 514	14.02 (0.45)
Completed high school	9 452	27.48 (0.53)
More than high school	19 687	58.50 (0.63)
Employment status		
Working full-time (+35 hours a week)	17 833	53.00 (0.40)
Working part-time (<35 hours a week)	3 675	10.90 (0.20)
Not working	13 145	36.10 (0.43)
Relationship status		
Married/cohabitating	18 866	63.79 (0.48)
Widowed/divorced/separated	9 149	18.86 (0.26)
Never married	6 638	17.35 (0.45)
Sexual identity		
Heterosexual	33 598	98.07 (0.10)
Lesbian/gay	335	0.85 (0.07)
Bisexual	242	0.62 (0.05)
Unsure	170	0.46 (0.04)

[a]Based on unweighted data. [b]Based on weighted data. NESARC: National Epidemiologic Survey on Alcohol and Related Conditions; SE: standard error.

Table 2 Weighted prevalence estimates of past-year substance use disorders and victimization experiences by current sexual identity.

	Women				*Men*			
	Lesbian % (SE) 95% CI	*Bisexual* % (SE) 95% CI	*Not Sure* % (SE) 95% CI	*Heterosexual* % (SE) 95% CI	*Gay* % (SE) 95% CI	*Bisexual* % (SE) 95% CI	*Not Sure* % (SE) 95% CI	*Heterosexual* % (SE) 95% CI
Any past-year substance use disorder	25.8 (4.4)[ac] (16.9, 34.7)	24.3 (4.4)[ac] (15.4, 33.2)	12.6 (3.9)[c] (4.8, 20.4)	5.8 (0.3)[b] (5.3, 6.3)	31.4 (3.8)[a] (23.9, 38.9)	27.6 (5.7)[ab] (16.2, 39.1)	16.9 (5.9)[ab] (5.1, 28.7)	15.6 (0.4)[b] (14.7, 16.4)
Victimization experiences								
Childhood sexual abuse (CSA)	34.7 (4.9)[a] (24.9, 44.6)	38.8 (4.9)[a] (28.9, 48.7)	9.2 (3.5)[b] (2.2, 16.2)	10.3 (0.4)[b] (9.6, 11.0)	15.4 (3.5)[a] (8.4, 22.3)	11.0 (3.9)[ab] (3.1, 18.8)	7.6 (3.9)[ab] (0.0, 15.4)	2.2 (0.2)[b] (1.9, 2.5)
Childhood physical abuse (CPA)	11.3 (4.1)[ab] (3.0, 19.5)	11.1 (2.6)[a] (6.0, 16.2)	4.5 (2.3)[ab] (0.0, 9.0)	3.8 (0.2)[b] (3.5, 4.2)	5.3 (1.9)[a] (1.5, 9.0)	8.7 (3.7)[a] (1.4, 16.0)	4.0 (2.3)[a] (0.0, 8.5)	3.0 (0.2)[a] (2.6, 3.3)
Childhood neglect	12.4 (4.1)[a] (4.1, 20.6)	8.7 (2.3)[a] (4.2, 13.3)	7.1 (2.9)[a] (1.2, 13.0)	3.4 (0.2)[a] (3.1, 3.7)	11.6 (3.2)[a] (5.1, 18.0)	6.2 (3.2)[ab] (0.0, 12.6)	4.6 (3.2)[ab] (0.0, 10.9)	2.5 (0.2)[b] (2.2, 2.9)
Adult sexual assault (ASA)	8.1 (3.3)[a] (1.6, 14.6)	6.7 (2.2)[a] (2.2, 11.2)	9.1 (5.2)[a] (0.0, 19.5)	3.3 (0.2)[a] (2.9, 3.6)	2.6 (1.1)[a] (0.4, 4.8)	1.1 (1.1)[a] (0.0, 3.2)	2.4 (2.0)[a] (0.0, 6.4)	0.3 (<0.1)[a] (0.2, 0.4)
Partner violence	16.1 (3.8)[ab] (8.5, 23.7)	20.2 (3.6)[a] (13.0, 27.4)	12.5 (5.4)[ab] (1.6, 23.3)	9.7 (0.3)[b] (9.1, 10.2)	11.5 (3.0)[a] (5.5, 17.5)	0.0 (0.0)[c] (0.0, 0.0)	0.0 (0.0)[c] (0.0, 0.0)	2.0 (0.1)[b] (1.8, 2.3)
Non-partner violence	10.5 (2.9)[ab] (4.6, 16.4)	20.7 (4.0)[a] (12.8, 28.6)	8.1 (3.2)[ab] (1.7, 14.4)	3.7 (0.2)[b] (3.3, 4.0)	20.7 (3.6)[a] (13.5, 27.9)	10.4 (3.4)[a] (3.6, 17.2)	17.9 (5.6)[a] (6.8, 29.1)	11.8 (0.3)[a] (11.2, 12.5)
Assault with a weapon	13.6 (3.1)[a] (7.5, 19.8)	17.4 (3.8)[a] (9.8, 25.0)	5.5 (2.6)[a] (0.4, 10.7)	7.5 (0.3)[a] (6.9, 8.0)	27.6 (3.8)[a] (20.0, 35.1)	20.7 (4.9)[ab] (10.8, 30.6)	34.1 (7.6)[ab] (18.9, 49.3)	16.2 (0.5)[b] (15.3, 17.2)
Any victimization experiences	58.7 (4.8)[a] (49.2, 68.2)	54.8 (4.5)[a] (45.9, 63.7)	30.0 (6.4)[b] (17.1, 42.9)	25.6 (0.5)[b] (24.7, 26.5)	50.9 (4.2)[a] (42.5, 59.3)	30.6 (5.6)[bc] (19.4, 41.9)	47.4 (7.8)[ac] (32.0, 62.9)	26.2 (0.5)[b] (25.2, 27.1)
Number of victimization experiences								
None	41.3 (4.8)	45.2 (4.5)	70.0 (6.4)	74.5 (0.5)	49.3 (4.2)	69.4 (5.6)	52.6 (7.8)	73.9 (0.5)
1	20.5 (3.8)	16.1 (3.3)	10.6 (3.5)	14.8 (0.3)	23.7 (3.3)	16.8 (4.4)	28.1 (7.4)	17.4 (0.4)
2 or more	38.2 (5.3)	38.7 (4.5)	19.3 (5.9)	10.7 (0.3)	27.1 (3.8)	13.8 (4.0)	19.4 (5.9)	8.7 (0.3)
$\chi^2(6)$, *P*-value	43.0(6),<0.01				27.4(6),<0.01			
Total number of victimization experiences (0–7), mean (SE)	1.17 (0.15)[a]	1.41 (0.15)[a]	0.60 (0.14)[b]	0.44 (0.01)[b]	0.97 (0.12)[a]	0.59 (0.15)[ab]	0.74 (0.14)[ab]	0.38 (0.01)[b]

[a,b,c]Estimates with different superscripts for the sexual identity subgroups are significantly different from each other, after applying a Bonferroni correction for the six comparisons being performed ($P < 0.0083$). Estimates with the same superscript are not significantly different from each other after applying the Bonferroni correction. Note: Based on missing data sample sizes were 144 to 145 for lesbian women, 161 for bisexual women, 101 for not sure women, 19 417 to 19 489 for heterosexual women, 189 to 190 for gay men, 81 for bisexual men, 68 for not sure men, and 14 070 to 14 109 for heterosexual men. CI: confidence interval; SE: standard error.

lesbian or bisexual were about twice as likely as heterosexual women to meet criteria for any past-year SUD and about twice as likely as heterosexual women and women who were unsure about their sexual identity to report any victimization experience. Bisexual women were more likely than heterosexual women to report CSA, CPA, partner violence and non-partner violence. Lesbians differed from heterosexual women only in reports of CSA. Unsure women did not differ from heterosexual women on any victimization experiences. Lesbians and bisexual women reported more victimization experiences than did heterosexual women or unsure women.

Table 3 shows the weighted prevalence estimates of any SUD based on each of the victimization experiences. Whereas findings for heterosexual women fitted the expected pattern of greater prevalence of SUDs among those who reported victimization, results were much less consistent among sexual minority and unsure women. CPA, childhood neglect and partner violence appeared to have the greatest impact on SUDs among lesbians. For example, lesbians who reported CPA were more than twice as likely as those who did not to meet criteria for any SUD. Among bisexual women, CSA, partner violence and assault with a weapon were associated with greater SUD prevalence. Several victimization experiences showed an unexpected relationship with SUDs: women who reported the experience were less likely than those who did not report it to meet criteria for SUDs (e.g. lesbians who reported ASA and non-partner violence and unsure women who reported CSA, CPA, partner violence and non-partner violence).

Past-year substance use disorders and life-time victimization among men

There were fewer differences in SUDs and victimization experiences based on sexual identity among men than among women, and these were mainly in comparisons of gay and heterosexual men. As shown in Table 2, gay men were twice as likely as heterosexual men to meet criteria for SUDs and about twice as likely to report any victimization experience as heterosexual or bisexual men. Unsure men were more likely than heterosexual men to report any victimization experiences.

CSA was much more prevalent among gay men than heterosexual men. Gay men were also more likely than heterosexual men to report childhood neglect, partner violence and assault with a weapon. With the exception of partner violence, bisexual and unsure men did not differ from gay or heterosexual men on any individual victimization experiences (no bisexual or unsure men reported partner violence). Gay men also reported a greater number of victimization experiences than heterosexual men.

As with women, associations between SUDs and victimization experiences were in the expected direction for heterosexual men, but less so for gay and unsure men (Table 3). Among these two groups, most of the victimization experiences appeared to confer little or no greater risk of SUDs—or to have the opposite effect. Among gay men, only childhood neglect showed a clear and strong relationship with SUDs in the expected direction. Bisexual men who reported CSA, childhood neglect, non-partner violence and assault with a weapon were more than twice as likely as those who did not report these experiences to meet criteria for any SUD.

Multivariate associations among sexual identity, life-time victimization and SUDs: women

Table 4 summarizes results of logistic regression analyses examining the relationship between sexual identity and victimization and past-year SUDs. As shown at the top of the table, lesbians had significantly greater odds than heterosexual women of alcohol abuse and drug dependence. The remainder of the table summarizes results of logistic regression models in which no significant interactions were found. None of the individual victimization experiences were associated significantly with alcohol abuse or drug dependence. However, odds of drug abuse were higher among women, regardless of sexual identity, who had experienced CSA, CPA or ASA. Women who reported two or more victimization experiences had higher odds of alcohol dependence [adjusted odds ratio (AOR) = 2.1, confidence interval (CI) = 1.4–3.0], drug abuse (AOR = 3.5, CI = 2.1–5.9) and drug dependence (AOR = 4.3, CI = 1.8–10.3) than women who reported none (data not shown).

We found a significant interaction between sexual identity and childhood neglect in predicting alcohol dependence (design-based Wald $F_{(2,65)} = 3.32$, $P = 0.042$). Among women who had not experienced childhood neglect, lesbians had marginally higher odds of alcohol dependence than heterosexual women [AOR = 2.4, CI = 1.0, 5.8, not significant (NS)]. However, among those who reported childhood neglect, lesbians had more than 30 times the odds of alcohol dependence (AOR = 30.5, CI = 5.2, 181.2). No other interactions were significant. We found a significant main effect of adult sexual assault; odds of alcohol dependence for women who reported ASA were higher than for women who did not report this experience, regardless of sexual identity (AOR = 2.4, CI = 1.6, 3.7).

Multivariate associations among sexual identity, life-time victimization and SUDs: men

Neither sexual identity nor any of the individual victimization experiences were associated significantly with

Table 3 Weighted prevalence estimates of past-year substance use disorders by past victimization experiences and current sexual identity.

	Women				*Men*			
Victimization experiences	*Lesbian* % (95% CI)	*Bisexual* % (95% CI)	*Not sure* % (95% CI)	*Heterosexual* % (95% CI)	*Gay* % (95% CI)	*Bisexual* % (95% CI)	*Not Sure* % (95% CI)	*Heterosexual* % (95% CI)
Childhood sexual abuse (CSA)								
Yes	26.8 (7.1, 46.5)	34.2 (17.3, 51.0)	0.0 (0.0, 0.0)	12.8 (10.8, 14.9)	35.0 (13.9, 56.1)	50.2 (10.5, 89.9)	0.0 (0.0, 0.0)	20.6 (15.0, 26.1)
No	25.3 (15.1, 35.4)	18.0 (9.1, 26.9)	13.9 (5.3, 22.4)	5.0 (4.6, 5.5)	30.8 (22.8, 38.7)	24.8 (12.5, 37.2)	18.2 (5.6, 30.9)	15.4 (14.6, 16.3)
Childhood physical abuse (CPA)								
Yes	48.6 (7.4, 89.9)	25.7 (4.1, 47.3)	0.0 (0.0, 0.0)	11.5 (8.5, 14.5)	49.0 (11.6, 86.3)	44.3 (0.0, 90.9)	21.1 (0.0, 56.9)	26.2 (21.6, 30.7)
No	22.9 (14.6, 31.2)	24.1 (14.6, 33.6)	13.2 (5.1, 21.3)	5.6 (5.1, 6.1)	30.4 (22.8, 38.0)	26.0 (13.8, 38.3)	17.5 (4.8, 30.1)	15.3 (14.4, 16.1)
Childhood neglect								
Yes	47.8 (9.6, 86.0)	27.1 (0.6, 53.6)	21.2 (0.0, 58.1)	9.6 (7.0, 12.1)	63.3 (32.9, 93.7)	69.9 (29.4, 100.0)	0.0 (0.0, 0.0)	20.7 (15.4, 25.9)
No	22.7 (14.6, 30.7)	24.0 (14.6, 33.4)	11.9 (4.1, 19.8)	5.7 (5.2, 6.2)	27.2 (19.6, 34.9)	24.8 (12.9, 36.8)	18.5 (5.7, 31.2)	15.4 (14.6, 16.3)
Adult sexual assault (ASA)								
Yes	18.8 (0.0, 42.1)	38.6 (9.6, 67.6)	23.4 (0.0, 62.4)	14.4 (10.8, 17.9)	21.1 (0.0, 53.3)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	15.7 (2.0, 29.5)
No	26.4 (16.9, 35.9)	23.3 (13.9, 32.6)	11.5 (3.7, 19.3)	5.6 (5.1, 6.0)	31.7 (24.0, 39.4)	27.9 (16.4, 39.5)	17.3 (5.2, 29.3)	15.6 (14.7, 16.4)
Partner violence								
Yes	43.0 (17.0, 69.0)	40.9 (21.4, 60.4)	6.7 (0.0, 20.6)	11.6 (9.9, 13.3)	25.2 (3.4, 47.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	39.1 (32.5, 45.7)
No	22.5 (12.6, 32.3)	20.1 (10.5, 29.7)	13.5 (4.8, 22.2)	5.2 (4.7, 5.7)	32.2 (24.1, 40.4)	27.6 (16.2, 39.1)	17.6 (5.4, 29.8)	15.1 (14.2, 15.9)
Non-partner violence								
Yes	5.9 (0.0, 17.6)	26.6 (4.8, 48.4)	7.6 (0.0, 22.8)	12.6 (9.3, 16.0)	28.4 (9.0, 47.8)	58.4 (26.1, 90.7)	21.3 (0.0, 50.5)	26.3 (23.7, 28.9)
No	28.5 (18.7, 38.2)	23.7 (14.5, 32.9)	13.0 (4.7, 21.4)	5.6 (5.1, 6.1)	32.2 (24.0, 40.4)	24.0 (11.8, 36.3)	16.8 (3.4, 30.3)	14.1 (13.3, 15.0)
Assault with a weapon								
Yes	16.7 (0.0, 35.0)	50.2 (25.5, 74.8)	15.0 (0.0, 43.7)	10.7 (8.5, 12.8)	26.0 (9.4, 42.6)	51.2 (27.0, 75.4)	29.7 (0.6, 58.9)	23.6 (21.5, 25.7)
No	27.2 (17.0, 37.5)	18.8 (10.5, 27.2)	12.5 (4.2, 20.7)	5.4 (5.0, 5.9)	33.1 (24.1, 42.2)	21.5 (8.8, 34.2)	11.3 (2.6, 20.1)	14.0 (13.2, 14.9)
Number of victimization experiences								
None	23.8 (10.5, 37.1)	11.8 (3.0, 20.5)	13.8 (3.8, 23.7)	4.2 (3.8, 4.7)	28.3 (18.5, 38.2)	22.0 (7.8, 36.1)	12.9 (12.1, 13.8)	10.7 (0.8, 20.7)
1	16.6 (0.0, 35.8)	31.4 (9.4, 53.4)	0.0 (0.0, 0.0)	8.6 (7.4, 9.8)	33.2 (13.9, 52.4)	26.5 (0.0, 53.1)	32.6 (0.0, 65.0)	20.5 (18.5, 22.4)
2 or more	33.9 (15.4, 52.4)	36.0 (19.1, 52.8)	15.3 (0.0, 34.1)	13.2 (11.2, 15.2)	34.5 (17.3, 51.8)	57.5 (28.3, 86.6)	14.6 (0.0, 41.0)	28.5 (25.6, 31.4)

Note: Based on missing data sample sizes ranged from 144 to 145 for lesbian women, 161 for bisexual women, 101 for not sure women, 19 417 to 19 489 for heterosexual women, 189 to 190 for gay men, 81 for bisexual men, 68 for not sure men, and 14 070 to 14 109 for heterosexual men. CI: confidence interval.

Table 4 Logistic regression: relationships of sexual identity [c] and victimization with substance use disorders.

	Women			*Men*	
	Past-year alcohol abuse[a] *AOR (95% CI)*[b]	*Past-year drug abuse*[a] *AOR (95% CI)*[b]	*Past-year drug dependence*[a] *AOR (95% CI)*[b]	*Past-year alcohol abuse*[a] *AOR (95% CI)*[b]	*Past-year drug abuse*[a] *AOR (95% CI)*[b]
Sexual identity					
Heterosexual	Referent	Referent	Referent	Referent	Referent
Lesbian/gay	4.0 (2.1–7.6)***	2.0 (0.4–10.7)	13.4 (4.3–42.3)***	1.0 (0.5–1.9)	6.4 (3.2–12.7)***
Bisexual	0.7 (0.3–2.1)	2.0 (0.8–4.7)	0.7 (0.2–3.5)	0.4 (0.1–1.3)	9.3 (3.6–23.9)***
Childhood sexual abuse					
No	Referent	Referent	Referent	Referent	Referent
Yes	1.2 (0.9–1.7)	2.2 (1.3–3.8)**	2.3 (0.9–6.1)	0.8 (0.5–1.3)	1.1 (0.5–2.2)
Childhood physical abuse					
No	Referent	Referent	Referent	Referent	Referent
Yes	0.9 (0.5–1.5)	2.3 (1.1–4.5)*	0.7 (0.3–1.9)	0.8 (0.5–1.2)	1.3 (0.7–2.3)
Childhood neglect					
No	Referent	Referent	Referent	Referent	Referent
Yes	0.8 (0.4–1.4)	0.6 (0.3–1.2)	2.0 (0.8–5.0)	0.8 (0.5–1.3)	0.6 (0.3–1.2)
Adult sexual assault					
No	Referent	Referent	Referent	Referent	Referent
Yes	1.2 (0.7–2.0)	3.1 (1.5–6.2)**	2.2 (0.8–6.2)	0.5 (0.2–1.4)	0.4 (0.1–1.7)
Partner violence					
No	Referent	Referent	Referent	Referent	Referent
Yes	1.2 (0.9–1.6)	1.2 (0.7–2.1)	1.5 (0.7–3.3)	1.3 (0.9–2.0)	2.6 (1.5–4.5)***
Non-partner violence					
No	Referent	Referent	Referent	Referent	Referent
Yes	0.9 (0.5–1.4)	1.1 (0.6–2.0)	0.9 (0.4–2.0)	1.1 (0.9–1.4)	1.5 (1.0–2.2)*
Assault with a weapon					
No	Referent	Referent	Referent	Referent	Referent
Yes	1.1 (0.8–1.6)	1.3 (0.8–2.4)	1.2 (0.5–2.7)	1.1 (0.9–1.4)	1.8 (1.2–2.5)**

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$. Table includes results of models in which there were no significant interactions. [a]Drug abuse and dependence refers to non-medical use of sedatives, tranquilizers, pain relievers, stimulants, marijuana, cocaine, hallucinogens, inhalants or heroin. [b]AOR indicates odds ratios adjusted for the effects of all aforementioned covariates, including race, age, educational level, employment status, age of drinking onset, age of first sex, life-time post-traumatic stress disorder (PTSD) and history of alcohol/drug problems in the home; estimated odds ratios for these control variables are not shown. [c]Analyses exclude men and women who were unsure about their sexual identity. Sample size for each model ranged from 18 202 to 18 288. CI: confidence interval.

alcohol abuse among men, but both gay and bisexual men had significantly higher odds of drug abuse than heterosexual men. Partner violence, non-partner violence and assault with a weapon were each associated with higher odds of drug abuse. Men who reported two or more victimization experiences had significantly higher odds of all four SUD outcomes than those who reported no life-time victimization: alcohol abuse (AOR = 1.3, CI = 1.0–1.7), alcohol dependence (AOR = 1.8, CI = 1.4–2.4), drug abuse (AOR = 3.0, CI = 2.1–4.3) or drug dependence (AOR = 2.6, CI = 1.3–5.1) (data not shown).

We found a significant interaction between sexual identity and assault with a weapon in predicting alcohol dependence (design-based Wald $F_{(2,65)} = 3.52$, $P = 0.035$). Among those who had not experienced assault with a weapon, odds of alcohol dependence were significantly higher for both gay (AOR = 4.0, 95% CI = 2.2, 7.4) and bisexual (AOR = 4.1, 95% CI = 1.5, 11.2) men than for heterosexual men. Among those who had experienced assault with a weapon, odds of alcohol dependence did not differ significantly for gay and heterosexual men, but bisexual men had nearly 13 times the odds of heterosexual men (AOR = 12.7, 95% CI = 4.9, 33.1). We also found main effects of partner violence (AOR = 1.8, 95% CI = 1.1, 2.9) and non-partner violence (AOR = 1.3, 95% CI = 1.1, 1.7) on alcohol dependence; both these experiences increased significantly the odds of this SUD among men, regardless of sexual identity.

The interaction between assault with a weapon and sexual identity was significant in predicting drug dependence (design-based Wald $F_{(2,65)} = 4.22$, $P = 0.019$). Among those who had not experienced assault with a weapon, gay men had significantly higher odds than heterosexual men of drug dependence (AOR = 5.3, 95% CI = 1.6, 17.6), but odds for bisexual and heterosexual men did not differ significantly. Among men who had experienced assault with a weapon, bisexual men had substantially higher odds than heterosexual men

(AOR = 31.6, 95% CI = 6.2, 162.0), but gay and heterosexual men did not differ significantly.

DISCUSSION

Results support our first hypothesis that, relative to heterosexuals, sexual minority women and men are at heightened risk for life-time victimization. Lesbian and bisexual women were more than twice as likely as heterosexual women to report any life-time victimization. Lesbians, gay men and bisexual women also reported a greater number of victimization experiences. The most pronounced difference between lesbian and heterosexual women was in reports of CSA. Three times as many lesbians (34.7%) as heterosexual women (10.3%) reported this experience. As we [9] and others [7,8,56] have noted, higher rates of CSA may be attributable, in part, to lesbians' greater willingness to acknowledge and report this experience. Research indicates that the majority of lesbians have been in therapy or counseling [57–60]. Through efforts to understand their present difficulties more clearly, women who seek help for mental health concerns—such as relationship issues, depression and anxiety—may be more likely to recall and report CSA. Thus, if lesbians are more willing than heterosexual women to report CSA, some of the differences in prevalence of CSA may be a result of response bias.

Bisexual women were also more likely than heterosexual women to report CSA as well as three other lifetime victimization experiences (CPA, partner violence and non-partner violence). The dearth of data on bisexual women's health and life experiences makes it difficult to speculate about reasons for their high rates of victimization. However, our findings are consistent with other studies showing bisexual women to be at high risk for a variety of mental and physical health problems [6,61,62]. To address health disparities in bisexual women, more research with larger samples is greatly needed.

We also found overall higher prevalence of victimization among sexual minority men, but most differences were between gay and heterosexual men. Gay men were more likely to report CSA, childhood neglect, partner violence and assault with a weapon. Again, differences in rates of victimization due to reporting biases versus how much is reflective of actual differences in prevalence is unclear. None the less, findings point to the need for more research on prevalence, risk factors and consequences of victimization among sexual minority men.

Results are consistent with findings from general population samples [34,63] and provide support for our second hypothesis that victimization is associated positively with risk of SUDs. For example, women who reported two or more victimization experiences had two to four times the odds of alcohol dependence, drug abuse and drug dependence as women who reported no victimization. Men who reported two or more victimization experiences had higher odds of all four SUD outcomes, but odds were smaller than those observed in women. These results suggest a possible cumulative effect of multiple victimization, consistent with previous research [16,30,34,63,64].

Associations between victimization and SUDs varied by sexual identity. For example, whereas lesbians who reported CPA, childhood neglect and partner violence had higher rates of past-year SUDs than lesbians who did not report these experiences, CSA, ASA, partner violence and assault with a weapon conferred higher risk of SUDs for bisexual women. Although gay men were significantly more likely than heterosexual men to report four of the seven victimization experiences, these differences did not appear to increase gay men's risk of SUDs. In contrast, although bisexual men were much more similar to heterosexual men in prevalence of victimization experiences, relationships between victimization and SUDs appeared to be stronger in bisexual men than in heterosexual men.

Among women, childhood neglect was the only victimization experience that showed a significant interaction with sexual identity in predicting SUDs. Lesbians who reported childhood neglect had more than 30 times the odds of alcohol dependence as heterosexual women who reported this experience. Gay men were also significantly more likely than heterosexual men to report childhood neglect, and bivariate relationships between childhood neglect and past-year SUDs were very strong for both gay and bisexual men. Researchers have yet to examine the prevalence and impact of childhood neglect on sexual minority women's and men's health, but our findings suggest that this experience may be an important predictor of SUDs in at least some sexual minority subgroups.

Assault with a weapon also showed strong effects on SUDs for some subgroups, particularly bisexual men and men unsure about their sexual identity. Among men who reported this experience bisexual men had nearly 13 times the odds of alcohol dependence and 31 times the odds of drug dependence as heterosexual men.

Collectively, findings from the study suggest that the impact of some victimization experiences on SUDs may be compounded among some sexual minority women and men. Sexual minority youth are believed to be at heightened risk of victimization for several reasons, including their being targeted for abuse/violence by parents, siblings, peers, older children and adults because of antigay stigma and bias [11,65–67]. There is ample evidence that early victimization increases the risk for subsequent revictimization substantially [33]. Given that

sexual minority youth and adults are more likely than their heterosexual counterparts to use alcohol and other drugs [4,6,68–70], a self-perpetuating cycle may occur in which sexual minorities use substances in part to cope with adverse psychological and interpersonal effects of victimization and this use, in turn, increases risk for further victimization.

Results suggest that efforts to prevent SUDs are likely to benefit from greater understanding of multiple traumatic victimization experiences in the lives of individuals, especially those who identify as lesbian, gay or bisexual. Programs and interventions must go beyond educating youth about the risks of substance use to help youth also recognize and cope with the stressors of childhood physical and sexual abuse, relationship violence and other forms of victimization. Given the high rates of childhood victimization among sexual minority women and men it is important that clinicians who care for sexual minority youth ask routinely about victimization experiences.

Our study has several limitations. Retrospective reporting of childhood experiences is a potential source of bias because respondents may have difficulty recalling and reporting certain events. In addition, because individual victimization experiences were assessed using single questions, these experiences are likely to be under-reported. As with all cross-sectional research, there are uncertainties about the temporal relationships of the major study variables. For example, because questions about sexual identity development milestones (e.g. first recognition of same-sex attraction, first same-sex sexual experience) were not included in the NESARC, we are unable to speculate about whether or to what extent victimization experiences reported by lesbian/gay and bisexual respondents may have been related to their sexual orientation.

There is also the possibility that minority sexual identity and SUDs were under-reported, especially given that data were collected in face-to-face interviews. The prevalence rates of LGB identity in the NESARC are slightly lower than in previous US national probability studies [2,8,58,71] and the substance use rates in the NESARC are generally lower [72]. Replication of these findings using self-administered data collection modes including computer-based approaches, which may produce more accurate reporting of socially sensitive behaviors [73–77], would strengthen confidence in the findings. Finally, some of the prevalence estimates are based on small subsample sizes and should be interpreted cautiously. Despite these limitations, study findings add to the evidence of higher rates of victimization among sexual minority women and men and provide insight into potential reasons for SUD disparities within this population.

Declarations of interest

None.

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