Original investigation

Sexual Orientation Discrimination and Tobacco Use Disparities in the United States

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Abstract

Introduction: Differences in tobacco/nicotine use by sexual orientation are well documented. Development of interventions requires attention to the etiology of these differences. This study examined associations among sexual orientation discrimination, cigarette smoking, any tobacco/nicotine use, and DSM-5 tobacco use disorder (TUD) in the United States.

Methods: We used data from the 2012–2013 National Epidemiologic Survey on Alcohol and Related Conditions based on in-person interviews with a nationally representative sample of noninstitutionalized US adults. Approximately 8.3% of the target population was estimated to have same-sex sexual attraction, 3.1% had at least one same-sex sexual partner in the past-year, and 2.8% self-identified as lesbian, gay, or bisexual.

Results: Sexual attraction, sexual behavior, and sexual identity were significantly associated with cigarette smoking, any tobacco/nicotine use, and DSM-5 TUD. Risk of all tobacco/nicotine outcomes was most pronounced for bisexual adults across all three sexual orientation dimensions. Approximately half of sexual minorities who identified as lesbian or gay and one-fourth of those who identified as bisexual reported past-year sexual orientation discrimination. Sexual minorities who experienced high levels of past-year sexual orientation discrimination had significantly greater probability of past-year cigarette smoking, any tobacco/nicotine use, and TUD relative to sexual minorities who experienced lower levels of sexual orientation discrimination or no discrimination.

Conclusions: Sexual minorities, especially bisexual adults, are at heightened risk of cigarette smoking, any tobacco/nicotine use, and DSM-5 TUD across all three major sexual orientation dimensions. Tobacco prevention and cessation efforts should target bisexual adults and consider the role that sexual orientation discrimination plays in cigarette smoking and treatment of TUD.

Implications: Differences in tobacco/nicotine use by sexual orientation are well documented, but little is known about differences across all three sexual orientation dimensions (attraction, behavior, and identity) or the origins of these differences. This study is the first to show that differences

in tobacco/nicotine use across the three sexual orientation dimensions for respondents who were exclusively heterosexually-oriented were minimal, but varied more substantially among sexual minority women and men across the three sexual orientation dimensions. Sexual minorities who experienced high levels of past-year sexual orientation discrimination had significantly greater probability of cigarette smoking, any tobacco/nicotine use and DSM-5 tobacco use disorder.

Introduction

Tobacco use remains the leading preventable cause of death and cigarette smoking is responsible for more than 480 000 deaths per year in the United States.^{1,2} The tobacco industry targets sexual minorities and other specific subgroups.^{3–5} A robust body of research shows that sexual minorities (eg, lesbian, gay, bisexual) are at particularly high risk for cigarette smoking-related adverse health consequences.^{6–10} Although differences in tobacco use among sexual minorities have been documented in population-based samples, relatively little national research has been conducted to examine (1) whether differences exist across all three major sexual orientation dimensions (sexual attraction, sexual behavior, and sexual identity) and (2) the mechanisms underlying tobacco-related health disparities among sexual minorities.¹¹

The relationships between sexual orientation and tobacco/nicotine use have increasingly been examined in population-based studies.¹² Although several studies have found that women who identify as lesbian or bisexual are more likely than their heterosexual counterparts to be current cigarette smokers,^{5,7,13,14} recent national findings suggest that bisexual women are at greater risk of cigarette smoking than either their heterosexual or lesbian/gay counterparts.^{4,14} In contrast, sexual minority men were similar to their heterosexual male peers in their rates of cigarette smoking.⁴

In addition to studies focusing on targeted marketing by the tobacco industry and social norms around tobacco use,^{5,15} studies have posited that discrimination and stress associated with being a sexual minority is a primary cause of disparities in some adverse health behaviors and outcomes.^{16–18} However, no large national studies related to past-year cigarette smoking, other tobacco/nicotine use, and tobacco use disorder (TUD) have tested this supposition. Meyer's *Minority Stress Model*^{16–18} presupposes that discrimination, internalized homophobia, family rejection, and social stigma can create a hostile and stressful social environment for sexual minorities, and that this contributes to stress-related substance use behaviors such as cigarette smoking, which in turn contributes to adverse health consequences. An assumption of this model is that minority stress is unique and additive to general stressors that all people experience.

Sexual minorities experience discrimination in housing, employment, and basic civil rights, as well as harassment and violence.^{19–22} Some studies have assessed experiences of sexual orientation discrimination among sexual minorities and connected these experiences to substance use and mental health outcomes.^{23–26} While these studies suggest that exposure to discrimination may contribute to substance use and poor mental health outcomes among sexual minorities, they have notable limitations. No national probability-based samples have assessed the impact of varying levels of individual-level sexual orientation discrimination on past-year cigarette smoking, other tobacco/nicotine use, and DSM-5 TUD.

Several literature reviews conclude that sexual minorities are at greater risk of stress-related substance use behaviors and mental health disorders as a result of factors such as discrimination related to their sexual minority status.^{11,27} A regional study conducted in

New York found that the number of rejecting reactions to disclosure of sexual orientation was significantly associated with recent and subsequent cigarette smoking among sexual minority youth.²⁸ A national study using data from the Behavioral Risk Factor Surveillance System identified psychosocial variables that were associated with smoking among sexual minorities (eg, mental health, life dissatisfaction, alcohol use, exposure to tobacco marketing, and single relationship status), but the study did not assess sexual orientation discrimination or other stressors.¹³ Thus, research is needed to understand the origins of differences in cigarette and other tobacco use among sexual minorities.¹⁴ The main objectives of this study were to examine relationships between sexual orientation discrimination and cigarette smoking, other nicotine/tobacco use, and DSM-5 TUD among sexual minority adults in the United States.

Methods

Participants and Procedures

We used data collected from the 2012–2013 NESARC-III, the primary source of information regarding DSM-5 substance use disorders among the general civilian noninstitutionalized population of individuals aged 18 and older in the United States. The NESARC-III included the National Institute on Alcohol Abuse and Alcoholism Alcohol Use Disorder and Associated Disabilities Interview Schedule-5 (AUDADIS-5), a fully structured diagnostic interview conducted in households. In-person interviews were conducted; the household response rate was 72%, the person response rate was 84%, and the overall response rate was 60.1%. The NESARC-III sample design and weighting procedures are described elsewhere.²⁹ Data for the current study were analyzed in June–November, 2017. All procedures, including informed consent, received full human subjects review and institutional review board approval.

Measures

Sociodemographic characteristics were included that have been shown to differ between heterosexual and sexual minority adults, including sex, age (18–29, 30–44, 45–64, 65 years and older), race/ethnicity (White, African American, Hispanic, other), educational attainment (high school degree or less, some college, or college degree or higher), urbanicity/metropolitan statistical area (urban, rural), and US Census geographical region (Northeast, South, Midwest, and West).³⁰ Respondents were asked “What is your sex?” Response options included (1) male and (2) female.

Sexual attraction was assessed by asking, “People are different in their sexual attraction to other people. Which 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, and (5) only attracted to males?”

Sexual behavior was assessed with multiple items, including “Have you had sex in the last 12 months?” and “During the last 12 months, did you have sex with (1) only males, (2) only females, or (3) both males and females?”

Sexual identity was assessed by asking “Which of the categories on the card best describes you? (1) heterosexual (straight), (2) gay or lesbian, (3) bisexual, or (4) not sure?”

Cigarette smoking and other tobacco/nicotine use was assessed by asking respondents separate questions about cigarette smoking, cigars, pipe, chewing tobacco, e-cigarettes, and other nicotine and tobacco products in their lifetime and in the past 12 months. For instance, respondents were asked whether they had smoked at least 100 cigarettes in their lifetime and any in the past 12 months. Test-retest reliability of tobacco use variables over an average of 10 months indicate that measures of tobacco use are highly reliable.³¹

DSM-5 TUD was assessed according to the criteria of the DSM-5 using the AUDADIS-5, which contains symptom questions that operationalize DSM-5 criteria for TUD for all products containing nicotine or tobacco (ie, cigarettes, cigars, pipe, snuff, chewing tobacco, e-cigarettes, e-liquid, other nicotine or tobacco products). Consistent with the DSM-5, a 12-month AUDADIS-5 TUD diagnosis is based on the presence of at least 2 of the 11 DSM-5 criteria.³² Reliability and validity of the DSM-based diagnoses of TUD have been established in prior psychometric studies.^{33,34}

Sexual orientation discrimination was measured using questions adapted from the Experiences with Discrimination scale.^{35,36} The measure included questions that asked sexual minority respondents how often they experienced discrimination because they were assumed to be gay, lesbian, or bisexual. Six types of sexual orientation discrimination were assessed for prior-to-past-year and in the past-year: (1) ability to obtain health care or health insurance coverage; (2) health care treatment; (3) in public settings like on the street, in stores or in restaurants; (4) other situations like obtaining a job or on the job, getting admitted to a school or training program, in the courts, or by the police; (5) verbal harassment; and (6) physical assault or threats of harm. Response options for each type of discrimination ranged from *never* (0) to *very often* (4). Based on previous work, sexual orientation discrimination scales for both prior-to-past-year and past-year were created by summing responses to the six items (range 0–24) for each scale.^{25,35,36} Excellent reliability was observed in the NESARC-II data for sexual orientation discrimination scales for both past-year (Cronbach’s alpha = 0.84) and prior-to-past-year (Cronbach’s alpha = 0.81),³⁷ and this reliability remained high in the NESARC-III data for both of these scales in the present study (past-year, Cronbach’s alpha = 0.88; prior-to-past-year, Cronbach’s alpha = 0.89).

Statistical Analysis

All statistical analyses were design-based, fully incorporating the complex design features of the NESARC sample, including stratification of the target population, multistage cluster sampling, and weighting to compensate for unequal probabilities of selection and differential nonresponse across population subgroups (see Grant et al.²⁹ for more information about the NESARC-III survey weight calculations). We used the Stata software (Version 15.1), and specifically the “svy” suite of commands, to perform all design-based analyses. Variance estimates were computed using Taylor series linearization to reflect the complex sampling features in the estimates of sampling variance (stratification, cluster sampling, and weighting).

We began by estimating the percentages of women and men in the target population who identified as belonging to each subgroup, defined by sexual attraction, sexual identity, and sexual behavior in the past 12 months. Next, and separately for women and men, we estimated the percentages of each subgroup (based on attraction,

behavior, or identity) that indicated: (1) cigarette smoking in the past year, (2) any nicotine/tobacco use in the past year, and (3) DSM-5 TUD in the past year. We assessed differences in the distributions of each of these tobacco use behaviors/diagnoses by sexual orientation, separately for each sexual orientation domain and gender, using design-adjusted Rao–Scott tests of association. For these tests, the most powerful design-adjusted statistic for testing the null hypothesis of no association between two categorical variables (eg, sexual identity and cigarette smoking in the past year) is one that follows an *F* distribution with degrees of freedom defined by the features of the two-way contingency table describing the association and the complex sample design features.^{38,39} We similarly assessed the associations between experiences of discrimination and the three behaviors/diagnoses by sexual orientation domain, separately for men and women.

Finally, respondents who reported experiencing sexual orientation discrimination included lesbian-identified women, bisexual-identified women, heterosexual-identified women with same-sex attraction and/or same-sex behavior, gay-identified men, bisexual-identified men, and heterosexual-identified men with same-sex attraction and/or same-sex sexual behavior. We used design-based logistic regression models to predict the probability of cigarette smoking in the past year, any tobacco/nicotine use in the past year, and having met criteria for a DSM-5 TUD in the past year as a function of the two aforementioned sexual orientation discrimination scales (past-year and prior-to-past-year), each of which could be computed for these specific respondents. In these models, we controlled for relevant covariates, including age (18–29, 30–44, 45–64, 65 years and older), sex (male, female), race/ethnicity (white, African American, Hispanic, other), educational attainment (high school degree or less, some college, or college degree or higher), urbanicity/ metropolitan statistical area (urban, rural), and US Census geographical region (Northeast, South, Midwest, and West). We separately tested interactions (data not shown) between both sex and the sexual orientation domains with sexual orientation discrimination.

Results

Sample Description

After applying the final NESARC-III survey weights, approximately 8.3% of the target population was estimated to have same-sex sexual attraction; 3.1% had at least one same-sex sexual partner in the past year; and 2.8% self-identified as lesbian, gay, or bisexual. As illustrated in Table 1, slightly more women than men endorsed same-sex sexual attraction and sexual identity while slightly more men endorsed same-sex sexual behavior. Approximately 66.2% of the target population identified as white, 11.8% identified as African American, 5.7% Asian, 14.7% Hispanic, and 1.6% identified as Native American or another race/ethnicity.

Cigarette Smoking, Any Tobacco/Nicotine Use, and TUD by Sex and Dimension of Sexual Orientation

As shown in Table 2, the distributions of past-year cigarette smoking, any nicotine/tobacco use, and DSM-5 TUD differed within each of the three sexual orientation dimensions among women ($p < .001$). Similar significant associations in past-year cigarette smoking, any past-year nicotine/tobacco use behaviors, and past-year TUD were found among men based on sexual identity and sexual behavior; however associations based on sexual attraction were not as robust. Bisexual men and women consistently reported the highest rates

Table 1. Sexual Orientation Sample Sizes in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III), Including Weighted Estimates of Population Percentages

	Women % (n)	Men % (n)
Sexual attraction		
Only same-sex	2.6% (530)	2.8% (492)
Mostly same-sex	0.5% (115)	0.8% (141)
Equally females and males	2.0% (444)	0.7% (138)
Mostly other sex	4.5% (933)	2.7% (429)
Only other sex	90.4% (18 228)	93.0% (14 524)
Sexual behavior ^a		
Only same-sex	2.1% (426)	3.5% (545)
Both sexes	0.9% (171)	0.4% (56)
Did not have sex	32.2% (6 427)	21.8% (3 385)
Only other sex	64.8% (12 954)	74.4% (11 571)
Sexual identity		
Lesbian or gay	1.2% (265)	1.8% (321)
Bisexual	1.9% (422)	0.8% (144)
Not sure	0.6% (130)	0.4% (69)
Heterosexual	96.4% (19 454)	97.0% (15 190)

^aSexual behavior is based on the past 12 months.

of past-year cigarette smoking, any nicotine/tobacco use, and TUD across all three sexual orientation dimensions.

Additional exploratory analyses were conducted to examine the associations between age of onset of cigarette smoking and sexual orientation. Significant differences in the distribution of age of onset of cigarette smoking were found for all three sexual orientation dimensions. We found that bisexual men and women reported the earliest onset of cigarette smoking. For example, among lifetime cigarette smokers, bisexual men reported the lowest mean age of onset among men (13.8 years old, SE = 0.62, 95% CI = 12.6 to 15.1) and bisexual women reported the lowest mean age of onset among women (15.0 years old, SE = 0.29, 95% CI = 14.4 to 15.6). These differences in mean ages of onset, relative to heterosexual men and women, were significant at the 0.01 level, and in the case of male lifetime cigarette smokers, this mean age of onset was also significantly lower than that for males identifying as gay ($p < .001$).

Cigarette Smoking, Any Tobacco/Nicotine Use, and TUD by Type and Frequency of Sexual Orientation Discrimination

As shown in Table 3, the majority of adults who identified as lesbian (60%) or gay (67%) reported prior-to-past-year sexual orientation discrimination. There were significant associations between reported sexual orientation discrimination and the sexual orientation dimensions, as indicated by the Rao-Scott tests of associations. For instance, past-year sexual orientation discrimination was reported by approximately one-half of adults who identified as lesbian or gay, about one-fourth of men or women who identified as bisexual, and approximately one-twentieth of those who identified as heterosexual but reported same-sex attraction and/or behavior.

Figure 1 shows marginal predicted probabilities resulting from a logit model predicting the probability of past-year cigarette smoking based on sexual orientation discrimination among individuals having experienced sexual orientation discrimination. After adjusting for covariates, the association between past-year sexual orientation discrimination (range 0–24) and past-year cigarette smoking was

significant (AOR = 1.04, 95% CI = 1.01 to 1.08, $p < .05$). We found that individuals who experienced the highest levels of past-year sexual orientation discrimination had a marginal predicted probability of having smoked cigarettes in the past year that approached 0.50 (SE = 0.09). We found a similar relationship between prior-to-past-year sexual orientation discrimination and past-year cigarette smoking, but this association was not statistically significant (AOR = 1.03, 95% CI = 0.99 to 1.06, $p = .108$). We conducted additional analysis and found that sexual minority adults who reported no sexual orientation discrimination in their lifetime had much higher rates of past-year cigarette smoking relative to heterosexual adults (gay/lesbian = 38.0%; bisexual = 47.2%; heterosexual = 22.9%; $p < .001$).

After adjusting for relevant covariates, the relationship of the past-year sexual orientation discrimination index with the probability of any past-year tobacco/nicotine use was significant (AOR = 1.04, 95% CI = 1.01 to 1.08, $p < .05$). We found that individuals who reported the highest levels of past-year sexual orientation discrimination had a marginal predicted probability of any past-year tobacco/nicotine use that approached 0.54 (SE = 0.09). The relationship of prior-to-past-year sexual orientation discrimination and the probability of any current smoking was similar, but did not reach statistical significance ($p = .150$).

Figure 2 shows the results from a logit model predicting the probability of having a past-year DSM-5 TUD based on sexual orientation discrimination (again controlling for the aforementioned covariates). The relationship of past-year sexual orientation discrimination and past-year TUD was marginally significant (AOR = 1.04, 95% CI = 1.00 to 1.07, $p = .05$). Individuals who experienced the highest levels of past-year sexual orientation discrimination had a marginal predicted probability of 0.43 (SE = 0.09) of having a past-year TUD. The relationship of prior-to-past-year sexual orientation discrimination and past-year TUD was similar, but did not reach statistical significance (AOR = 1.02, 95% CI = 0.99 to 1.06, $p = .173$). Finally, we found no significant interactions between sex and sexual orientation discrimination for any of the models. Similarly, there were no significant interactions between discrimination and any of the sexual orientation dimensions (identity, attraction, or behavior) in any of the models.

Discussion

This is the first study using nationally representative survey data to examine whether sexual orientation discrimination is associated with past-year cigarette smoking, tobacco/nicotine use, and DSM-5 TUD. Findings from the current study extend empirical support for the minority stress model, which asserts that sexual orientation discrimination contributes to stress-related substance use behaviors such as cigarette smoking.^{16–18,40} This is important because cigarette smoking increases the risk for TUD and adverse health consequences among sexual minorities.^{1,2,41} Findings also contribute to the literature on tobacco use by sexual minorities.^{6–10} Most notably, we found an increased risk of cigarette smoking, any tobacco/nicotine use, and TUD among sexual minorities across all three sexual orientation dimensions (attraction, behavior, and identity)—especially among men and women who reported past-year same-sex sexual behavior. Thus, studies that combine lesbian and bisexual women or gay and bisexual men when examining tobacco-related health disparities among sexual minorities may not fully account for the heightened risk among bisexual men and women.

Table 2. Weighted Prevalence Estimates of Past-Year Cigarette Smoking, Any Nicotine/Tobacco Use, and DSM-5 Tobacco Use Disorder by Sexual Attraction, Sexual Behaviors, and Sexual Identity

	Women			Men		
	Cigarette smoking % (SE)	Any nicotine/ tobacco use ^a % (SE)	DSM-5 tobacco use disorder % (SE)	Cigarette smoking % (SE)	Any nicotine/ tobacco use ^a % (SE)	DSM-5 tobacco use disorder % (SE)
Sexual attraction						
Only same-sex	25.70 (2.12)	29.93 (2.13)	20.18 (1.72)	24.84 (2.39)	25.81 (2.42)	20.86 (2.28)
Mostly same-sex	29.23 (5.56)	29.23 (5.56)	22.25 (5.45)	29.00 (4.51)	30.92 (4.99)	26.01 (4.87)
Both sexes equally	38.26 (2.65)	38.97 (2.64)	31.20 (2.47)	37.04 (4.80)	39.30 (4.69)	32.97 (5.12)
Mostly other sex	32.34 (1.96)	33.37 (2.00)	26.68 (1.78)	27.29 (2.20)	34.58 (2.32)	23.68 (2.07)
Only other sex	19.74 (0.49)	20.42 (0.50)	16.10 (0.45)	26.25 (0.55)	33.27 (0.58)	23.22 (0.56)
Rao-Scott tests of association ^c	$F(3.91, 441.27) = 31.64$, $p < .001$	$F(3.88, 438.90) = 35.06$, $p < .001$	$F(3.81, 430.12) = 25.34$, $p < .001$	$F(3.70, 418.46) = 1.74$, $p = .146$	$F(3.63, 410.53) = 2.83$, $p < .05$	$F(3.55, 401.24) = 1.53$, $p = .200$
Sexual behavior^b						
Only same-sex	30.39 (2.89)	34.22 (2.87)	23.52 (2.47)	28.31 (2.42)	30.69 (2.57)	24.88 (2.55)
Both sexes	56.72 (5.29)	59.40 (5.23)	49.22 (5.08)	57.32 (7.25)	61.91 (7.02)	48.12 (7.67)
Never had sex	15.60 (0.56)	16.45 (0.56)	12.79 (0.49)	20.48 (0.85)	25.39 (0.95)	18.26 (0.85)
Only other sex	22.81 (0.59)	23.45 (0.62)	18.60 (0.56)	27.82 (0.59)	35.38 (0.66)	24.59 (0.61)
Rao-Scott tests of association ^c	$F(2.78, 314.44) = 59.04$, $p < .001$	$F(2.73, 308.64) = 64.70$, $p < .001$	$F(2.91, 328.85) = 50.42$, $p < .001$	$F(2.86, 322.63) = 27.28$, $p < .001$	$F(2.78, 314.66) = 34.69$, $p < .001$	$F(2.79, 315.17) = 17.53$, $p < .001$
Sexual identity						
Lesbian or gay	35.29 (3.76)	36.66 (3.72)	27.27 (3.48)	35.67 (3.36)	37.03 (3.38)	29.99 (3.56)
Bisexual	44.93 (3.16)	45.69 (3.17)	36.26 (3.16)	45.17 (5.68)	50.00 (5.33)	40.80 (5.54)
Not sure	34.57 (5.08)	38.88 (5.01)	33.57 (5.11)	30.21 (7.58)	32.71 (7.37)	27.51 (7.21)
Heterosexual	20.16 (0.48)	20.91 (0.50)	16.41 (0.43)	26.00 (0.54)	32.92 (0.58)	22.99 (0.55)
Rao-Scott tests of association ^c	$F(2.92, 330.09) = 41.30$, $p < .001$	$F(2.85, 322.50) = 44.64$, $p < .001$	$F(2.91, 328.68) = 32.38$, $p < .001$	$F(2.95, 332.95) = 7.93$, $p < .001$	$F(2.96, 334.56) = 4.29$, $p < .01$	$F(2.97, 335.43) = 6.06$, $p < .001$

^aAny nicotine/tobacco use refers to cigarette smoking, cigars, pipe, chewing tobacco, e-cigarettes, and other nicotine and tobacco products.^bSexual behavior is based on the past 12 months.^cRao-Scott design adjusted tests of association^{38,39} were conducted within each cell (eg, past-year cigarette smoking and sexual attraction among women).

Source: NESARC-III.

Table 3. Weighted Estimates of Sexual Orientation Discrimination by Sexual Identity and Same-Sex Attraction and/or Behavior

	Overall		Women			Men		
	Overall sample ^a % (SE)		Lesbian-identified % (SE)	Bisexual-identified % (SE)	Heterosexual-identified with same-sex attraction and/or behavior % (SE)	Gay-identified % (SE)	Bisexual-identified % (SE)	Heterosexual-identified with same-sex attraction and/or behavior % (SE)
Past-year sexual orientation discrimination	<i>n</i> = 3181		<i>n</i> = 261	<i>n</i> = 417	<i>n</i> = 1368	<i>n</i> = 317	<i>n</i> = 138	<i>n</i> = 680
Any past-year discrimination	15.68 (0.78)		52.14 (3.33)	22.60 (2.54)	4.41 (0.71)	46.55 (3.33)	25.00 (4.47)	5.56 (1.03)
Obtaining health care/insurance	4.98 (0.47)		13.47 (2.42)	7.29 (1.61)	1.91 (0.53)	11.73 (1.92)	9.87 (3.05)	2.74 (0.82)
Receiving health care	4.82 (0.49)		14.77 (2.87)	7.10 (1.51)	1.56 (0.50)	13.16 (2.33)	7.40 (2.69)	2.24 (0.79)
Public places (eg, stores)	10.67 (0.71)		38.22 (3.37)	17.30 (2.23)	2.65 (0.66)	32.93 (2.85)	14.40 (3.60)	2.60 (0.78)
Other situations	6.29 (0.61)		23.36 (3.36)	7.59 (1.70)	1.99 (0.52)	21.17 (2.57)	8.11 (2.72)	1.12 (0.42)
Called names	9.98 (0.59)		29.26 (3.41)	14.12 (2.14)	2.71 (0.58)	32.76 (2.98)	21.40 (4.08)	2.64 (0.60)
Assaulted, bullied or threatened	5.08 (0.52)		12.40 (2.46)	7.55 (1.69)	1.78 (0.52)	15.95 (2.33)	9.54 (2.95)	1.81 (0.54)
Number of discrimination situations								
0	84.32 (0.78)		47.86 (3.33)	77.40 (2.54)	95.59 (0.71)	53.45 (3.33)	75.00 (4.47)	94.44 (1.03)
1–2	8.54 (0.53)		30.27 (3.67)	11.63 (1.72)	2.31 (0.39)	24.02 (3.22)	13.91 (3.32)	3.44 (0.77)
3+	7.14 (0.63)		21.87 (3.03)	10.97 (1.96)	2.10 (0.61)	22.52 (2.47)	11.09 (3.15)	2.11 (0.75)
Rao–Scott tests of association			$F(3.68, 415.90) = 74.49, p < .001$			$F(3.79, 427.75) = 39.38, p < .001$		
Prior-to-past year sexual orientation discrimination	<i>n</i> = 3178		<i>n</i> = 261	<i>n</i> = 417	<i>n</i> = 1367	<i>n</i> = 316	<i>n</i> = 138	<i>n</i> = 679
Any prior-to-past-year discrimination	21.29 (0.92)		59.89 (3.49)	26.55 (2.78)	6.86 (0.83)	67.20 (3.23)	37.96 (4.56)	8.95 (1.39)
Obtaining health care/insurance	6.20 (0.56)		17.85 (2.84)	9.02 (1.76)	2.32 (0.60)	15.97 (2.53)	10.00 (3.12)	3.07 (0.90)
Receiving health care	6.64 (0.57)		19.30 (3.34)	9.17 (1.82)	2.07 (0.57)	20.47 (2.84)	11.43 (3.53)	2.58 (0.80)
Public places (eg, stores)	15.05 (0.89)		48.26 (3.74)	19.19 (2.41)	4.46 (0.75)	50.51 (3.45)	22.06 (3.97)	4.60 (0.97)
Other situations	8.67 (0.74)		29.50 (3.45)	8.94 (1.86)	2.77 (0.61)	31.86 (3.26)	9.38 (2.88)	2.26 (0.63)
Called names	16.87 (0.86)		44.69 (3.70)	20.99 (2.62)	4.53 (0.73)	60.55 (2.96)	34.03 (4.15)	5.66 (0.99)
Assaulted, bullied or threatened	11.26 (0.88)		27.01 (3.20)	12.42 (2.08)	3.52 (0.69)	45.11 (4.57)	18.76 (3.85)	3.28 (0.75)
Number of discrimination situations								
0	78.71 (0.92)		40.11 (3.49)	73.45 (2.78)	93.14 (0.83)	32.80 (3.23)	62.04 (4.56)	91.05 (1.39)
1–2	9.21 (0.56)		23.92 (3.18)	9.66 (1.65)	3.64 (0.50)	23.96 (2.79)	20.63 (4.09)	5.60 (1.19)
3+	12.07 (0.79)		35.97 (3.41)	16.89 (2.30)	3.21 (0.69)	43.24 (3.33)	17.33 (3.46)	3.34 (0.88)
Rao–Scott tests of association			$F(3.78, 427.05) = 82.94, p < .001$			$F(3.75, 423.27) = 65.02, p < .001$		

^aSelf-identified heterosexuals who are only attracted to the opposite sex and either *never had sex* or *had sex only with opposite-sex partners* were excluded from the sample.

Source: NESARC-III.

Figure 1. Sexual orientation discrimination and cigarette smoking among adults experiencing sexual orientation discrimination. *Source:* NESARC-III.

Figure 2. Sexual orientation discrimination and DSM-5 tobacco use disorder among adults experiencing sexual orientation discrimination. *Source:* NESARC-III.

We found that past-year sexual orientation discrimination was significantly associated with cigarette smoking, any tobacco/nicotine use and TUD among sexual minorities. While prior studies have shown that experiences of sexual orientation discrimination among sexual minorities are associated with substance use and mental health outcomes,^{23–26,42} our findings extend this research and suggest that sexual minorities who experience higher levels of past-year sexual orientation discrimination have greater probability of cigarette smoking, any tobacco/nicotine use and TUD relative to those who experience lower levels of sexual orientation discrimination or no discrimination. Moreover, we found that associations between prior-to-past-year sexual orientation discrimination and cigarette smoking, any tobacco/nicotine use, or TUD were not as robust, suggesting that past-year experiences of sexual orientation discrimination are more salient than more distal experiences of sexual orientation discrimination. Additionally, we found that even sexual minority adults

who reported never experiencing sexual orientation discrimination in their lifetime had much higher rates of past-year cigarette smoking relative to heterosexual adults. This suggests that factors other than sexual orientation discrimination contribute to cigarette smoking among sexual minorities, for example, concealment/fear of rejection, internalized homophobia, childhood adversity, institutional discrimination, and other forms of discrimination (eg, age, sex, race/ethnicity).^{11,16–18,25,43}

Our findings provide strong evidence that minority sexual orientation, whether based on sexual attraction, sexual behavior, or sexual identity, is significantly associated with elevated risk of cigarette smoking, any tobacco/nicotine use, and DSM-5 TUD. Risk was most pronounced among bisexual men and women, regardless of sexual orientation dimension examined, placing these individuals at highest risk for developing smoking-related adverse health consequences. The higher cigarette smoking and TUD rates among bisexual-identified men

and women, combined with lower rates of discrimination (compared to lesbian/gay-identified participants), suggest the need for research that investigates the potential moderating effect of sexual identity on the association between discrimination and tobacco use. Moreover, the earlier onset of cigarette smoking found among bisexual men and women suggests the need for future prospective studies that examine whether coming out as a sexual minority person leads to stress in the form of peer victimization, discrimination, or family rejection, which may in turn lead to earlier initiation of smoking among bisexual youth.

While studies that combine lesbian, gay and bisexual adults provide useful information regarding differences between sexual minority and heterosexual adults,^{8,10} our findings reinforce the importance of analyzing data separately by sexual minority subgroup to more fully account for potential variations among these subgroups. In addition, our results demonstrate the importance of considering multiple measures of sexual orientation when assessing differences in tobacco use.^{44,45} In particular, the prevalence of past-year cigarette smoking, any nicotine/tobacco use, and TUD varied considerably among sexual minority women and men across the three sexual orientation dimensions, while differences were minimal across the three sexual orientation dimensions for respondents who were exclusively heterosexually oriented (whether sexual orientation was defined by attraction, behavior, or identity).

The present study has several strengths worth highlighting. The NESARC-III has one of the largest national samples of sexual minority adults in the United States. In addition, the NESARC-III includes measures of sexual orientation discrimination and TUD based on DSM-5 criteria. Nevertheless, some limitations should be taken into account when considering the findings. First, these analyses likely underestimate the prevalence of cigarette smoking, other tobacco/nicotine use, and TUD, because small but high-risk groups of currently institutionalized individuals, such as incarcerated adults, were not included.⁴⁶ Second, causal inferences were not possible given that the data were cross-sectional. Although we found a relationship between sexual orientation discrimination and cigarette smoking, which is consistent with prior qualitative work,⁴⁷ future longitudinal research is needed to examine the prospective relationships among sexual orientation, sexual orientation discrimination, and tobacco/nicotine outcomes. Similarly, although the NESARC-III included a large sample, there were not enough sexual minorities to examine the relationship between sexual orientation discrimination and cigarette smoking for each sexual minority subgroup separately, and future research is needed with larger samples to help identify the most at-risk subgroups.

Third, the NESARC-III did not assess the severity of individual sexual orientation discrimination experiences or other factors presumed to be more proximally associated with sexual minority stress, such as internalized homophobia, concealment, and family rejection. Longitudinal data and more detailed and relevant measures are needed to further examine the temporal ordering among discrimination, other sexual-minority-specific stressors, and cigarette smoking. Fourth, the NESARC-III did not assess gender identity, and sex was assessed as binary (male/female). Researchers should consider examining cigarette smoking, other tobacco/nicotine use, and TUD using nonbinary gender response options. To date, analyses associated with gender identity are often constrained by measurement issues in large national surveys. As more national surveys include more expansive indicators of sex assigned at birth and gender identity as separate questions, researchers will be better able to determine the associations with discrimination, tobacco use, and gender identity. Finally, the NESARC-III was conducted in the United States and future work is needed to examine whether these findings are replicated in other parts of the world.

Despite these limitations, the findings of this study provide strong evidence that a higher proportion of sexual minorities smoke cigarettes, and their higher rates of smoking portend a greater number of negative health consequences for sexual minorities when compared to heterosexuals, especially among bisexual men and women. We found that both past-year and prior-to-past-year sexual orientation discrimination were most prevalent among lesbian women and gay men. We also found support for the minority stress hypothesis in that past-year sexual orientation discrimination was associated with cigarette smoking, any tobacco/nicotine use, and TUD among sexual minorities. More specifically, past-year experiences of sexual orientation discrimination appeared to be somewhat more salient than prior sexual orientation discrimination. Although sexual minorities who experienced no sexual orientation discrimination had elevated rates of cigarette smoking relative to heterosexuals, findings demonstrate the importance of designing smoking cessation efforts and treatment of TUD among sexual minority adults who experience high levels of past-year sexual orientation discrimination since these individuals reported the highest rates of cigarette smoking, any tobacco-nicotine use, and having a DSM-5 TUD.

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Declaration of Interests

None declared.

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