

Comparison of Health and Health Risk Factors Between Lesbian, Gay, and Bisexual Adults and Heterosexual Adults in the United States

Results From the National Health Interview Survey

Gilbert Gonzales, PhD, MHA; Julia Przedworski, BS; Carrie Henning-Smith, PhD, MPH, MSW

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IMPORTANCE Previous studies identified disparities in health and health risk factors among lesbian, gay, and bisexual (LGB) adults, but prior investigations have been confined to samples not representative of the US adult population or have been limited in size or geographic scope. For the first time in its long history, the 2013 and 2014 National Health Interview Survey included a question on sexual orientation, providing health information on sexual minorities from one of the nation's leading health surveys.

OBJECTIVE To compare health and health risk factors between LGB adults and heterosexual adults in the United States.

DESIGN, SETTING, AND PARTICIPANTS Data from the nationally representative 2013 and 2014 National Health Interview Survey were used to compare health outcomes among lesbian (n = 525), gay (n = 624), and bisexual (n = 515) adults who were 18 years or older and their heterosexual peers (n = 67 150) using logistic regression.

MAIN OUTCOMES AND MEASURES Self-rated health, functional status, chronic conditions, psychological distress, alcohol consumption, and cigarette use.

RESULTS The study cohort comprised 68 814 participants. Their mean (SD) age was 46.8 (11.8) years, and 51.8% (38 063 of 68 814) were female. After controlling for sociodemographic characteristics, gay men were more likely to report severe psychological distress (odds ratio [OR], 2.82; 95% CI, 1.55-5.14), heavy drinking (OR, 1.97; 95% CI, 1.08-3.58), and moderate smoking (OR, 1.98; 95% CI, 1.39-2.81) than heterosexual men; bisexual men were more likely to report severe psychological distress (OR, 4.70; 95% CI, 1.77-12.52), heavy drinking (OR, 3.15; 95% CI, 1.22-8.16), and heavy smoking (OR, 2.10; 95% CI, 1.08-4.10) than heterosexual men; lesbian women were more likely to report moderate psychological distress (OR, 1.34; 95% CI, 1.02-1.76), poor or fair health (OR, 1.91; 95% CI, 1.24-2.95), multiple chronic conditions (OR, 1.58; 95% CI, 1.12-2.22), heavy drinking (OR, 2.63; 95% CI, 1.54-4.50), and heavy smoking (OR, 2.29; 95% CI, 1.36-3.88) than heterosexual women; and bisexual women were more likely to report multiple chronic conditions (OR, 2.07; 95% CI, 1.34-3.20), severe psychological distress (OR, 3.69; 95% CI, 2.19-6.22), heavy drinking (OR, 2.07; 95% CI, 1.20-3.59), and moderate smoking (OR, 1.60; 95% CI, 1.05-2.44) than heterosexual women.

CONCLUSIONS AND RELEVANCE This study supports prior research finding substantial health disparities for LGB adults in the United States, potentially due to the stressors that LGB people experience as a result of interpersonal and structural discrimination. In screening for health issues, clinicians should be sensitive to the needs of sexual minority patients.

Author Affiliations: Department of Health Policy, Vanderbilt University School of Medicine, Nashville, Tennessee (Gonzales); Division of Health Policy & Management, School of Public Health, University of Minnesota, Minneapolis (Przedworski, Henning-Smith).

Corresponding Author: Gilbert Gonzales, PhD, MHA, Department of Health Policy, Vanderbilt University School of Medicine, 2525 W End Ave, Ste 1200, Nashville, TN 37203 (gilbert.gonzales@vanderbilt.edu).

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Attention to the health care needs of the lesbian, gay, bisexual, and transgender (LGBT) population has increased in recent years.¹⁻⁴ In 2011, the Institute of Medicine⁵ identified—and targeted for elimination—disparities in health and health care for sexual and gender minority individuals. According to the numerous studies reviewed in the Institute of Medicine report, LGBT people experience worse health outcomes compared with their heterosexual and nontransgender peers as a result of “minority stress,” or the chronic stress associated with being a member of a marginalized minority group.⁶⁻¹⁰ Discriminatory environments and public policies can stigmatize LGBT people and engender feelings of rejection, shame, and low self-esteem, which can negatively shape their health and health-related behaviors.¹¹

Unfortunately, data for measuring and monitoring the health of LGBT populations in the United States have been limited. In some research, data were gathered from nonrandom convenience samples of LGBT people in clinical settings¹² or LGBT-specific community organizations.^{13,14} Population-based studies on LGBT adults have been constrained to health surveys of small samples,¹⁵⁻¹⁷ requiring researchers to pool data over many years^{18,19} or to collapse all LGBT adults into a single category.^{17,20-22} Other health surveys with sexual orientation data have been confined to individual states,²³⁻²⁸ making it difficult to generalize to the US population. While these studies have been instrumental for providing important health information on LGBT people, recent federal initiatives have taken steps toward adding sexual orientation and gender identity questions to federally funded health surveys.²⁹

This study uses recently collected nationally representative data to examine health and health risk factors within the lesbian, gay, and bisexual (LGB) adult population in the United States. We focus on health outcomes and health-related behaviors that represent the wide spectrum of health and well-being in the LGB population. The objectives of our study were to establish baseline nationally representative estimates of the physical, functional, and mental health status and health risk factors for LGB adults compared with non-LGB adults to monitor progress toward eliminating sexual orientation-based health disparities and avoidable differences in health.³⁰

Methods

Data Source

All analyses were limited to publicly available, deidentified data and did not require institutional review board approval. Verbal informed consent was obtained by the National Center for Health Statistics. The National Health Interview Survey (NHIS) is a nationally representative health survey of the civilian, non-institutionalized population and serves as one of the most comprehensive resources on health in the United States.³¹ The Family Core questionnaire records basic health and disability information for each household member, while a single random adult in each household is selected for a detailed interview on more specific health information that includes health conditions, health behaviors, and access to health care. Our

Key Points

Question What does one of the nation's leading health surveys teach us about health outcomes and health risk factors in lesbian, gay, and bisexual (LGB) adults when it first measured sexual orientation?

Findings In this nationally representative study of approximately 68 000 adults, LGB adults were more likely to report impaired physical and mental health, heavy alcohol consumption, and heavy cigarette use, potentially due to the stressors that LGB people experience as a result of interpersonal and structural discrimination.

Meaning In screening for health issues, clinicians should be sensitive to the needs of sexual minority patients.

study sample was drawn from the Sample Adult component (n = 68 814) in the Integrated Health Interview Series,³² a harmonized version of the 2013 and 2014 NHIS. Approximately 75% of the selected households completed the survey, and approximately 81% of selected adults completed the Sample Adult component.³³

Study Sample

Beginning in 2013, a question regarding sexual orientation was added to the Sample Adult component of the NHIS.³⁴ Respondents 18 years or older were asked which of the following categories best represents how they thought of themselves: (1) lesbian or gay; (2) straight, that is, not gay; (3) bisexual; (4) something else; (5) I don't know the answer; or (6) refuse. We classified respondents as lesbian or gay (n = 1149), bisexual (n = 515), and heterosexual (n = 67 150). All analyses were stratified separately for men and women, and we excluded respondents who indicated their sexual orientation as something else (n = 144), did not know the answer (n = 310), or refused to answer (n = 448). Initial quality assessments conducted by the National Center for Health Statistics³⁵ found item nonresponse (ie, cases reporting something else, refused to answer, or did not know the answer) was higher among respondents with lower levels of education, respondents residing in rural areas, and respondents not completing the survey in English. Meanwhile, transgender identity was not separately ascertained in the 2013 and 2014 NHIS.

Health Status and Health Risk Factor Measures

We examined 3 physical and functional health outcomes. These included the following: (1) self-rated health status (poor or fair health vs excellent, very good, or good health), (2) reporting 1 or multiple (≥ 2) of 10 chronic conditions (cancer, hypertension, coronary heart disease, stroke, chronic obstructive pulmonary disease, asthma, diabetes, arthritis, hepatitis, and weak or failing kidneys³⁶), and (3) needing help with activities of daily living (ADLs) (eg, eating, bathing, dressing, or getting around inside the home) or instrumental ADLs (IADLs) (eg, household chores, doing necessary business, or shopping) because of physical, mental, or emotional problems.

We also examined differences in 3 mental health and substance use measures available in the NHIS. To examine

mental health status, we relied on the Kessler 6-Item Psychological Distress Scale for an indicator of nonspecific psychological distress, which asked how often during the previous 30 days the respondent felt nervous, hopeless, worthless, so sad that nothing could cheer him or her up, restless or fidgety, and that everything was an effort.³⁷ The Kessler 6-Item Psychological Distress Scale is a validated and widely used 6-item screening instrument used to assess individuals for moderate and severe mental illness in epidemiologic studies. Based on a 24-point range, we classified adults between the 5-point and 12-point threshold as symptomatic of moderate psychological distress³⁸ and above the 13-point threshold as symptomatic of severe psychological distress.³⁷ Beyond representing an important mental health outcome, nonspecific psychological distress has been tied to later health outcomes, including mortality.³⁹

Two substance use measures were also assessed, including alcohol consumption and cigarette use (the NHIS does not ask respondents about marijuana, opioid, or other illicit drug use). Respondents were classified as having been lifetime abstainers from alcohol drinking (<12 drinks in their lifetime), former alcohol drinkers (≥ 12 drinks in their lifetime and none in the past year), and current alcohol drinkers (≥ 12 drinks in their lifetime and ≥ 1 drink in the past year). Infrequent, light, and moderate current drinkers (1-14 drinks per week for men and 1-7 drinks per week for women) were distinguished from heavy current drinkers (>14 drinks per week for men and >7 drinks per week for women). Unfortunately, binge drinking was not measured consistently across the 2013 and 2014 NHIS.

Cigarette users were classified as nonsmokers (<100 cigarettes in their lifetime), former smokers (≥ 100 cigarettes in their lifetime but no longer smoke), and current smokers (≥ 100 cigarettes in their lifetime and smoke some days or every day). Moderate vs heavy smokers were distinguished by whether they reported smoking on average less than vs at least 20 cigarettes (or approximately 1 pack of cigarettes) per day.⁴⁰ Of the respondents reporting current cigarette use ($n = 12\,189$), 1.7% ($n = 203$) were excluded from the analysis of cigarette use because they were missing information on the number of cigarettes smoked daily.

Statistical Analysis

We used descriptive statistics to characterize the study sample and to estimate the prevalence of impaired physical, functional, and mental health, as well as alcohol consumption and tobacco use. Pearson χ^2 tests were used to compare sociodemographic characteristics and health outcomes across sexual orientation categories. We then estimated binary or multinomial logistic regression models for each outcome: multinomial logistic regression models were used on outcomes with 3 or more responses (ie, chronic conditions, psychological distress, alcohol consumption, and cigarette use). All models were adjusted for confounding variables and key differences across sexual orientation samples, including the following: age, race/ethnicity, relationship status, presence of a minor child in the household, language of interview, family income relative to the federal poverty guidelines, educational attainment, employment status, primary source of health insurance, no office visit

with a physician or health care professional in the past year, unmet medical care due to cost in the past year, region, and survey year. Rural residence was not available in the public use data files. If multiple sources of health insurance were reported for an observation, we assigned the primary source of coverage in the order of private, public, and uninsured. Results from the logistic regression models are presented as adjusted odds ratios (ORs) with 95% CIs. We conducted all analyses separately for men and women in a software program (Stata, version 14; StataCorp LP) using survey weights and the *svy* command to adjust standard errors for the complex survey design of the NHIS and to generate nationally representative estimates.⁴¹ Finally, we included indicators when data were missing for demographic and socioeconomic variables (ie, relationship status, educational attainment, employment status, health insurance status, office visits, and unmet medical care due to cost). As recommended by the National Center for Health Statistics,⁴² we used multiple imputations in Stata (via the *mi* family of commands) to adjust for missing responses to family income.

Results

Demographic and Socioeconomic Characteristics by Sexual Orientation

Table 1 lists demographic and socioeconomic characteristics of the US adult population by gender and sexual orientation. Approximately 2% of the noninstitutionalized, civilian adult population identified as lesbian, gay, or bisexual. Compared with heterosexual men, both gay men and bisexual men tended to be younger, less likely to be married or living with a partner, and less likely to have a minor child in the household. Both gay men and bisexual men had higher levels of educational attainment than heterosexual men. Bisexual men were most likely to be uninsured, and both gay men and bisexual men were more likely to have unmet medical care due to cost compared with heterosexual men. There were no significant differences in race/ethnicity, family income, employment status, and having a recent office visit for health care across sexual orientation categories for men.

While there were no statistically significant differences in race/ethnicity across sexual orientations for women, compared with heterosexual women, lesbian women were less likely to be married or living with a partner and were more likely to report higher levels of family income, educational attainment, and full-time employment status. Bisexual women were less likely to be married or living with a partner and were more likely to be younger, living in poverty, and unemployed compared with heterosexual women. Both lesbian women and bisexual women were more likely to be uninsured and have unmet medical care due to cost, while lesbian women were most likely to not have an office visit for health care in the past year.

Health and Health Risk Factors by Sexual Orientation

Table 2 compares physical, functional, and mental health status and health risk factors by gender and sexual orientation. Gay, bisexual, and heterosexual men reported similar levels of

Table 1. Characteristics of US Adults by Gender and Sexual Orientation^a

Variable	Men, %				Women, %			
	Heterosexual (n = 29 965)	Gay (n = 624)	Bisexual (n = 162)	P Value	Heterosexual (n = 37 185)	Lesbian (n = 525)	Bisexual (n = 353)	P Value
Weighted %	97.7	1.8	0.4	NA	97.6	1.4	1.0	NA
Age, y								
18-25	15.0	18.6	23.3		13.5	17.8	36.1	
26-34	16.1	17.7	20.3		15.4	17.7	31.6	
35-49	25.7	30.6	24.7	.002	25.1	26.7	19.6	<.001
50-64	26.0	24.1	17.7		25.8	30.5	10.0	
≥65	17.2	9.1	14.0		20.2	7.3	2.8	
Race/ethnicity								
Non-Hispanic white	66.9	70.0	68.5		66.2	65.5	71.7	
Non-Hispanic black	11.1	12.2	8.6	.07	12.5	14.7	14.1	.19
Hispanic	15.8	14.1	10.6		14.7	15.0	10.4	
Non-Hispanic other	6.2	3.7	12.3		6.6	4.8	3.9	
Relationship status								
Married or living with a partner	64.2	38.8	28.4		57.8	53.6	34.7	
Separated, divorced, or widowed	12.4	6.3	13.5	<.001	22.2	8.9	13.0	<.001
Never married	23.3	54.7	58.1		19.8	37.2	51.5	
Missing data	0.1	0.2	0		0.2	0.3	0.7	
Child <18 y old in the household	33.7	13.0	25.4	<.001	37.9	28.5	31.3	.001
Non-English speaking interview	6.7	1.8	2.8	<.001	6.4	2.5	2.3	<.001
Educational attainment								
<High school	14.0	6.7	9.5		13.1	6.4	18.4	
High school graduate	27.1	18.0	15.7	<.001	25.1	21.1	22.9	.008
Some college	29.1	33.7	36.6		32.1	36.2	30.9	
≥Bachelor's degree	29.4	41.5	38.3		29.4	36.3	27.7	
Missing data	0.5	0.0	0.0		0.5	0.1	0.0	
Family income relative to the FPGs								
<100%	12.0	10.2	15.4	.27	14.9	15.2	25.9	<.001
100%-199%	17.9	14.8	18.5		20.3	19.8	25.8	
200%-399%	30.8	29.6	29.3		29.4	24.0	24.4	
≥400%	39.3	45.4	36.8		35.3	41.1	23.9	
Employment status								
Full-time	53.9	53.1	43.6		35.6	49.1	31.4	
Part-time	12.3	14.6	13.6		18.4	17.8	22.7	
Unemployed	5.4	5.1	7.8	.48	4.5	8.4	16.6	<.001
Not in labor force	27.4	26.5	34.6		40.4	24.8	27.9	
Missing data	1.1	0.7	0.4		1.2	0.0	1.3	
Health insurance status								
Private	54.4	63.0	54.4		51.6	57.0	54.4	
Public	28.6	19.9	25.2	.001	34.7	24.7	25.8	<.001
Uninsured	16.6	15.8	18.0		13.2	17.4	19.3	
Missing data	0.5	1.3	2.3		0.4	0.9	0.5	
No office visit for health care in the past year	25.2	17.9	21.7	.05	12.9	21.8	12.3	<.001
Missing data	0.2	0.5	0.0	NA	0.4	0.5	0.2	NA
Unmet medical care due to cost in the past year	6.4	8.3	14.4	.02	7.9	17.2	14.7	<.001
Missing data	0.0	0.0	0.0	NA	0.1	0.0	0.3	NA

Abbreviations: FPGs, federal poverty guidelines; NA, not applicable.

^a Data are from the 2013 and 2014 National Health Interview Survey among adults 18 years or older.

self-rated health, functional status, and physical health. While 16.9% of heterosexual men had moderate or severe psychological distress, 25.9% of gay men and 40.1% of bisexual men

reported moderate or severe psychological distress ($P < .001$). The prevalence of heavy drinking was highest among bisexual men (10.9%) compared with heterosexual (5.7%) or gay

Table 2. Health Status and Health Risk Factors of US Adults by Gender and Sexual Orientation^a

Variable	Men, %				Women, %			
	Heterosexual	Gay	Bisexual	P Value	Heterosexual	Lesbian	Bisexual	P Value
Self-rated health	(n = 29 956)	(n = 624)	(n = 162)		(n = 37 162)	(n = 525)	(n = 353)	
Excellent, very good, or good	87.7	89.1	84.4	.44	86.6	83.4	88.6	.22
Poor or fair	12.3	10.9	15.6		13.4	16.6	11.4	
Functional status	(n = 29 962)	(n = 624)	(n = 162)		(n = 37 182)	(n = 525)	(n = 353)	
Does not need help with ADLs or IADLs	96.4	96.0	96.2	.90	94.3	96.3	96.2	.14
Needs help with ADLs or IADLs	3.6	4.0	3.8		5.7	3.8	3.8	
Physical health	(n = 29 695)	(n = 616)	(n = 161)		(n = 36 899)	(n = 520)	(n = 349)	
No chronic conditions	52.7	51.3	49.4	.77	47.9	48.9	55.2	.33
One chronic condition	23.7	25.1	29.2		25.3	25.6	23.3	
Multiple chronic conditions	23.6	23.6	21.4		26.8	25.5	21.4	
Mental health	(n = 29 561)	(n = 619)	(n = 161)		(n = 36 701)	(n = 518)	(n = 351)	
No psychological distress	83.1	74.1	59.9	<.001	78.1	71.5	53.6	<.001
Moderate psychological distress	14.1	19.1	30.3		18.1	23.4	35.2	
Severe psychological distress	2.8	6.8	9.8		3.8	5.0	11.2	
Alcohol consumption	(n = 29 532)	(n = 618)	(n = 162)		(n = 36 834)	(n = 519)	(n = 352)	
Lifetime abstainer	15.7	7.5	10.8	<.001	26.2	14.2	25.6	<.001
Former drinker	14.0	8.7	7.2		14.1	14.3	5.7	
Infrequent, light, or moderate current drinker	64.6	78.7	71.1		54.9	62.6	56.9	
Heavy current drinker	5.7	5.1	10.9		4.8	8.9	11.7	
Cigarette use	(n = 29 792)	(n = 623)	(n = 160)		(n = 37 054)	(n = 524)	(n = 353)	
Never smoked cigarettes	55.3	52.0	55.5	.05	66.5	52.1	57.5	<.001
Former smoker	25.6	23.2	20.4		18.8	22.8	16.3	
Moderate current smoker	12.9	18.7	14.8		11.3	19.9	22.0	
Heavy current smoker	6.2	6.0	9.3		3.4	5.2	4.2	

Abbreviations: ADLs, activities of daily living; IADLs, instrumental activities of daily living.

^a Data are from the 2013 and 2014 National Health Interview Survey among adults 18 years or older.

(5.1%) men. Both gay men and bisexual men were more likely to be current smokers compared with heterosexual men, but bisexual men were most likely to be heavy smokers (9.3%) compared with heterosexual (6.0%) and gay (6.2%) men.

Table 2 also lists health outcomes and health risk factors for women by sexual orientation. As with men, there were no statistically significant differences in physical health and functional status by sexual orientation. Approximately 21.9% of heterosexual women exhibited symptoms of moderate and severe psychological distress, but the prevalence of moderate and severe psychological distress was higher among lesbian women (28.4%) and twice as high (46.4%) among bisexual women ($P < .001$). Heavy alcohol consumption was highest among bisexual women (11.7%), but lesbian women (8.9%) were still more likely to be heavy drinkers compared with heterosexual women (4.8%). Both lesbian and bisexual women were also more likely to be current smokers (>25%) compared with heterosexual women (14.7%), and lesbian women were slightly more likely to be heavy smokers (5.2%) compared with heterosexual (3.4%) and bisexual (4.2%) women.

Adjusted Binary and Multinomial Logistic Regression Findings

Table 3 compares health outcomes and health risk factors between LGB adults and their heterosexual peers, while adjust-

ing for potentially confounding variables. After controlling for demographic and socioeconomic characteristics, compared with heterosexual men, gay men experienced elevated odds of moderate (OR, 1.45; 95% CI, 1.08-1.96) to severe (OR, 2.82; 95% CI, 1.55-5.14) psychological distress, heavy alcohol consumption (OR, 1.97; 95% CI, 1.08-3.58), and moderate cigarette use (OR, 1.98; 95% CI, 1.39-2.81). Bisexual men exhibited greater odds of moderate (OR, 2.60; 95% CI, 1.62-4.18) and severe (OR, 4.70; 95% CI, 1.77-12.52) psychological distress compared with heterosexual men, and bisexual men were more likely to be heavy drinkers (OR, 3.15; 95% CI, 1.22-8.16) and heavy cigarette smokers (OR, 2.10; 95% CI, 1.08-4.10).

Table 3 also lists results from logistic regression analyses comparing lesbian and bisexual women with heterosexual women. After controlling for demographic and socioeconomic factors, lesbian women reported elevated odds of poor or fair health (OR, 1.91; 95% CI, 1.24-2.95), multiple chronic conditions (OR, 1.58; 95% CI, 1.12-2.22), moderate psychological distress (OR, 1.34; 95% CI, 1.02-1.76), heavy alcohol consumption (OR, 2.63; 95% CI, 1.54-4.50), and moderate (OR, 2.14; 95% CI, 1.51-3.04) to heavy (OR, 2.29; 95% CI, 1.36-3.88) cigarette use. Compared with heterosexual women, bisexual women reported greater odds of multiple chronic conditions (OR, 2.07; 95% CI, 1.34-3.20), moderate (OR, 2.17; 95% CI, 1.48-3.19) to severe (OR, 3.69; 95% CI, 2.19-6.22) psychological distress,

Table 3. Association Between Sexual Orientation and Health Status and Health Risk Factors^a

Variable	Men				Women			
	Gay vs Heterosexual		Bisexual vs Heterosexual		Lesbian vs Heterosexual		Bisexual vs Heterosexual	
	OR (95% CI)	P Value	OR (95% CI)	P Value	OR (95% CI)	P Value	OR (95% CI)	P Value
Self-rated health								
Excellent, very good, or good	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
Poor or fair	0.99 (0.62-1.56)	.96	1.48 (0.74-2.96)	.26	1.91 (1.24-2.95)	.004	1.16 (0.76-1.77)	.50
Functional status								
Does not need help with ADLs or IADLs	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
Needs help with ADLs or IADLs	1.07 (0.56-2.04)	.85	0.83 (0.25-2.70)	.75	0.89 (0.43-1.83)	.75	1.20 (0.64-2.24)	.57
Physical health								
No chronic conditions	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
One chronic condition	1.23 (0.93-1.63)	.14	1.61 (0.94-2.76)	.08	1.21 (0.87-1.68)	.26	1.35 (0.94-1.95)	.11
Multiple chronic conditions	1.51 (0.99-2.31)	.06	1.47 (0.68-3.18)	.33	1.58 (1.12-2.22)	.01	2.07 (1.34-3.20)	.001
Mental health								
No psychological distress	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
Moderate psychological distress	1.45 (1.08-1.96)	.02	2.60 (1.62-4.18)	<.001	1.34 (1.02-1.76)	.04	2.17 (1.48-3.19)	<.001
Severe psychological distress	2.82 (1.55-5.14)	.001	4.70 (1.77-12.52)	.002	1.45 (0.91-2.29)	.12	3.69 (2.19-6.22)	<.001
Alcohol consumption								
Lifetime abstainer	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
Former drinker	1.74 (1.00-3.03)	.05	1.08 (0.50-2.34)	.84	2.20 (1.36-3.57)	.001	0.57 (0.30-1.11)	.10
Infrequent, light, or moderate current drinker	2.76 (1.73-4.40)	<.001	1.99 (0.96-4.12)	.06	1.80 (1.19-2.72)	.01	1.05 (0.71-1.56)	.81
Heavy current drinker	1.97 (1.08-3.58)	.03	3.15 (1.22-8.16)	.02	2.63 (1.54-4.50)	<.001	2.07 (1.20-3.59)	.01
Cigarette use								
Never smoked cigarettes	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
Former smoker	1.38 (1.02-1.88)	.04	1.11 (0.61-2.02)	.72	1.85 (1.33-2.56)	<.001	1.55 (1.06-2.27)	.02
Moderate current smoker	1.98 (1.39-2.81)	<.001	1.22 (0.65-2.29)	.53	2.14 (1.51-3.04)	<.001	1.60 (1.05-2.44)	.03
Heavy current smoker	1.58 (0.87-2.86)	.13	2.10 (1.08-4.10)	.03	2.29 (1.36-3.88)	.002	1.36 (0.70-2.65)	.36

Abbreviations: ADLs, activities of daily living; IADLs, instrumental activities of daily living; OR, odds ratio.

^a Data are from the 2013 and 2014 National Health Interview Survey among adults 18 years or older. All estimates are from binary or multinomial logistic regression models controlling for age, race/ethnicity, relationship status,

presence of a child in the household, educational attainment, language of interview, family income, employment status, primary source of health insurance, no office visit for health care in the past year, unmet medical care due to cost in the past year, region, and year.

heavy alcohol drinking (OR, 2.07; 95% CI, 1.20-3.59), and moderate cigarette use (OR, 1.60; 95% CI, 1.05-2.44).

Discussion

This study examined differences in physical, functional, and mental health status and health risk factors between LGB adults and heterosexual adults using recently available sexual orientation data in the NHIS, one of the principal sources of health information on the US population. Findings from our study indicate that LGB adults experience significant health disparities—particularly in mental health and substance use—likely due to the minority stress that LGB adults experience as a result of their exposure to both interpersonal and structural discrimination.⁶⁻¹⁰ As a first step toward eliminating sexual orientation-based health disparities, it is important for health care professionals to be aware and mindful of the increased risk of impaired health, alcohol consumption, and tobacco use among their LGB adult patients.

We found the highest prevalence and odds of psychological distress among bisexual adults. Bisexual people are not only marginalized by the larger heterosexual population, but also some bisexual individuals may experience stigma from gay and lesbian individuals, resulting in lower connections with the sexual minority community.⁴³⁻⁴⁶ Combined with the relative scarcity of bisexual communities and organizations, this ostracizing may lead to social isolation, a risk factor for psychological distress.^{46,47} Combining LGB adults into a single category would have obscured these important differences between groups. As additional data are collected each year, allowing for more robust sample sizes among small populations, researchers should continue to examine the causes and consequences of impaired health in subgroups within the LGB population. In addition to bisexual adults, such groups might include racial/ethnic minorities, older adults, individuals with disabilities, and low-income individuals who identify as sexual minorities.

Another finding from our study is that, while gay and lesbian adults in the NHIS were advantaged in terms of education

and (for lesbian women) income relative to their heterosexual counterparts, that advantage did not translate into better health outcomes. Research has long demonstrated a strong link between socioeconomic status and better health.⁴⁸ However, the effect of sexual minority status appears to have an even stronger influence on health and health risk factors. This effect may be attributable to the chronic minority stress experienced by gay and lesbian people, or it may also be a reflection of differences in family structure and the health advantages that partnership affords.⁴⁹ Access to legally recognized marriage was a new phenomenon for many of the LGB adults in the study sample and would not have taken effect for most of the country until after the NHIS was conducted in 2013 and 2014. Still, future research should elucidate the interactions between sexual orientation, socioeconomic status, and family structure and their effects on long-term health outcomes, including physical and mental health status and health risk factors.

There were several limitations to using the NHIS for this study. All responses to the NHIS were self-reported, which can lead to response and recall bias when describing health and health behaviors, but the health outcomes we study represent standard and clinically meaningful outcomes for monitoring the population's health.^{31,37,38} In addition, reporting sexual orientation may be limited by selection bias. For example, lesbian women may be more likely than gay men to register and report their same-sex relationships and sexual orientation status,⁵⁰ and adults reporting sexual minority status are more likely to be highly educated.⁵¹ Meanwhile, ascertaining sexual orientation during in-person interviews with NHIS surveyors may discourage respondents from reporting accurate sexual orientations, especially among rural populations, non-English language speakers, and racial/ethnic minorities.^{35,52} Our results may be biased to the extent that select subgroups did not disclose their sexual orientation in the NHIS.

Our study would have benefited from additional information that was missing in the NHIS. For example, the NHIS does not measure other dimensions of sexual orientation, including sexual behavior or sexual attraction. Therefore, our study does not consider individuals who are sexually active with or

attracted to people of the same gender but do not identify as lesbian, gay, or bisexual. Furthermore, data on transgender identity were not separately ascertained. Transgender individuals, a small group, are often not identified in federally sponsored health surveys. Given this group's high risk of experiencing impaired health, substance abuse, discrimination, and violence,⁵ the NHIS should continue its work to incorporate transgender identity status in future surveys,⁵³ even if doing so requires pooling across years or combining categories of gender identity to protect anonymity. Finally, the NHIS is a cross-sectional survey and cannot definitively establish the causal directions of the observed associations because cross-sectional studies are prone to omitted variable bias. Missing and unmeasured variables—such as exposure to discrimination or nondisclosure of sexual orientation to family, friends, and health care professionals—may provide alternative explanations for the association between sexual orientation and health outcomes. Future research should continue to explore the underlying causes of impaired health in the LGB population and use those findings to identify medical and policy interventions to ameliorate disparities in health and health risk factors.

Conclusions

Notwithstanding these limitations, our study supports previous research finding differences in health status and health behaviors in the LGB population using recently available data from a large, nationally representative health survey. This observation is an important step toward understanding the health and well-being of the LGB population, as prior research has been limited to convenience samples or population-based health surveys limited in size or geographic scope. Our findings that LGB adults were more likely to experience impaired health and well-being, combined with an elevated risk of heavy drinking and smoking patterns, should serve as a call to health care professionals and public health practitioners to pay particular attention to the current and future health outcomes of this small, diverse, and vulnerable population.

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