

Chronic Health Conditions and Key Health Indicators Among Lesbian, Gay, and Bisexual Older US Adults, 2013–2014

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Objectives. To examine disparities in chronic conditions and health indicators among lesbian, gay, and bisexual (LGB) adults aged 50 years or older in the United States.

Methods. We used data from the 2013 and 2014 National Health Interview Survey to compare disparities in chronic conditions, health outcomes and behaviors, health care access, and preventive health care by sexual orientation and gender.

Results. LGB older adults were significantly more likely than heterosexual older adults to have a weakened immune system and low back or neck pain. In addition, sexual minority older women were more likely than their heterosexual counterparts to report having arthritis, asthma, a heart attack, a stroke, a higher number of chronic conditions, and poor general health. Sexual minority older men were more likely to report having angina pectoris or cancer. Rates of disability and mental distress were higher among LGB older adults.

Conclusions. At substantial cost to society, many disparities in chronic conditions, disability, and mental distress observed in younger LGB adults persist, whereas others, such as cardiovascular disease risks, present in later life. Interventions are needed to maximize LGB health. (*Am J Public Health.* 2017;107:1332–1338. doi:10.2105/AJPH.2017.303922)

Awareness of the health disadvantages faced by sexual minority adults has increased substantially in recent years. In *Healthy People 2020*,¹ lesbian, gay, and bisexual (LGB) adults were named for the first time in national health objectives, and the National Institutes of Health recently identified sexual minorities as health-disparate populations.²

However, insufficient population-based research data have been gathered on the health of sexual minorities.³ Moreover, despite the rapid growth of the older segment of the sexual minority population and the likelihood of health care needs increasing with age,⁴ research investigating health disparities among sexual minority older adults is particularly limited. Until recently, no national-level data were available to assess the health of sexual minority older adults. As a result, many questions remain regarding the health of this group, particularly whether health disparities observed in the general

sexual minority adult population persist or diminish at older ages.

Health disparities among sexual minorities have been documented in the general population aged 18 years and older. There is evidence based on national data that LGB adults have elevated rates of some chronic health conditions relative to heterosexual adults, including cancer, arthritis, hepatitis, and lung disease.⁵ In comparison with heterosexual adults, poorer self-rated general physical and mental health, higher rates of disability, and greater degrees of functional limitation have been reported among LGB adults in multiple US population-based studies,^{6,7} including the National Health Interview Survey (NHIS), which has

included a sexual orientation question since 2013.⁸ Differences in health behaviors have been documented as well, including elevated rates of excessive drinking (particularly among sexual minority women)⁶ and smoking.⁸ Moreover, lesbians and bisexual women have been found to face elevated barriers to accessing health care, including lack of insurance and financial barriers.⁸

Population-based data specific to sexual minority older adults are much more limited, and no studies to our knowledge have analyzed national-level disparities in this specific population. Although existing state-level data have consistently revealed heightened risks of poor mental health, poor general health, and disability among LGB older adults,^{9,10} findings are mixed regarding disparities in rates and severity of chronic health conditions, which are of particular concern in the LGB older adult population as a result of their potential to dramatically affect quality of life, functional disability, mortality, and health care costs.¹¹

In one study involving state-level population-based data from adults aged 50 years or older in Washington State, rates of cardiovascular disease and obesity were higher among lesbians than among heterosexual women; however, rates of chronic conditions were not elevated among gay or bisexual men after adjustment for socio-demographic characteristics.⁹ In contrast, in an investigation of adults aged 50 to 70 years old in California, there were no differences by sexual orientation in rates of

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cardiovascular disease or other chronic conditions among women, but gay and bisexual men showed elevated rates of diabetes and hypertension relative to heterosexual men.¹⁰ Using NHIS data, Gonzales and Henning-Smith¹² found that older men and women in same-sex cohabiting partnerships were less likely than those in opposite-sex partnerships to report having a chronic condition.

Taken together, these sparse and divergent findings highlight the need to use nationally representative data to more fully investigate disparities in chronic conditions and other key health indicators among sexual minority older women (lesbians and bisexual women) and men (gay and bisexual men). The study described here, based on national data, is to our knowledge the first to examine the extent to which sexual orientation and gender are related to disparities in chronic health conditions, general health outcomes, health behaviors, health care access, and preventive health care specifically among adults aged 50 years or older in the United States. Our aim was to provide a more comprehensive understanding of the aging needs of the increasingly diverse older adult population.

METHODS

We derived our aggregated population-based data from the 2013 and 2014 versions of the NHIS, the largest in-person household health survey of the US noninstitutionalized population; we analyzed data from the subsample of adults aged 50 years or older.⁹ In 2013, for the first time, the survey assessed sexual orientation. Survey respondents were asked “Which of the following best represents how you think of yourself?” Response categories were as follows: gay or lesbian, straight (not gay or lesbian), bisexual, something else, and don’t know. We included in our study participants who self-identified as gay, lesbian, bisexual, or straight. Our sample comprised 18 669 heterosexual women, 14 141 heterosexual men, 197 lesbians, 229 gay men, 55 bisexual women, and 55 bisexual men. We applied pooled weights throughout our analyses to adjust for the unequal probabilities of sample selection arising from the study design and nonresponse.

Measures

Chronic health conditions. Participants were asked whether they had ever been told by a doctor or other health professional that they had had a stroke, a heart attack, angina pectoris, high blood pressure, chronic obstructive pulmonary disease, asthma, arthritis, low back or neck pain, diabetes, cancer, and weakened immune system. Obesity was defined as a body mass index of 30 kilograms per meter squared or greater.¹³ We computed numbers of chronic conditions¹⁴ by summing the conditions (other than weakened immune system, which was included only in 2013) reported by each participant.

General health outcomes. The NHIS assessed participants’ general health via self-evaluations.¹⁵ We dichotomized general health categories into good (good, very good, or excellent) and poor (fair or poor). Disability was measured through participants’ affirmative responses to any of the following items:

1. trouble with seeing, even when wearing glasses or contact lenses;
2. activity limitations attributable to hearing problems;
3. difficulty in walking up 10 steps without resting or walking a quarter of a mile without using any special equipment;
4. needing help with bathing or showering;
5. needing help in handling routine needs; or
6. being limited in any way because of difficulty remembering or experiencing periods of confusion.¹⁶

Limitations in activities of daily living (ADLs) and instrumental ADLs (IADLs) were assessed by asking whether participants, because of a physical, mental, or emotional problem, needed help with personal care (e.g., eating, bathing, dressing) and routine needs (e.g., everyday household chores, shopping, doing necessary business), respectively.¹⁵ Mental distress was measured via the 6-item Psychological Distress Scale ($\alpha = 0.87$); a summed score greater than 6 was coded as reflecting mental distress.¹⁷

Health behaviors, health care access, and preventive health care. Among those who had smoked 100 or more cigarettes, current and former smokers were distinguished by whether or not they currently smoked.¹⁵ Excessive drinking was defined as women

having 4 or more and men having 5 or more drinks on a single occasion during the preceding month.¹⁸ Former drinkers were categorized as those who had consumed at least 12 drinks during their lifetime but no drinks in the preceding year.¹⁹ Physical activity was defined according to a combined duration of moderate and vigorous activities of 150 minutes or more per week as recommended by the Centers for Disease Control and Prevention.²⁰ Those who reported experiencing any of 4 types of sleep problems (trouble falling asleep, trouble staying asleep, taking sleep aid medication, and not waking up feeling well rested in the past week) 3 times or more a week²¹ were categorized as having sleep problems.

We assessed health care access according to whether participants had health insurance coverage and a primary source of care (a place to go when they were sick or needed advice about health). Preventive health care was assessed according to whether participants had had a blood pressure screening, flu shot, or mammogram (among women aged 50–70 years) in the preceding 12 months and whether they had ever had an HIV test.

Sociodemographic characteristics. The sociodemographic characteristics assessed included age in years, race/ethnicity (non-Hispanic White vs other), household income (200% or below vs more than 200% above the federal poverty level), employment status (employed vs not employed), educational attainment (high school or less vs at least some college), relationship status, and living arrangement (living alone vs living with someone). Relationship status was categorized as married, partnered (living with a partner), or single (widowed, divorced, separated, or never married).

Statistical Analysis

We used Stata version 14.0 in conducting our analyses.²² All analyses were conducted separately by gender. Sexual orientation was dichotomized into sexual minority (lesbian, gay, bisexual) or heterosexual, with heterosexuals treated as the reference group.

First, we used the adjusted Wald test to compare estimates of sociodemographic characteristics according to sexual orientation. Second, we estimated prevalence rates for health indicators by sexual orientation.

We conducted a series of logistic and linear regressions as appropriate, controlling for socioeconomic covariates (age, race/ethnicity, income, and education) that have been found to be associated with health disparities,^{23,24} to test associations between sexual orientation and chronic health conditions and other health indicators. Also, we assessed the statistical significance of differences in sociodemographic characteristics and key health indicators between sexual minority subgroups (lesbians vs bisexual women and gay men vs bisexual men).

We applied balanced repeated replications methodology to calculate standard errors.²⁵ This method incorporates the specific complex sampling designs of the NHIS, with each sampling stratum having exactly 2 sampling units. We used the Survey package in R²⁶ to derive a 308 × 308 Hadamard matrix and used the first 300 entries in computing balanced repeated replication weights.

RESULTS

In comparison with heterosexual older women, sexual minority older women were younger and had higher household incomes, educational attainment levels, and employment rates, whereas the racial/ethnic backgrounds of the 2 groups were comparable (Table 1). Sexual minority older women were less likely than heterosexual older women to be married, more likely to be partnered, and equally likely to be single. There were no significant differences in number of children in the household or likelihood of living alone. Subgroup comparisons revealed that bisexual women had lower incomes than lesbians, were more likely to be married, and were less likely to be partnered.

In comparison with heterosexual older men, sexual minority older men were significantly younger and had higher educational levels; however, there were no differences in income or employment status. Sexual minority older men were more likely than heterosexual older men to be non-Hispanic White, less likely to be married, more likely to be partnered, and more likely to be single. In addition, they were more likely to live alone and had fewer children in the household. According to subgroup comparisons, bisexual older men were older and less likely to be employed than gay older

men; although members of the 2 groups were equally likely to be married, bisexual older men were less likely to be partnered, and they had more children in the household.

Chronic Health Conditions

Table 2 presents data on the prevalence of chronic health conditions according to sexual orientation and gender and the results of significance tests after control for demographic characteristics. Sexual minority older women were more likely than heterosexual older women to have experienced a stroke, a heart attack, asthma, arthritis, low back or neck pain, and a weakened immune system but were less likely to have diabetes. Sexual minority older women had a significantly higher number of chronic conditions than heterosexual older women. Among sexual minority older women, lesbians were more likely than bisexual women to report having had a stroke (adjusted odds ratio [OR] = 2.79; $P < .05$), a heart attack (adjusted OR = 4.47; $P < .01$), or arthritis (adjusted OR = 3.15; $P < .001$).

Sexual minority older men were more likely than heterosexual older men to report angina pectoris, low back or neck pain, cancer, and a weakened immune system; they were less likely to be obese. The likelihood of a weakened immune system (adjusted OR = 10.25; $P < .001$) and obesity (adjusted OR = 2.77; $P < .001$) was higher among gay older men than among bisexual older men, whereas bisexual older men were more likely to have low back or neck pain (adjusted OR = 1.57; $P < .05$).

General Health Outcomes

As shown in Table 3, after adjustment for demographic characteristics, sexual minority older women were more likely than heterosexual older women to report poor general health, disability, and mental distress; they were less likely to report ADL limitations. Among sexual minority older women, lesbians were more likely than bisexual women to report poor general health (adjusted OR = 2.22; $P < .001$) and disability (adjusted OR = 2.66; $P < .001$), whereas bisexual women were more likely to report ADL limitations (adjusted OR = 0.08; $P < .01$).

Sexual minority older men were more likely than heterosexual older men to report

disability, ADL and IADL limitations, and mental distress. Among sexual minority older men, gay men were more likely than bisexual men to report ADL limitations (adjusted OR = 4.40; $P < .01$), and bisexual men were more likely to report mental distress (adjusted OR = 1.93; $P < .05$).

Health Behaviors

Table 4 shows that, after control for demographic characteristics, sexual minority older women were more likely to engage in excessive drinking than heterosexual older women and were more likely to be former drinkers and smokers. Also, sexual minority older women were more likely than heterosexual older women to experience sleep problems. Rates of physical activity did not differ according to sexual orientation. Subgroup comparisons showed that lesbians were more likely than bisexual women to be former drinkers (adjusted OR = 2.66; $P < .001$).

In comparison with heterosexual older men, sexual minority older men were more likely to be current smokers and to engage in excessive drinking. Physical activity and sleep problems were not associated with sexual orientation among older men. Subgroup comparisons revealed that bisexual men were more likely than gay men to be current smokers (adjusted OR = 2.13; $P < .01$).

Health Care Access and Preventive Health Care

After adjustment for demographic characteristics, sexual minority older women were more likely than heterosexual older women to have insurance coverage; there were no significant differences in having a usual source of care (Table 4). In terms of preventive care, adjusted analyses showed that sexual minority older women were more likely to have had a blood pressure screening and HIV test than were heterosexual older women.

Older men were comparable with respect to health care access across sexual orientation groups. Sexual minority older men were more likely than heterosexual older men to have had a flu shot and an HIV test during the preceding year. Subgroup comparisons showed that gay men were more likely than bisexual men to have had an HIV test (adjusted OR = 1.70; $P < .05$).

TABLE 1—Sociodemographic Characteristics Among Women and Men Aged 50 Years or Older, by Sexual Orientation: National Health Interview Survey, United States, 2013–2014

Characteristic	Heterosexual Women (n = 18 669), Mean or % (95% CI)	Lesbian/Bisexual Women			Heterosexual Men (n = 14 141), Mean or % (95% CI)	Gay/Bisexual Men		
		Total (n = 252), Mean or % (95% CI)	Lesbian (n = 197), Mean or % (95% CI)	Bisexual (n = 55), Mean or % (95% CI)		Total (n = 284), Mean or % (95% CI)	Gay (n = 229), Mean or % (95% CI)	Bisexual (n = 55), Mean or % (95% CI)
Age, y	64.4 (64.3, 64.5)	58.6*** (58.0, 59.3)	58.4 (57.6, 59.2)	59.6 (58.2, 61.0)	63.3 (63.2, 63.4)	60.7*** (60.0, 61.4)	60.0 (59.2, 60.8)	63.9*** (62.4, 65.3)
Non-Hispanic White race/ethnicity	74.0 (73.6, 74.5)	75.0 (70.8, 78.8)	74.5 (69.7, 78.9)	77.0 (69.2, 83.3)	75.3 (74.8, 75.8)	83.2*** (80.9, 85.3)	84.2 (81.5, 86.6)	78.5 (72.2, 83.6)
Income ≤ 200% of poverty level	30.8 (30.2, 31.4)	23.8*** (20.3, 27.8)	21.6 (17.9, 25.7)	34.1* (25.0, 44.5)	24.8 (24.3, 25.4)	24.5 (21.3, 28.1)	23.3 (19.7, 27.4)	31.0 (24.7, 38.1)
Employed	40.1 (39.6, 40.6)	57.0*** (52.5, 61.4)	56.4 (51.4, 61.3)	59.7 (50.5, 68.3)	50.4 (49.9, 51.0)	49.4 (44.7, 54.1)	53.3 (48.0, 58.6)	31.0*** (24.1, 38.9)
High school education or less	44.1 (43.6, 44.6)	22.5*** (19.4, 26.1)	22.5 (18.8, 26.7)	22.6 (16.2, 30.5)	41.3 (40.7, 41.9)	25.6*** (21.9, 29.6)	26.1 (22.1, 30.6)	22.9 (17.1, 30.0)
Relationship status								
Married	54.3 (53.8, 54.9)	26.1*** (22.3, 30.3)	23.6 (19.4, 28.3)	37.6* (28.0, 48.3)	70.0 (69.6, 70.5)	21.7*** (18.8, 24.9)	21.5 (17.9, 25.6)	22.8 (16.3, 30.8)
Partnered	2.6 (2.5, 2.8)	30.9*** (26.8, 35.3)	34.5 (29.8, 39.5)	14.8*** (7.6, 26.6)	3.7 (3.5, 3.9)	21.8*** (18.9, 25.1)	24.6 (21.1, 28.5)	8.9*** (5.0, 15.5)
Single	43.0 (42.5, 43.6)	43.0 (38.8, 47.3)	42.0 (37.3, 46.7)	47.7 (37.9, 57.6)	26.3 (25.8, 26.7)	56.5*** (53.0, 59.9)	53.9 (50.0, 57.8)	68.3** (59.6, 76.0)
No. of children in household	0.2 (0.2, 0.2)	0.2 (0.1, 0.2)	0.2 (0.1, 0.2)	0.1 (0.0, 0.2)	0.2 (0.2, 0.2)	0.1* (0.1, 0.2)	0.1 (0.0, 0.1)	0.5** (0.2, 0.8)
Lives alone	27.3 (26.9, 27.8)	24.7 (21.5, 28.2)	23.9 (20.3, 27.9)	28.3 (21.7, 36.0)	19.4 (19.0, 19.8)	44.1*** (40.6, 47.7)	44.3 (40.4, 48.2)	43.4 (35.1, 52.0)

Note. CI = confidence interval. Wald tests were used to compare demographic characteristics between heterosexuals and lesbian, gay, and bisexual participants as well as between lesbians/gays and bisexuals.

* $P < .05$; ** $P < .01$; *** $P < .001$.

DISCUSSION

To our knowledge, this is the first national population-based study to comprehensively investigate disparities in chronic health conditions and other key health indicators among sexual minority older adults. In comparison with heterosexual older adults, sexual minority older adults exhibited a significantly higher likelihood of chronic health conditions and other disparities; however, they also showed some positive health indicators. As the population ages, the prevalence of chronic conditions increases,²⁷ and these conditions represent some of the most common, costly, and preventable of all health problems.¹¹ It is critical that groups at elevated risk for chronic health conditions be identified and targeted for prevention efforts, both to improve their health and well-being and to control health care expenditures.

Sexual minority older adults in this study were more likely than heterosexual older adults to experience low back or neck pain and weakened immune systems, which have not been examined in previous studies. These disparities, along with consistent findings of elevated distress and disability among sexual minority older adults^{7,8} and poor general health among sexual minority older women, particularly lesbians,⁸ likely reflect the substantial toll of marginalization and stigma across the life course.^{4,28} Chronic stressors can affect physical health over the life span through an accumulation of allostatic load, causing acceleration of aging.²⁹ In studies of sexual and gender minority older adults, discrimination and victimization have been shown to be the strongest predictors of poor health outcomes.^{30,31}

Some of the disparities found with chronic health conditions may develop earlier in

adulthood and persist into older age. Gonzales et al. observed this pattern for the higher likelihood of having multiple chronic conditions among lesbians and bisexual women aged 18 years or older.⁸ In addition, previous studies have consistently shown heightened risks of asthma⁶ and arthritis⁵ among sexual minority women and cancer among sexual minority men.^{5,32} Other disparities documented in this study, including disparities in cardiovascular disease risks such as stroke and heart attack among sexual minority older women and angina pectoris among men, seem to first emerge in older adulthood. Interestingly, disparities in obesity, although well documented,³³ were not significantly different by sexual orientation among women in this study. This finding could reflect a leveling effect, with rates of obesity among older heterosexual women reaching a level comparable to rates among sexual minority

TABLE 2—Chronic Health Conditions Among Women and Men Aged 50 Years or Older, by Sexual Orientation: National Health Interview Survey, United States, 2013–2014

Health Indicator	Women			Men		
	Heterosexual (Ref), % or Mean (95% CI)	Lesbian/Bisexual, % or Mean (95% CI)	Adjusted OR or IRR (95% CI)	Heterosexual (Ref), % or Mean (95% CI)	Gay/Bisexual, % or Mean (95% CI)	Adjusted OR or IRR (95% CI)
Chronic conditions						
Stroke	5.1 (4.9, 5.3)	6.8 (5.2, 9.0)	2.12 (1.57, 2.87) ^a	5.5 (5.2, 5.7)	2.5 (1.6, 4.0)	0.56 (0.27, 1.17)
Heart attack	4.3 (4.1, 4.4)	6.4 (4.5, 9.0)	2.28 (1.58, 3.29) ^a	8.7 (8.4, 9.0)	8.0 (6.3, 10.0)	1.08 (0.83, 1.40)
Angina pectoris	3.0 (2.8, 3.1)	2.8 (1.9, 4.1)	1.29 (0.88, 1.90)	4.8 (4.6, 5.0)	6.9 (5.0, 9.4)	1.69 (1.21, 2.35)
High blood pressure	50.0 (49.6, 50.5)	39.0 (35.1, 43.0)	0.88 (0.74, 1.04)	51.3 (50.7, 51.9)	46.4 (42.7, 50.3)	0.94 (0.80, 1.10)
Chronic obstructive pulmonary disease	6.0 (5.8, 6.2)	5.2 (4.0, 6.7)	1.08 (0.83, 1.41)	5.7 (5.5, 6.0)	5.3 (4.0, 6.9)	1.06 (0.71, 1.57)
Asthma	13.7 (13.4, 14.0)	18.0 (15.7, 20.5)	1.28 (1.12, 1.53)	9.0 (8.7, 9.3)	9.9 (8.0, 12.2)	1.06 (0.77, 1.44)
Arthritis	44.7 (44.2, 45.2)	50.3 (46.0, 54.6)	1.57 (1.32, 1.88) ^a	34.2 (33.6, 34.8)	28.9 (25.6, 32.5)	0.84 (0.71, 1.01)
Low back/neck pain	39.8 (39.3, 40.3)	53.0 (48.4, 57.5)	1.78 (1.46, 2.17)	35.5 (35.0, 36.1)	40.2 (36.6, 43.8)	1.21 (1.04, 1.41) ^b
Diabetes	15.9 (15.6, 16.2)	10.6 (8.8, 12.7)	0.77 (0.63, 0.96)	18.7 (18.3, 19.1)	14.2 (11.6, 17.2)	0.85 (0.68, 1.07)
Obesity	30.6 (30.1, 31.1)	35.4 (31.4, 39.4)	1.18 (0.98, 1.41)	30.9 (30.4, 31.5)	24.2 (21.2, 27.5)	0.67 (0.55, 0.80) ^a
Cancer	16.3 (15.9, 16.7)	14.6 (12.1, 17.6)	1.07 (0.88, 1.30)	16.2 (15.8, 16.7)	19.0 (16.2, 22.2)	1.41 (1.17, 1.69)
Weakened immune system ^c	10.1 (9.6, 10.5)	17.2 (12.2, 23.7)	1.69 (1.16, 2.46)	5.0 (4.6, 5.3)	15.2 (11.6, 19.6)	3.16 (2.25, 4.43) ^a
No. of chronic conditions ^d	2.3 (2.3, 2.3)	2.4 (2.3, 2.6)	1.18 (1.11, 1.25)	2.2 (2.2, 2.2)	2.1 (1.9, 2.2)	0.98 (0.93, 1.04)

Note. CI = confidence interval; IRR = incidence risk ratio; OR = odds ratio. Significance tests adjusted for age, race/ethnicity, income, and education, and heterosexual women and men were coded as the reference groups.

^aDisparity is significantly more prevalent among lesbians or gay men than among their bisexual counterparts at an α level of 0.05.

^bDisparity is significantly more prevalent among bisexual men than among their gay counterparts at an α level of 0.05.

^cItem available in 2013 only.

^dIncludes stroke, heart attack, angina, high blood pressure, chronic obstructive pulmonary disease, asthma, arthritis, low back or neck pain, diabetes, obesity, and cancer. A negative binomial model was applied for significance tests, and IRRs are reported.

women; it could also reflect selection bias resulting from premature mortality among those who are obese in younger adulthood.

We found higher likelihoods of ADL and IADL limitations among gay and bisexual older men, which have not been previously documented in other studies of younger LGB

adults.⁸ Such limitations may be associated with higher rates of disabling chronic conditions, such as cancer and angina pectoris, and likely require additional access to formal and informal caregiving. Yet, we found that sexual minority older men were more likely to live alone and less likely to have children in the household, which may

result in an increased risk of social isolation in old age. Although sexual minority men had higher levels of education, this advantage did not lead to concomitant gains in resources such as income or employment.

Sexual minority older women exhibited lower rates of diabetes and a lower risk of

TABLE 3—General Health Outcomes Among Women and Men Aged 50 Years or Older, by Sexual Orientation: National Health Interview Survey, United States, 2013–2014

Health Indicator	Women			Men		
	Heterosexual (Ref), % (95% CI)	Lesbian/Bisexual, % (95% CI)	Adjusted OR (95% CI)	Heterosexual (Ref), % (95% CI)	Gay/Bisexual, % (95% CI)	Adjusted OR (95% CI)
Poor general health	20.0 (19.6, 20.4)	25.0 (20.8, 29.6)	1.75 (1.36, 2.24) ^a	19.8 (19.4, 20.3)	19.5 (16.8, 22.5)	1.18 (0.94, 1.47)
Disability	44.9 (44.4, 45.4)	44.9 (40.7, 49.2)	1.57 (1.32, 1.87) ^a	34.37 (33.8, 34.9)	38.1 (34.3, 42.0)	1.46 (1.22, 1.75)
ADL limitations	4.9 (4.6, 5.1)	0.9 (0.5, 1.5)	0.34 (0.20, 0.59) ^b	3.0 (2.8, 3.2)	5.8 (4.0, 8.4)	2.64 (1.82, 3.82) ^a
IADL limitations	9.5 (9.2, 9.8)	7.4 (5.5, 9.9)	1.30 (0.93, 1.82)	5.3 (5.1, 5.5)	7.5 (5.5, 10.2)	1.87 (1.31, 2.66)
Mental distress	17.2 (16.8, 17.6)	21.6 (18.6, 25.0)	1.33 (1.08, 1.63)	12.8 (12.4, 13.2)	19.2 (16.2, 22.6)	1.64 (1.29, 2.08) ^b

Note. ADL = activity of daily living; CI = confidence interval; IADL = instrumental activity of daily living; OR = odds ratio. Significance tests adjusted for age, race/ethnicity, income, and education, and heterosexual women and men were coded as the reference groups.

^aDisparity is significantly more prevalent among lesbians or gay men than among their bisexual counterparts at an α level of 0.05.

^bDisparity is significantly more prevalent among bisexual women or men than among their lesbian or gay counterparts at an α level of 0.05.

TABLE 4—Health Behaviors, Health Care Access, and Preventive Health Care Among Women and Men Aged 50 Years or Older, by Sexual Orientation: National Health Interview Survey, United States, 2013–2014

Health Indicator	Women			Men		
	Heterosexual (Ref), % (95% CI)	Lesbian/Bisexual, % (95% CI)	Adjusted OR (95% CI)	Heterosexual (Ref), % (95% CI)	Gay/Bisexual, % (95% CI)	Adjusted OR (95% CI)
Health behaviors						
Current smoker	12.7 (12.4, 13.1)	14.4 (11.8, 17.6)	0.97 (0.76, 1.23)	16.6 (16.2, 17.1)	21.4 (18.5, 24.6)	1.30 (1.10, 1.54) ^a
Former smoker	26.7 (26.2, 27.1)	34.8 (30.9, 39.0)	1.57 (1.32, 1.86)	38.4 (37.8, 38.9)	35.1 (31.5, 38.8)	0.99 (0.84, 1.18)
Excessive drinker ^b	9.4 (9.0, 9.8)	18.0 (14.2, 22.5)	1.53 (1.17, 2.02)	19.6 (18.9, 20.3)	25.81 (21.9, 30.2)	1.28 (1.00, 1.62)
Former drinker	19.4 (19.0, 19.8)	23.9 (20.2, 28.1)	1.57 (1.27, 1.96) ^c	22.0 (21.6, 22.5)	16.4 (13.9, 19.2)	0.84 (0.69, 1.03)
Physical activity ≥ 150 min/wk	37.5 (37.0, 38.1)	45.4 (41.2, 49.7)	1.02 (0.86, 1.20)	43.9 (43.2, 44.5)	48.8 (45.2, 52.5)	1.02 (0.87, 1.20)
Sleep problem	49.0 (48.5, 49.5)	64.0 (59.8, 68.0)	1.74 (1.46, 2.08)	41.8 (41.2, 42.4)	45.9 (42.1, 49.7)	1.14 (0.97, 1.34)
Health care access						
Insurance coverage	92.5 (92.2, 92.7)	93.8 (91.6, 95.4)	1.61 (1.20, 2.16)	91.8 (91.5, 92.1)	89.8 (87.4, 91.8)	0.86 (0.64, 1.16)
Primary source of care	95.0 (94.8, 95.2)	95.1 (93.2, 96.6)	1.25 (0.84, 1.86)	91.9 (91.6, 92.2)	91.1 (88.9, 92.9)	1.00 (0.77, 1.31)
Preventive health care						
Blood pressure screening	93.7 (93.4, 93.9)	95.6 (94.1, 96.8)	1.62 (1.07, 2.48)	90.4 (90.0, 90.7)	91.3 (89.4, 93.0)	1.21 (0.95, 1.55)
Mammogram ^d	61.0 (60.5, 61.6)	57.9 (53.4, 62.3)	0.85 (0.70, 1.02)
Flu shot	58.4 (57.9, 58.8)	56.1 (51.5, 60.5)	1.10 (0.91, 1.33)	52.2 (51.6, 52.8)	64.7 (61.2, 68.1)	1.95 (1.64, 2.33)
HIV test	24.0 (23.6, 24.4)	47.3 (43.1, 51.5)	2.07 (1.74, 2.47)	27.6 (27.1, 28.1)	76.1 (72.3, 79.5)	8.32 (6.81, 10.16) ^c

Note. CI = confidence interval; OR = odds ratio. Significance tests adjusted for age, race/ethnicity, income, and education, and heterosexual women and men were coded as the reference groups.

^aDisparity is significantly more prevalent among bisexual women or men than among their lesbian or gay counterparts at an α level of 0.05.

^bData available in 2014 only.

^cDisparity is significantly more prevalent among lesbians or gay men than among their bisexual counterparts at an α level of 0.05.

^dIncludes only women between 50 and 75 years of age.

ADL limitations despite heightened risks in some chronic conditions, poor general health, and disability. It will be important in future research to examine how some protective factors, such as physical activity and socioeconomic resources, among sexual minority older women might help delay the progression to certain chronic diseases and limitations in independent living. Sexual minority older women had higher incomes, educational levels, and employment rates than heterosexual older women despite heightened risks in several health indicators. They were also more likely to have health insurance coverage, whereas NHIS data for adults aged 18 years or older indicate that sexual minority women are more likely than heterosexual women to lack health insurance coverage.⁸ It may be that sexual minority older women were aware at a younger age that they had to support themselves and were more likely to seek education and employment despite the traditional roles for women at the time. Recent policy changes may also help them secure health insurance.

The recognition of sexual minority families in the Affordable Care Act (Pub Law

No. 111-148) as well as the 2013 Supreme Court decision in *Windsor v. United States* (570 US ___, 2013) may have made it easier for working sexual minority individuals and those who were married to obtain health insurance.

With respect to health behaviors, our data revealed more sleep problems among sexual minority older women than heterosexual women, a potentially understudied health issue in this population. Sexual minority men, as in previous studies, were more likely to report smoking.⁸ However, we also found signs of resilience among sexual minority older adults. Sexual minority older women were more likely to report being former drinkers and smokers, suggesting that many of these women take action to reduce such adverse health behaviors and promote their own health as they age. In addition, as a positive sign that LGB older adults are accessing preventive care, sexual minority older adults fared better than heterosexual older adults in terms of HIV testing, blood pressure screening (among women), and flu shots (among men).

Previous studies have shown that greater levels of social support and community

connectedness are associated with good health and optimal aging among LGB older adults.³⁰ Future studies need to examine aspects of both resilience and risk as a means of understanding the complex health issues in these populations.

Although studies involving larger samples of bisexual older adults are needed, our findings reveal important differences among sexual minority subgroups that need to be considered in prevention, intervention development, and research. Bisexual people may experience elevated stress and social isolation, in part as a result of marginalization within lesbian and gay communities as well as society in general. This disadvantaged status may have contributed to our findings that bisexual older men were at elevated risk for low back or neck pain, mental distress, and smoking and that bisexual older women were at greater risk for poverty.

Limitations

Although the results of our study have important implications for public health

research and practice, there are a few limitations. Our findings are based on self-reported data; incorporating objective measures would likely reduce errors in estimates. The sampling weights may not have adequately adjusted for sampling bias because of the possibility of higher nonresponse rates on sexual orientation questions among those in older age brackets and racial/ethnic minority groups.^{34,35} The samples of sexual minority older adults in this study were not large enough to allow investigation of health disparity differences among such subgroups. Because the NHIS collects information annually, pooled multiple-year data will allow for further evaluation of the diverse experiences of sexual minority older adults and for the development of targeted prevention efforts and interventions to improve the health of this population. Although the inclusion of a sexual orientation item in the NHIS is an important step forward, data regarding gender identity and expression are still lacking.

Conclusions

This study is a significant step forward in understanding health disparities among sexual minority older adults. Our findings present a complex picture of sexual minority older adult health and suggest both that health disparities persist into older adulthood and that new health concerns emerge with the aging of the sexual minority population. Targeted prevention and intervention programs are needed to identify sexual minority older adults at greatest health risk and to promote good health in later life. *AJPH*

CONTRIBUTORS

K. I. Fredriksen-Goldsen originated the study, synthesized the conceptualization and analyses, and led the overall preparation of the article. H.-J. Kim contributed to the data analyses and assisted in the conceptualization, interpretation, and synthesis of the findings and discussion. C. Shiu conducted the data analyses, assisted in conducting the literature review, and contributed to the conceptualization and interpretation of the findings. A. E. B. Bryan assisted in conducting the literature review and in developing the article. All of the authors participated in the writing and editing of the article.

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HUMAN PARTICIPANT PROTECTION

The institutional review board of the University of Washington approved this study. Publicly available data were used in the study.

REFERENCES

1. US Department of Health and Human Services. Healthy People 2020 objectives. Available at: <http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx>. Accessed June 5, 2017.
2. National Institute on Minority Health and Health Disparities. Sexual and gender minorities formally designated as a health disparity population for research purposes. Available at: <http://www.nimhd.nih.gov/about/directors-corner/message.html>. Accessed June 5, 2017.
3. Institute of Medicine. *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*. Washington, DC: National Academies Press; 2011.
4. Fredriksen-Goldsen K, Kim H-J. The science of conducting research with LGBT older adults—an introduction to Aging with Pride: National Health, Aging, Sexuality and Gender Study. *Gerontologist*. 2017;57(suppl 1):S1–S14.
5. Ward BW, Joestl SS, Galinsky AM, Dahlhamer JM. Selected diagnosed chronic conditions by sexual orientation: a national study of US adults, 2013. *Prev Chronic Dis*. 2015;12:E192.
6. Blossnich JR, Farmer GW, Lee JGL, Silenzio VMB, Bowen DJ. Health inequalities among sexual minority adults: evidence from ten US states, 2010. *Am J Prev Med*. 2014;46(4):337–349.
7. Fredriksen-Goldsen KI, Kim HJ, Barkan SE. Disability among lesbian, gay, and bisexual adults: disparities in prevalence and risk. *Am J Public Health*. 2012;102(1):e16–e21.
8. Gonzales G, Przedworski J, Henning-Smith C. 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. *JAMA Intern Med*. 2016;176(9):1344–1351.
9. Fredriksen-Goldsen KI, Kim H-J, Barkan SE, Muraco A, Hoy-Ellis CP. Health disparities among lesbian, gay, and bisexual older adults: results from a population-based study. *Am J Public Health*. 2013;103(10):1802–1809.
10. Wallace SP, Cochran SD, Durazo EM, Ford CL. The health of aging lesbian, gay and bisexual adults in California. *Policy Brief UCLA Cent Health Policy Res*. 2011; PB2011-2:1–8.
11. Centers for Disease Control and Prevention. Chronic disease overview. Available at: <https://www.cdc.gov/chronicdisease/overview/>. Accessed June 5, 2017.
12. Gonzales G, Henning-Smith C. Disparities in health and disability among older adults in same-sex cohabiting relationships. *J Aging Health*. 2015;27(3):432–453.
13. Centers for Disease Control and Prevention. Defining adult overweight and obesity. Available at: <https://www.cdc.gov/obesity/adult/defining.html>. Accessed June 5, 2017.
14. Freedman VA, Schoeni RF, Martin LG, Cornman JC. Chronic conditions and the decline in late-life disability. *Demography*. 2007;44(3):459–477.
15. National Center for Health Statistics. National Health Interview Survey. Available at: <http://www.cdc.gov/nchs/nhis.htm>. Accessed June 5, 2017.

16. Brault M, Stern S, Raglin D. Evaluation report covering disability. Available at: https://www.census.gov/content/dam/Census/library/working-papers/2007/acs/2007_Brault_01.pdf. Accessed June 5, 2017.
17. Kessler RC, Andrews G, Colpe LJ, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychol Med*. 2002;32(6):959–976.
18. National Institute on Alcohol Abuse and Alcoholism. NIAAA council approves definition of binge drinking. Available at: https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf. Accessed June 5, 2017.
19. Rostron B. Alcohol consumption and mortality risks in the USA. *Alcohol Alcohol*. 2012;47(3):334–339.
20. Centers for Disease Control and Prevention. How much physical activity do older adults need? Available at: http://www.cdc.gov/physicalactivity/basics/older_adults. Accessed June 5, 2017.
21. Lichstein KL, Durrence HH, Taylor DJ, Bush AJ, Riedel BW. Quantitative criteria for insomnia. *Behav Res Ther*. 2003;41(4):427–445.
22. *Stata Statistical Software: Release 14*. College Station, TX: StataCorp LP; 2015.
23. Adler NE, Newman K. Socioeconomic disparities in health: pathways and policies. *Health Aff (Millwood)*. 2002; 21(2):60–76.
24. Kim H-J, Fredriksen-Goldsen KI. Hispanic lesbians and bisexual women at heightened risk for [corrected] health disparities. *Am J Public Health*. 2012;102(1):e9–e15.
25. Wolter KM. *Introduction to Variance Estimation*. 2nd ed. New York, NY: Springer; 2007.
26. R Project for Statistical Computing. R package version 3.30-3. Available at: <https://www.r-project.org/>. Accessed June 5, 2017.
27. Sierra F. Moving geroscience into uncharted waters. *J Gerontol A Biol Sci Med Sci*. 2016;71(11):1385–1387.
28. Hatzenbuehler ML. How does sexual minority stigma “get under the skin”? A psychological mediation framework. *Psychol Bull*. 2009;135(5):707–730.
29. Juster RP, McEwen BS, Lupien SJ. Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neurosci Biobehav Rev*. 2010;35(1):2–16.
30. Fredriksen-Goldsen KI, Emlert CA, Kim HJ, et al. The physical and mental health of lesbian, gay male, and bisexual (LGB) older adults: the role of key health indicators and risk and protective factors. *Gerontologist*. 2013;53(4):664–675.
31. Fredriksen-Goldsen KI, Cook-Daniels L, Kim H-J, et al. Physical and mental health of transgender older adults: an at-risk and underserved population. *Gerontologist*. 2014;54(3):488–500.
32. Boehmer U, Miao X, Ozonoff A. Cancer survivorship and sexual orientation. *Cancer*. 2011;117(16):3796–3804.
33. Ward BW, Dahlhamer JM, Galinsky AM, Joestl SS. Sexual orientation and health among U.S. adults: National Health Interview Survey, 2013. Available at: <https://www.cdc.gov/nchs/data/nhsr/nhsr077.pdf>. Accessed June 5, 2017.
34. Kim HJ, Fredriksen-Goldsen KI. Nonresponse to a question on self-identified sexual orientation in a public health survey and its relationship to race and ethnicity. *Am J Public Health*. 2013;103(1):67–69.
35. Fredriksen-Goldsen KI, Kim H-J. Count me in: response to sexual orientation measures among older adults. *Res Aging*. 2015;37(5):464–480.