

ORIGINAL ARTICLE

Asthma Diagnosis Among Individuals in Same-Sex Relationships

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This study examined ever and current asthma diagnosis among persons in same-sex relationships (SSRs) using data from the pooled 1997–2004 National Health Interview Surveys. Among SSRs, 13.5% of men and 14.3% of women reported ever diagnosis of asthma, compared to 7.6% and 10.2% opposite-sex relationship (OSR) men and women. SSRs had higher rates of smoking, stress, and among women, obesity. In regression analyses, male SSRs had a significantly elevated risk of ever asthma diagnosis (adjusted OR = 1.51), while 12-month asthma was elevated among SSR women (adjusted OR = 2.48). SSRs may be at higher risk for asthma due to a spectrum of risk factors.

Keywords homosexuality, asthma, smoking, stress, tobacco smoke pollution

INTRODUCTION

Large gaps in knowledge remain about the health risks for gay, lesbian, and bisexual persons (1). The existing literature on gay and lesbian health has most frequently focused on human immunodeficiency virus (HIV), other sexually transmitted diseases (STDs), and substance use. It is commonly assumed that apart from these health risks, gays and lesbians should be at about the same risk for disease as heterosexual persons. However, health behaviors such as sedentary lifestyle, smoking, alcohol and other drug use, obesity, and the lower utilization of preventive care services (1–4) may put homosexuals at higher risk for some chronic diseases than heterosexuals.

An observed association between HIV disease and elevated immunoglobulin E (IgE) in homosexual and bisexual men has raised questions about the prevalence of asthma or allergy in those populations (5–13). If homosexuals are more likely than heterosexuals to have these conditions, the association may reflect such known asthma risk factors as smoking, urban residence, and among lesbians, obesity (3, 14–16).

A handful of studies have examined bronchial reactivity among HIV-positive patients, some of whom were homosexuals. In one study by Poirier et al., wheezing and bronchial hyperresponsiveness to methacholine were twice as common among HIV-seropositive men who have sex with men (MSM) as among healthy controls recruited by random digit dialing (17). Case subjects also had higher total IgE than control subjects. However, nonspecific airway hyperresponsiveness has been found to be no higher among HIV-positive MSM and intravenous drug users (IDU) than among HIV-seronegative MSM and IDU (18, 19). A non-controlled study reported high rates of low forced expiratory flow among a cohort of subjects

with acquired immunodeficiency syndrome (AIDS), the majority of whom were homosexual (20). One other study found no elevated bronchial reactivity among HIV-positive IDU subjects whose sexual orientation was not identified (21). In these studies, response to bronchial challenge ranged from 19.7% to 30.1% among HIV-positive homosexuals and from 13.3% to 14.9% among heterosexual control subjects. The varied findings may potentially be explained by differences in control groups.

Little is known about the prevalence of asthma among homosexual persons and individuals who are not HIV-positive. The purpose of this study was to analyze asthma prevalence and correlates of asthma diagnosis in a population-based sample that includes individuals living in a same-sex relationship (SSR) and individuals living in an opposite-sex relationship (OSR).

METHODS

The National Health Interview Survey (NHIS) is a nationwide probability sample survey of the civilian noninstitutionalized population of the United States. Included subjects were adults living with a spouse or partner during the time period of data collection. Subjects' self-reported sexual orientation was not ascertained. NHIS sampling is such that within each household, an adult household reference person is chosen and other household members' sex and relationship with the reference person is recorded. This was done by asking the names of each person in the household, and then asking of the household reference person, "What is [each person's name]'s relationship to you?" Among other responses, household members could be identified as a "Spouse (husband/wife)" or "Unmarried partner." In this manner, individuals living with same-sex or opposite-sex spouses or partners were identified. Although it is not known whether these relationships were monogamous, there were no subjects for whom more than one partner or spouse was identified. If one partner in a relationship was not identified as the household reference person (such as cases where extended families

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with multiple adults live together in a household), it was not possible to determine whether the household had a couple living there. As such, some same-sex and opposite sex partnerships may have been excluded.

In every household, a sample adult was randomly selected for an in-depth interview. If either the reference person or their spouse or partner was selected as the sample adult, they were included in the analysis. The sample does not include more than one person from any household.

Subjects were categorized as ever/never having an asthma diagnosis based on the question, "Has a doctor or other health professional ever told you that you had asthma?" Current asthma diagnosis was determined from the question, "During the past 12 months, have you had an episode of asthma or an asthma attack?"

We analyzed demographic risk factors for asthma, including age, gender, educational attainment, race/ethnicity, and income. Behavioral or physiological risk factors included smoking, body mass index (BMI), stress frequency, and elevated risk for HIV. *Overweight* was defined as BMI between 25 and 30, and *obese* was defined as BMI greater than (30). (22) Elevated HIV risk was ascertained from the following question:

Tell me if any of these statements is true for you: You have hemophilia and have received clotting factor concentrations; You are a man who has had sex with other men, even just one time; You have taken street drugs by needle, even just one time; You have traded sex for money or drugs, even just one time; You have tested positive for HIV, the virus that causes AIDS; You have had sex (even just one time) with someone who would answer "Yes" to any of these statements.

Stress frequency was indicated by subjects' responses to the following questions: "During the past 30 days, how often did you feel": restless or fidgety? hopeless? that everything was an effort? sad? or worthless? Answers were scored on a

scale of 1 to 5, where 1 = none of the time and 5 = all the time; the mean of the scores for each question was then computed for each respondent. Health care-related risk factors included health insurance status and having seen a health care provider within the prior 12 months, including both generalist and specialist physicians and nurse practitioners.

Statistical analysis

We used weighted chi-square tests to compare male and female SSR and OSR subjects with respect to asthma prevalence (ever diagnosis of asthma and current asthma), asthma risk factors, and HIV risk factors. We then used weighted logistic regression modeling to analyze the association between asthma prevalence and SSR, controlling for the other risk factors. Analyses were conducted using SUDAAN software (RTI International, Research Triangle Park, NC) to account for the complex survey design of the NHIS.

RESULTS

Among the 258,279 adults in the NHIS sample, 430 men and 387 women reported living in SSR, and 60,868 men and 67,809 women reported living in OSRs (Table 1). The SSR population included a greater proportion of males than the OSR population. The mean ages of both male (mean: 40.5 years) and female (40.9 years) SSR subjects were younger than those of male (47.6 years) and female (45.1 years) OSR subjects. The SSR population also included a larger proportion of college graduates than the OSR population. Although the length or seriousness of relationships could not be assessed, 15% of SSR subjects referred to their partner as a spouse, compared to 92% of OSR subjects.

Table 2 shows the prevalence of asthma, asthma-related risk factors, and elevated HIV risk. SSR men and women were significantly more likely to have been ever diagnosed with asthma than OSR men and women. SSR men were nearly

TABLE 1.—Demographics of subjects in same-sex and opposite sex households in the National Health Interview Survey sample.

	Men		<i>p</i> value	Women		<i>p</i> value
	Same sex <i>n</i> = 430 % (SE)	Opposite sex <i>n</i> = 60,868 % (SE)		Same sex <i>n</i> = 387 % (SE)	Opposite sex <i>n</i> = 67,809 % (SE)	
Sex	55.9 (2.1)	50.1 (0.2)		44.1 (2.1)	49.9 (0.2)	0.002
Relationship to partner			<0.0001			<0.0001
Spouse	16.7 (2.2)	91.8 (0.2)		12.8 (1.9)	91.8 (0.1)	
Unmarried partner	83.3 (2.2)	8.2 (0.2)		87.2 (1.9)	8.2 (0.1)	
Age			<0.0001			<0.0001
18–29	17.8 (2.1)	11.6 (0.2)		16.9 (2.0)	15.9 (0.2)	
30–39	34.1 (2.5)	23.0 (0.2)		31.0 (2.4)	24.5 (0.2)	
40–49	27.3 (2.3)	24.3 (0.2)		29.6 (2.3)	24.3 (0.2)	
50+	20.8 (2.1)	41.2 (0.3)		22.5 (2.2)	35.6 (0.3)	
Educational attainment			<0.0001			0.0001
Under 12th grade	7.3 (1.5)	15.9 (0.3)		8.1 (1.4)	13.9 (0.2)	
High school or GED	18.6 (2.0)	29.1 (0.3)		23.1 (2.2)	31.7 (0.3)	
Some college/AA degree	18.9 (2.3)	26.6 (0.2)		27.6 (2.7)	29.1 (0.2)	
Bachelor's degree or higher	45.2 (2.6)	28.4 (0.4)		41.2 (3.2)	25.3 (0.3)	
Race/ethnicity			0.7			0.009
White non-Hispanic	79.9 (2.1)	77.4 (0.4)		80.8 (2.4)	78.9 (7.0)	
Black non-Hispanic	6.6 (1.7)	8.1 (0.2)		9.5 (1.5)	7.0 (0.2)	
Hispanic	9.7 (1.6)	10.5 (0.3)		5.5 (1.3)	10.1 (0.2)	
Other	3.8 (1.3)	4.0 (0.1)		4.2 (1.5)	4.1 (0.1)	
Income			0.8			0.5
<\$20,000/year	12.7 (2.0)	13.1 (0.2)		14.0 (1.9)	15.2 (0.2)	
>\$20,000	87.3 (2.0)	86.9 (0.2)		86.0 (1.9)	84.8 (0.2)	

Data for this variable were collected from 1997–2001.

TABLE 2.—Asthma and asthma-related risk factors by gender and type of relationship among men and women.

	Men		<i>p</i> value	Women		<i>p</i> value
	Same sex <i>n</i> = 430 % (SE)	Opposite sex <i>n</i> = 60,868 % (SE)		Same sex <i>n</i> = 387 % (SE)	Opposite sex <i>n</i> = 67,809 % (SE)	
Ever diagnosed with asthma			<0.0001			0.03
	13.5 (1.6)	7.6 (0.1)		14.3 (2.1)	10.2 (0.1)	
Asthma episode or attack, prior 12 mos.			0.0007			0.1
	5.2 (1.3)	2.2 (0.1)		6.5 (1.6)	4.3 (0.1)	
Smoking status			<0.0001			<0.0001
Current	31.4 (2.5)	22.7 (0.2)		29.1 (2.3)	18.9 (0.2)	
Former	21.9 (2.1)	30.9 (0.2)		25.7 (2.3)	20.2 (0.2)	
Never	46.8 (2.6)	46.4 (0.3)		45.2 (2.6)	60.8 (0.3)	
Body size			<0.0001			0.02
Normal	43.4 (2.5)	28.5 (0.2)		42.3 (2.9)	48.0 (0.3)	
Overweight	39.3 (2.5)	45.9 (0.3)		24.9 (2.5)	26.6 (0.2)	
Obese	17.3 (2.0)	25.6 (0.2)		32.9 (2.8)	25.4 (0.2)	
Stress frequency score (1 = least often, 5 = most often)			<0.0001			<0.0001
Score	1.4 (0.0)	1.3 (0.0)		1.5 (0.1)	1.4 (0.0)	
Elevated risk for HIV			<0.0001			<0.0001
Yes	53.9 (2.6)	1.4 (0.1)		6.4 (1.3)	1.3 (0.1)	
Health insurance coverage			0.01			0.01
Private	75.3 (2.5)	79.5 (0.3)		77.2 (2.1)	79.7 (0.2)	
Public	7.5 (1.4)	8.5 (0.2)		5.7 (1.2)	8.2 (0.2)	
Uninsured	17.2 (2.1)	12.0 (0.2)		17.1 (2.0)	12.1 (0.2)	
Seen a health care provider within prior 12 months			0.1			0.1
	80.3 (2.0)	76.7 (0.2)		87.1 (1.9)	89.9 (0.2)	

three times as likely as OSR men to have experienced an asthma attack in the prior 12 months.

Both SSR men and women were more likely to be current smokers than OSR persons, and SSR women were more likely to have ever smoked than OSR women. OSR men were significantly more likely than SSR men to be overweight or obese, but SSR women were more likely to be obese than OSR women. More SSR men and women than OSR men and women were uninsured. The proportions of SSR and OSR subjects who reported having seen a medical provider in the prior 12 months were similar.

We conducted weighted multiple logistic regression analyses of predictors of asthma diagnosis (Table 3). SSR men were nearly twice as likely as OSR men to have ever been diagnosed with asthma. SSR women were more than twice as likely as OSR women to report current asthma. Other correlates of ever diagnosis of asthma included younger age, having seen a health care provider in the 12 months before interview, and being overweight or obese. Subjects of Hispanic ethnicity were less likely than whites to have been diagnosed with asthma. Being a former smoker was also associated with having an asthma diagnosis. Experiencing stress was associated with both ever and current asthma diagnosis.

DISCUSSION

To our knowledge, this study represents one of the first attempts to delineate the association between homosexuality and of asthma in a population-based sample. We found that compared with those in OSRs, men in SSRs had a higher odds of ever asthma diagnosis, while women had a higher odds of current asthma. Although individuals in SSRs may represent a small proportion of all asthma patients, their health concerns deserve attention from the public health community. In genetic epidemiology and other fields, research on population subsamples has provided insights into etiologies and risks; it is possible that the study of asthma in this population may shed light on generalizable risk factors.

To the best of our knowledge, asthma prevalence among homosexuals has been previously examined only in the context of HIV disease. HIV and AIDS progression have been associated with atopy and elevated IgE in a number of studies (5–13), but no association with asthma has been recognized. Elevated respiratory symptomatology, such as cough, wheeze, or dyspnea, is seen in HIV-positive persons more often than HIV-negative persons, among both smokers and nonsmokers (23). However, these factors are unlikely to explain the elevated risk found in this population because HIV risk was assessed in analyses.

Many studies on gay and lesbian health have noted high rates of smoking compared to the general population (3). In this study, nearly a third of SSR persons reported being current smokers, compared to less than a quarter of the OSR population and to the US in general, where 23% of adults are current smokers (24). Assuming that the observed findings are true, it is likely that the greater prevalence of smoking in the gay community may be one of the most important factors in increased asthma prevalence. Furthermore, among asthmatics, the increased rates of smoking will raise the risks of asthma attacks. Smoking in asthma is associated with worse respiratory symptoms and more asthma-related doctor visits (25).

The association between secondhand smoke exposure and asthma has been well documented. Secondhand smoke exposure exacerbates preexisting asthma, increasing emergency department visits, and hospital admissions (26). In a study in Finnish adults exposed to environmental tobacco smoke, the attributable risk of adult-onset asthma due to this exposure was 49.2% (27). The NHIS does not collect information on environmental tobacco smoke exposure. However, if we assume that smoking rates of the unmarried partners and spouses are similar to those of the subjects, 32.0% of SSR subjects live with a smoker, compared with 21.4% of OSR, hence SSR subjects have a 49.8% higher risk than OSR subjects of living with a current smoker. This difference may

TABLE 3.—Associations of ever and current asthma diagnosis with same-sex relationship and other variables.

	Ever asthma diagnosis		Current asthma (12- month)	
	Men <i>n</i> = 61,298 OR (CI)	Women <i>n</i> = 68,196 OR (CI)	Men <i>n</i> = 61,298 OR (CI)	Women <i>n</i> = 68,196 OR (CI)
In a same-sex relationship	1.51 (1.10, 2.07)	1.23 (0.88, 1.73)	0.59 (0.09, 3.94)	2.48 (1.11, 5.54)
Age				
18–29	1.80 (1.61, 2.01)	1.38 (1.26, 1.52)	1.62 (1.08, 2.43)	1.68 (1.30, 2.18)
30–39	1.26 (1.15, 1.39)	1.09 (1.00, 1.18)	1.04 (0.70, 1.55)	1.44 (1.11, 1.87)
40–49	1.11 (1.00, 1.22)	1.12 (1.04, 1.21)	1.21 (0.84, 1.76)	1.42 (1.10, 1.83)
50+	1.00 referent			
Race/ethnicity				
White	1.00 referent			
Black	1.03 (0.90, 1.17)	0.89 (0.79, 1.00)	1.73 (1.14, 2.63)	1.39 (1.05, 1.86)
Hispanic	0.68 (0.60, 0.77)	0.65 (0.59, 0.72)	0.87 (0.56, 1.36)	0.88 (0.67, 1.17)
Other	0.93 (0.76, 1.15)	0.92 (0.76, 1.10)	0.55 (0.24, 1.26)	1.35 (0.87, 2.09)
Educational attainment				
<12th grade	0.92 (0.82–1.04)	0.97 (0.87–1.08)	2.30 (1.34–3.93)	1.56 (1.09–2.22)
High school/GED	0.87 (0.79–0.96)	0.90 (0.82–0.98)	1.56 (0.96–2.53)	1.20 (0.88–1.63)
Some college/AA degree	0.96 (0.87–1.06)	1.15 (1.06–1.25)	1.57 (0.95–2.61)	1.43 (1.07–1.91)
Bachelor's +	1.00 referent			
Income				
<20,000	1.15 (1.04, 1.27)	1.05 (0.97, 1.13)	1.51 (1.07, 2.15)	1.03 (0.83, 1.29)
≥20,000	1.00 referent			
Body size				
BMI <25	1.00 referent			
BMI ≥25	1.20 (1.11, 1.31)	1.57 (1.47, 1.67)	1.02 (0.76, 1.37)	1.87 (1.57, 2.23)
Seen a health care provider in prior 12 months				
Yes	1.73 (1.57, 1.91)	1.75 (1.54, 1.98)	5.52 (3.26, 9.32)	4.86 (2.94, 8.02)
Smoking				
Current	1.07 (0.98, 1.17)	1.18 (1.08, 1.28)	1.06 (0.77, 1.48)	1.09 (0.87, 1.37)
Former	1.22 (1.11, 1.33)	1.38 (1.28, 1.49)	1.03 (0.73, 1.45)	1.42 (1.14, 1.77)
Never	1.00 referent			
Elevated HIV risk				
Yes	1.37 (1.10, 1.71)	1.40 (1.12, 1.75)	1.07 (0.51, 2.27)	1.60 (1.05, 2.44)
Health insurance coverage				
Private	0.93 (0.82–1.04)	0.93 (0.84–1.04)	0.55 (0.38–0.81)	0.67 (0.51–2.44)
Public	1.11 (0.95–1.29)	1.25 (1.10–1.43)	1.39 (0.90–2.14)	1.47 (1.08–1.99)
No insurance	1.00 referent			
Stress frequency score (1 = most often, 5 = least often)	1.52 (1.45, 1.59)	1.54 (1.48, 1.61)	1.90 (1.69, 2.14)	1.91 (1.74, 2.09)

partially account for the elevated rates of asthma in the SSR subjects.

We found that stress was associated with both SSRs and asthma, although subjects were asked only about their feelings in the prior 30 days. Psychological stress has been reported to be higher in asthmatics than others, and severity appears to be correlated with the intensity of stress (28, 29). Asthma patients are also more frequently diagnosed with anxiety, depression, and panic disorders than the general population (30, 31). The NHIS questionnaire did not cover history of depression or anxiety-related disorders. It has been reported that gays and lesbians have increased risk for psychological distress compared to heterosexuals, including depression and anxiety disorders, and they appear to use mental health services at higher rates than other Americans (32–34). They also may have a higher risk of suicidal thoughts (33, 35). These psychological factors have contributed to the higher risks of asthma that we observed among SSR persons and may also explain the higher rates of asthma found in other studies, among those at risk for HIV.

The differences in smoking, sedentary lifestyle, obesity, and alcohol and other drug use among the gay community is likely to have altered patterns of disease among gays and lesbians compared to the heterosexual population. Before the advent of antiretroviral treatments, it was anticipated that life expectancy among homosexual men would be 8 to 20 years

shorter than that of heterosexual men due to HIV alone (36). While advances in therapies will decrease this gap, differences in health behaviors among the gay, lesbian, or bisexual (GLB) population may also adversely affect their life expectancy.

LIMITATIONS

Categorizing individuals as asthmatic or not asthmatic based on questionnaire response is common but not definitive. Diagnosis is strongly associated with health care access, both currently and over the subjects' lifetimes. In addition, correct classification depends on subject recall; however, we have no reason to believe that recall would be differential by SSR/OSR status.

This study was limited to individuals living with a partner, and the findings cannot be generalized to homosexuals or heterosexuals not currently living with a partner. The social support gained from close intimate partnerships has been documented to improve health (37), possibly by increasing healthy behaviors and receipt of health care services. The greater financial resources of partnered persons, especially in households with two incomes and few or no dependents, may facilitate access to medical services, increasing the likelihood of opportunity for asthma diagnosis.

The SSR/OSR variable must be viewed as a proxy for sexual orientation because subjects were not asked directly

about sexual orientation. Nonetheless, the population-based nature of data collection in this sample can be viewed as a strength of the study. Many studies of GLB persons recruit subjects in social venues where the population is more likely to identify with the GLB community (38); hence, our sample may better represent the partnered GLB population than other studies.

The SSR adults in our sample may or may not be representative of SSR adults nationally, but the NHIS has been designed and weighted to be representative of US noninstitutionalized adults (39). Of the 129,510 persons in this study, 0.6% reported that they were in SSR and 99.4% reported they were in OSR. The percentage of same-sex couples found here is therefore similar to the 0.6% of partnered households found by the 2000 Census (40). We assume that not all individuals living with a same-sex partner disclosed their relationship status to interviewers. Estimates based on the Census indicate a likely 13% to 28% undercount of same-sex partners (41), although extrapolations from population estimates would suggest undercounts as high as 62% (42). In the Census, individuals not marking unmarried partner to designate their same-sex relationship were more likely to be of lower income and/or to live in the Midwest than those making that designation (41).

CONCLUSION

We found that asthma was more prevalent among individuals in the United States living in SSRs than among those in opposite-sex households. Although a number of asthma risk factors, including smoking, increased stress, and obesity (among lesbians) appeared more prevalent in SSR than OSR subjects, we found that living in an SSR was associated with asthma even after controlling for the above factors. Further research must be conducted to test this finding and to examine the unique risks experienced in this population. In addition, gays and lesbians appear to be a reasonable, accessible subgroup in which adult asthma in general can be studied because they (particularly men) are more likely than others to have prior experience with clinical research. Gays and lesbians should be recruited for clinical trials and observational studies, and primary care physicians working with homosexual persons should be made aware of their increased risk. It may be appropriate to target these populations for lung function testing and treatment. Further research may help to identify risk factors that increase asthma prevalence in this population and may be relevant to others. The contribution of sexual orientation to stress and depression is poorly understood, and their effects on asthma warrant further study.

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