Differential Influence of Weight Status on Chronic Diseases by Reported Sexual Orientation Identity in Men

David A. Stuppelbeen, MPH,¹ Michele J. Eliason, PhD,² Allen J. LeBlanc, PhD,^{3,4}
and Emma V. Sanchez-Vaznaugh, ScD^{2,4}

Abstract

Purpose: This study examined whether the association between weight status and four chronic diseases (heart disease, hypertension, lifetime asthma, and type 2 diabetes) varied according to sexual orientation identity among adult men, controlling for demographic, socioeconomic, and other factors.

Methods: Pooled data from male adult participants ($n = 72,214$) in the 2003–2012 California Health Interview Survey were used along with logistic regression models to estimate whether the associations between weight status and chronic diseases varied by sexual orientation identity.

Results: Weight status was positively associated with each of the chronic diseases (hypertension, heart disease, asthma, and diabetes) among both gay and bisexual men and heterosexual men; however, the associations varied significantly by sexual orientation identity. Among gay and bisexual men, the associations were stronger and statistically significant—with the exception of lifetime asthma—particularly for men in the obese classifications, before and after controlling for age, marital status, race/ethnicity, education, income, health insurance status, food security level, smoking, and nativity.

Conclusions: Weight status had stronger detrimental associations with chronic disease among gay and bisexual men despite these men having greater socioeconomic advantage and lower body mass index than heterosexual men. Future research should examine mechanisms, including stress related to minority status, which may lead to greater risks for chronic diseases among sexual minority men.

Keywords: chronic disease, men, sexual minority, sexual orientation, weight

Introduction

HIGH BODY MASS index (BMI) and obesity are linked to an elevated likelihood of chronic diseases, such as diabetes, heart disease, and hypertension^{1,2} across sociodemographic and gender groups; however, there appears to be a steeper association between heavier weight status and diabetes and heart disease among women compared with men.³ Regarding sexual orientation, research has focused primarily on differences in obesity or chronic disease comparing heterosexual to sexual minority groups. Sexual minority men tend to have lower BMI and are less likely to be obese than their heterosexual peers.^{4–10} However, the evidence on chronic disease rates between these groups is mixed. Although some studies report significant differences in hypertension between gay and heterosexual men,¹¹ in diabetes between bisexual and heterosexual men,¹² and heart disease

between gay and heterosexual men,¹³ other studies have found no differences in heart disease,^{6,9,14,15} hypertension,^{9,14} and diabetes.^{4,6,9,13–15} Other studies report slightly higher asthma prevalence among gay/bisexual^{6,7,9,13,15} versus heterosexual men. Limited research has systematically examined how the relationship between obesity and chronic disease may differ by sexual orientation.¹⁶

Obesity may reflect a differential embodiment of stress, resulting in greater risk for chronic disease among sexual minority individuals versus their heterosexual peers. Stress experienced as an oppressed minority, due to racism, classism, heterosexism, or other forms of stigma, is hypothesized to be written literally on the body in complex ways¹⁷ differing across identity intersections. Minority stress theory is useful in understanding possible underlying pathways by which obesity may differentially influence chronic disease among sexual minority individuals relative to their heterosexual

¹Office of Public Health Studies, University of Hawai'i at Mānoa, Honolulu, Hawai'i.
²Departments of ²Health Education and ³Sociology, College of Health and Social Sciences, San Francisco State University, San Francisco, California.

⁴Health Equity Institute, College of Health and Social Sciences, San Francisco State University, San Francisco, California.

peers. The theory is based on the notion that the unique challenges faced by people in stigmatized groups, such as those who identify as a sexual minority, diminish their well-being over time,¹⁸ leading to chronic and enduring health disparities across groups. These challenges include stressors stemming from discrimination, expectations of rejection, efforts to conceal a stigmatized identity, and the internalization of stigma, which may lead to unhealthy coping behaviors that influence mental¹⁸ and physical health¹⁹ including obesity and chronic disease, among sexual minority individuals relative to their heterosexual counterparts. Minority stress measures are rarely available in population-based data, thus we are unable to test this pathway directly. Instead, this study examined the joint influence of weight status and sexual orientation identity on the likelihood of chronic diseases among men.

Methods

Study population

Cross-sectional data from the adult samples in the 2003, 2005, 2007, 2009, and 2011–2012 California Health Interview Survey (CHIS) were pooled to increase statistical power and improve the precision of estimates. CHIS is a population-based, random digit dialed telephone survey of adults and children comparable to the Behavioral Risk Factor Surveillance System. Since 2011, continuous data collection has been performed over 2-year periods to eliminate seasonality of biennial data.²⁰ Survey languages include English, Spanish, Mandarin, Cantonese, Vietnamese, and Korean. CHIS includes relatively large samples of minority populations. Data were weighted to account for the complex sample design and to adjust for nonresponse and households without telephones. Given the use of secondary data, this study was deemed to be exempt by the Institutional Review Board of San Francisco State University.

A total of 226,661 observations comprised the combined CHIS adult sample datasets. The exclusion of women ($n=100,542$), those with missing sexual orientation identity data ($n=37,099$), adults over 70 years ($n=8301$) who were not asked the sexual orientation question, and those of other or multiple races/ethnicities ($n=7883$) yielded a dataset of 72,836 observations. Due to small sample sizes, underweight ($n=622$) individuals were removed, yielding an analytic dataset of 72,214 observations.

Measures

Dependent variables. Four chronic diseases—heart disease, hypertension, lifetime asthma, and type 2 diabetes—were dependent dichotomous variables. These variables were based on the following questions: “Has a doctor ever told you that you have heart disease?” “Has a doctor ever told you that you have high blood pressure?” “Has a doctor ever told you that you have asthma?” “Has a doctor ever told you that you have diabetes or sugar diabetes?” and “Were you told that you had Type 1 or Type 2 diabetes?”

Independent variables. We used BMI classifications following widely accepted standards,²¹ calculated as weight in kilograms divided by height in meters squared. Respondents were classified as normal weight (BMI 18.5–24.99 kg/m²), overweight (BMI 25–29.99 kg/m²), and obese class I (BMI

30–34.99 kg/m²). Due to small sample sizes, we combined obese classes II/III (BMI ≥ 35 kg/m²). Sexual orientation identity was self-reported (“Do you think of yourself as straight or heterosexual, as gay [lesbian] or homosexual, or bisexual?”). Gay, homosexual, and bisexual respondents were combined into a “gay/bisexual” group. Those responding as straight or heterosexual were combined and classified as “heterosexual.”

Additional covariates were age, nativity, marital status (married/living with partner, separated/divorced/widowed, and never married), race/ethnicity (African American, Asian, Latino/Hispanic, and White²²), educational attainment (less than high school, completed high school, some college, college degree, and some graduate school or higher), annual household income adjusted for household size,²³ (<\$15,000, \$15,001–\$30,000, \$30,001–\$50,000, \$50,001–\$75,000, and \$75,001+), current smoking status (defined as having smoked 100 or more cigarettes in a lifetime and currently smoke cigarettes daily or some days, quit smoking, or never smoked regularly), household smoking (smoking in the home none of the time, some days, or every day), food security level (respondents at or above 200% of the federal poverty level, respondents below 200% of the federal poverty level who reported food security, food insecurity without hunger, or food insecurity with hunger), and health insurance status (currently uninsured, uninsured anytime during the past 12 months, and insured all of the past 12 months).

Statistical analysis

We estimated the prevalence of chronic diseases and distributions of other characteristics for the sample overall and by sexual orientation identity (heterosexual vs. gay/bisexual men), using *t*-tests and chi square statistics to assess the statistical significance of any observed differences. We estimated the prevalence of chronic diseases by weight status overall and within each of the sexual orientation identity groups.

Using the overall sample, we investigated whether the associations between weight status and chronic diseases varied significantly by sexual orientation identity by first fitting a logistic regression model with each chronic disease as a dichotomous outcome, and weight status and sexual orientation identity as categorical predictors and a cross-product term between the categorical weight and sexual orientation identity variables. The logistic regression model was subsequently adjusted for demographic (age, race/ethnicity, and marital status), socioeconomic (annual income adjusted for household size and educational attainment), and other individual characteristics (smoking status, exposure to household smoking, food security, nativity, and health insurance status) and a dummy variable for survey year. Analyses were repeated for each chronic disease.

We present the data and report results separately for each sexual orientation identity group.²⁴ Stata 14.0 (StataCorp LP, College Station, TX, 2015) was used to conduct all analyses, accounting for CHIS’s complex sampling design. Based on pooled CHIS data from multiple cross-sectional cycles, weight variables generated by the University of California, Los Angeles Center for Health Policy Research were adjusted to reflect the California population represented by the CHIS 2007 cycle. The variance of estimates was obtained through design-based jackknife replicate weights. Effects

associated with p -values <0.05 were considered statistically significant, including the tests of interaction.

Results

Gay/bisexual men had significantly lower mean BMI and lower prevalence of overweight and obesity than heterosexual men (Table 1). Heart disease and hypertension prevalence was similar for both groups. Gay/bisexual men had higher prevalence of lifetime asthma and lower prevalence of diabetes than heterosexual men. Gay/bisexual men had higher education and income levels, were more likely to report having health insurance in the past 12 months, and were more likely to be White and less likely to be Hispanic or Asian than heterosexual men. Gay/bisexual men were more likely to be current smokers, and to report household smoking, but they were less likely to report food insecurity than heterosexual men. The prevalence of chronic diseases differed significantly by BMI category, with higher prevalence of chronic disease at each higher level of body weight with the exception of lifetime asthma for gay/bisexual men (Table 2). Similar patterns were observed among heterosexual and gay/bisexual men, although among obese gay/bisexual men, the prevalence of chronic diseases appeared greater.

We found evidence of a statistically significant interaction between weight status and sexual orientation identity (p for interactions <0.001) for each of the chronic diseases we examined (Table 3). Although weight status was associated with greater likelihoods of chronic diseases among both groups of men, the associations appeared stronger among gay/bisexual men, particularly for those in obese classes I and II/III combined. Among gay/bisexual men, overweight, and obese classes I and II/III combined were associated significantly with elevated odds of hypertension (adjusted odds ratios [AORs]: 2.54, 4.05, and 6.99) and diabetes (AORs: 3.56, 8.23, and 13.49) relative to their normal weight peers in both unadjusted and adjusted models. Only gay/bisexual men in obese classes I and II/III had significantly higher likelihoods of heart disease (AORs: 2.16 and 2.79) in both models compared with their normal weight counterparts. Although weight status was positively associated with lifetime asthma, the associations were not significant before and after covariate adjustments. Small sample sizes resulted in wide confidence intervals, particularly for estimates of the body weight associations with diabetes, thus caution is warranted when interpreting these findings.

Similarly, among heterosexual men, those classified as overweight, and obese classes I or II/III combined had significantly elevated likelihoods of hypertension (AORs: 1.77, 3.19, and 4.94) and diabetes (AORs: 1.63, 3.27, and 6.61) compared with those classified as normal weight. Odds of heart disease were only significantly higher for heterosexual men in obese classes I or II/III (AORs: 1.43 and 1.83). Lifetime asthma was higher for those classified as overweight, obese class I, or obese classes II/III (AORs: 1.13, 1.33, and 1.48) relative to those classified as normal weight. Although overweight was not significantly related to lifetime asthma in the unadjusted model, it became significant after covariate adjustments.

Discussion

Using population-based data on male adults in California, we documented three findings. First, as in another study,¹⁵

we found that gay and bisexual men had lower average BMI, were less likely to be overweight or obese, and reported higher education and income levels compared with their heterosexual peers. Second, consistent with other studies that examined men, we found that higher weight status was positively associated with chronic diseases.^{25–29} Third, we identified a significant interaction between weight status and sexual orientation identity, whereby the link between body weight and chronic disease appeared to be stronger for gay/bisexual men—particularly men in the obese classifications—than among their heterosexual counterparts. Our study contributes to this body of work by teasing out the role of sexual orientation identity in the associations between weight and chronic diseases among men.

Our core finding that gay and bisexual men who are classified as overweight or obese appear to have elevated likelihoods of chronic diseases may be better understood in the context of their exposure to minority stress. As mentioned previously, minority stress frameworks have been applied to research on sexual minority well-being, in studies of mental and physical health.^{18,19} The experiences of minority stress among gay and bisexual men who are perceived to be overweight or obese are very likely unique given that they may not only experience social stigma based on their weight status,³⁰ but also based on their sexual orientation.¹⁹ This combination of stressors can be seen as intersectional in nature. Moreover, they emanate not only from society in general, but also from within the communities in which gay and bisexual men participate.

Sexual minority male populations are not homogeneous: certain subgroups, such as “bears,” prefer larger body sizes than other subsets of the gay community³¹ forming a niche within the larger gay male community due to discrimination from other gay men.³⁰ Among gay men ages 18–39, those identifying as “cubs” (a younger subset of “bear”) have reported higher odds of experiencing discrimination.³² Thus, such minority stress experiences are also contextual, varying as people navigate across social settings defined by diverse cultural influences. The unique constellation of minority stressors to which these men are exposed has received some attention in published studies.^{19,30,32} However, additional research is needed, for example, to better understand whether these social and health differences are related to higher prevalence of chronic diseases in sexual minority men.

Additional mechanisms that contribute to the greater risk of chronic disease in sexual minority men may include behavioral and environmental factors such as diet, physical activity, and the built environment. Research findings concerning diet and physical activity among gay and bisexual men are mixed. One study found more physical activity and healthier eating habits among heterosexual men.³³ In another study³⁴ gay men reported less availability of fruits and vegetables in their communities and homes, and higher sugar-sweetened beverage consumption, whereas bisexual men reported more physical activity than heterosexual men. Another study found that eating patterns and physical activity levels were similar for men across sexual orientations and had an independent effect on BMI.³⁵ We were unable to include diet and physical activity indicators in our study, as they were not collected in all CHIS waves used in this study. As differences in diet and physical activity may contribute to the differential weight-chronic disease

TABLE 1. CHARACTERISTICS OF THE SAMPLE OVERALL AND BY SEXUAL ORIENTATION
IDENTITY, CALIFORNIA ADULT MEN, 2003–2012

	<i>Men overall</i>	<i>Heterosexual</i>	<i>Gay/Bisexual</i>	
	<i>n = 72,214</i>	<i>n = 69,299</i>	<i>n = 2915</i>	
	<i>Mean (SE) or %</i>	<i>Mean (SE) or %</i>	<i>Mean (SE) or %</i>	<i>p^a</i>
BMI	27.52 (0.036)	27.57 (0.036)	26.09 (0.174)	***
Weight status ^b				
Normal weight	33.61	33.1	47.77	***
Overweight	41.97	42.19	35.6	
Obese class I	16.86	17.08	10.67	
Obese classes II/III	7.56	7.62	5.96	
Heart disease	4.37	4.37	4.44	ns
Hypertension	22.12	22.12	21.94	ns
Lifetime asthma	11.93	11.78	16.23	***
Type 2 diabetes	5.67	5.72	4.41	*
Age	40.66 (0.09)	40.68 (0.09)	39.94 (0.39)	ns
Born outside the United States	34.6	35.01	23.16	***
Marital status				
Married/lives with partner	62.5	63.4	37.46	***
Widowed, separated, or divorced	8.62	8.64	8.28	
Never married	28.87	27.96	54.26	
Education				
Less than high school	16.87	17.25	6.34	***
High school graduate or equivalent	26.34	26.59	19.45	
Some college	23	22.89	26.01	
College graduate	20.09	19.86	26.46	
Some graduate school or higher	13.7	13.41	21.74	
Race/Ethnicity				
Hispanic	35.51	35.81	27.16	***
White, non-Hispanic	46.54	46.2	56.07	
African American only, non-Hispanic	5.6	5.58	6.15	
Asian only, non-Hispanic	12.35	12.41	10.62	
Equivalized annual income ^c				
Less than \$15,000	25.25	25.4	21.04	***
\$15,001–\$30,000	21.54	21.7	16.99	
\$30,001–\$50,000	20.71	20.81	17.97	
\$50,001–\$75,000	15.34	15.33	15.59	
\$75,001 or higher	17.16	16.75	28.41	
Current smoking status				
Currently smokes	18.99	18.8	24.26	***
Quit smoking	25.18	25.24	23.56	
Never smoked regularly	55.83	55.96	52.18	
Household smoking ^d				
None	91.53	91.74	85.55	***
Some days	4.15	4.05	6.75	
Every day	4.33	4.21	7.7	
Food security ^e				
At or above 200% of the federal poverty level	69.72	69.44	77.58	***
Food secure	19.03	19.21	14.02	
Food insecure without hunger	7.5	7.6	4.56	
Food insecure with hunger	3.75	3.74	3.84	
Health insurance				
Currently uninsured	21.31	21.43	17.96	*
Uninsured any time during the past 12 months	5.26	5.22	6.51	
Insured all of the past 12 months	73.43	73.36	75.54	

Data were pooled and reweighted; thus, the estimates reflect the state's population in 2007, the midpoint of the pooled 5 years of CHIS data.

^aBased on chi-square and *t*-tests.

^bBMI is based on World Health Organization cut points: Normal weight = 18.5–24.99, overweight = 25–29.99, obese class I = 30.0–34.99, and obese classes II/III ≥35.0.

^cTotal annual household income divided by the square root of household size.

^dHousehold smoking was used to capture exposure to secondhand smoke in the home.

^eFood security levels: respondents with income at or above 200% of the federal poverty level; respondents with income below 200% of the federal poverty level who reported food security, food insecurity without hunger, or food insecurity with hunger.

p* < 0.05; **p* < 0.001. *p* values are for comparisons of each characteristic by sexual orientation identity.

SE, standard error; BMI, body mass index; ns, not statistically significant.

TABLE 2. PREVALENCE OF CHRONIC DISEASES ACCORDING TO WEIGHT STATUS FOR THE SAMPLE OVERALL AND BY SEXUAL ORIENTATION IDENTITY, CALIFORNIA ADULT MEN, 2003–2012

	Overall sample	Heterosexual	Gay/Bisexual
	n = 72,214	n = 69,299	n = 2915
	%	%	%
Heart disease			
Normal weight	3.07	3.08	2.86
Overweight	4.30	4.29	4.49
Obese class I	5.88	5.83	7.99
Obese classes II/III	7.20	7.11	10.50
<i>p</i> -value	***	***	***
Hypertension			
Normal weight	12.03	12.06	11.43
Overweight	21.99	21.85	26.50
Obese class I	33.40	33.30	37.86
Obese classes II/III	42.52	42.29	50.43
<i>p</i> -value	***	***	***
Lifetime asthma			
Normal weight	11.42	11.28	14.14
Overweight	11.27	11.08	17.50
Obese class I	13.12	13.03	17.17
Obese classes II/III	15.23	14.99	23.79
<i>p</i> -value	***	***	ns
Type 2 diabetes			
Normal weight	2.45	2.52	1.14
Overweight	4.86	4.86	4.57
Obese class I	9.56	9.52	11.42
Obese classes II/III	16.12	16.09	17.42
<i>p</i> -value	***	***	***

CHIS pooled data from 2003 to 2012. Estimates reflect the state's population in 2007, the midpoint of the pooled 5 years of CHIS data. *p* values are based on chi-square tests for the overall sample, and within each of the sexual orientation identity groups.

BMI is based on World Health Organization cut points: Normal weight = 18.5–24.99, overweight = 25–29.99, obese class I = 30.0–34.99, and obese classes II/III ≥35.0.

****p* < 0.001.

CHIS, California Health Interview Survey.

associations identified in this study, this warrants additional research.

Social norms, including concerns about body image, may be related to and/or interact with minority stressors, which in turn could result in higher likelihood of chronic disease. Gay and bisexual men had lower average BMI that may be related to differences in socioeconomic status given that this group had relatively more favorable education and income levels than their heterosexual peers. Weight differences between the two groups may also be related to concerns about body image and appearance norms related to desirability of leanness rather than health-consciousness,^{36–38} or to a higher prevalence of eating disorders among gay men than heterosexual men.³⁸ Some studies suggest that sexual minority men may have even greater desire for muscularity than heterosexual men and may be more likely to use anabolic steroids and have intensive exercise patterns.^{39,40} Another study suggested that heterosexual men were more concerned with muscularity and gay men with leanness.³⁸ Sexual minority college men⁴¹ and adolescent gay and bisexual men had higher odds of diet pill use compared to heterosexual men.⁴²

The findings from this study underscore that not assessing joint influences of weight status and sexual orientation identity would mask the greater risk of chronic disease among

gay and bisexual men along with chronic disease disparities within and between sexual orientation identity groups.

Limitations

Study limitations included the self-reported, cross-sectional nature of the data, nonresponse for sexual orientation identity, measures used, and small sample sizes for some comparisons. Given that weight and height are self-reported, that men tend to inflate both their height and weight,^{43,44} and that gay men underreport their BMI relative to heterosexual men,⁴⁵ obesity associations with chronic disease may have been underestimated.

We excluded participants missing sexual orientation identity data, which may have resulted in an undercount of sexual minority men, especially racial or ethnic minorities. For example, bisexual men, those who are married, Asian men, and those living in rural areas are less likely to report their sexual orientation in surveys⁴⁶; however, sexual orientation nonresponse in CHIS has declined over time for some racial groups and among those with limited English proficiency.⁴⁷ In our study, gay and bisexual men had greater socioeconomic advantage and were less racially/ethnically diverse than heterosexual men, which may indicate that men of color are less

TABLE 3. ESTIMATED ODDS RATIOS AND 95% CONFIDENCE INTERVALS COMPARING THE ODDS OF EACH CHRONIC DISEASE AMONG OVERWEIGHT AND OBESE MEN RELATIVE TO NORMAL WEIGHT MEN, BY SEXUAL ORIENTATION IDENTITY, CALIFORNIA ADULT MEN, 2003–2012

	<i>Heterosexual</i>		<i>Gay/Bisexual</i>	
	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
Heart disease				
	<i>Unadjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.41	1.24–1.61	1.6	0.96–2.66
Obese class I	1.95	1.65–2.32	2.94	1.59–5.45
Obese classes II/III	2.42	2.04–2.87	3.98	1.77–8.96
	<i>Adjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.09	0.95–1.26	1.27	0.77–2.11
Obese class I	1.43	1.19–1.72	2.16	1.13–4.13
Obese classes II/III	1.83	1.53–2.20	2.79	1.11–7.03
Hypertension				
	<i>Unadjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	2.04	1.88–2.21	2.80	1.97–3.97
Obese class I	3.63	3.31–3.98	4.76	3.20–7.09
Obese classes II/III	5.32	4.75–5.96	7.90	4.73–13.19
	<i>Adjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.77	1.63–1.93	2.54	1.75–3.67
Obese class I	3.19	2.89–3.54	4.05	2.67–6.15
Obese classes II/III	4.94	4.36–5.59	6.99	4.14–11.79
Lifetime asthma				
	<i>Unadjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	0.98	0.89–1.09	1.29	0.87–1.91
Obese class I	1.18	1.04–1.33	1.27	0.77–2.08
Obese classes II/III	1.38	1.19–1.60	1.90	0.98–3.67
	<i>Adjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.13	1.02–1.26	1.31	0.89–1.94
Obese class I	1.33	1.18–1.51	1.28	0.77–2.11
Obese classes II/III	1.48	1.27–1.73	1.93	0.99–3.74
Type 2 diabetes				
	<i>Unadjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.99	1.65–2.39	4.13	2.23–7.67
Obese class I	4.07	3.44–4.80	11.25	6.25–20.27
Obese classes II/III	7.39	6.22–8.78	18.26	9.19–36.37
	<i>Adjusted***</i>			
Normal weight (ref)	1.0	—	1.0	—
Overweight	1.63	1.32–2.00	3.56	1.90–6.63
Obese class I	3.27	2.69–3.97	8.23	4.50–15.0
Obese classes II/III	6.61	5.45–8.03	13.49	6.28–29.0

CHIS pooled data from 2003 to 2012.

The chronic disease variables are based on whether the doctor had ever diagnosed the participant with each of these chronic conditions.

Estimated ORs are based on logistic regression models adjusted for age (centered at its mean), marital status, race/ethnicity, education, annual income adjusted for household size, health insurance status in the past 12 months, food security, smoking status, exposure to household smoking, nativity, and survey year, and include an interaction term between the categorical variables weight status and sexual orientation identity.

Models are weighted to account for the complex sample design of the CHIS.

****p*-value for the overall interaction between the categorical variables for weight status and sexual orientation identity <0.001.

OR, odds ratio; CI, confidence interval.

likely to respond to sexual orientation questions. Race or ethnicity and sexual identity have been shown to have differential effects on health outcomes in other studies⁴⁸ and differences in obesity trajectories.⁴⁹ As we would expect ethnic minority and socioeconomically disadvantaged sexual minority men to have higher levels of chronic disease even with lower BMI and obesity prevalence, estimates of the association between weight status and chronic disease among gay and bisexual men reported in this article may be conservative. Other measures of sexual orientation have been used in health studies, including sexual attraction⁵⁰ or lifetime sexual activity,⁵¹ possibly limiting the comparability of results across studies. CHIS is undergoing revisions to its sexual orientation question to minimize nonresponse.⁵²

Underweight status is associated with ill health; however, we were unable to include underweight men because of small sample size. Similarly, due to small sample sizes we combined higher weight classes; thus the confidence intervals, mostly for the estimates of weight-diabetes associations, were wider and should be interpreted with caution. We combined gay and bisexual men to increase sample size and thus were unable to assess the body weight associations with chronic disease separately for each group.

Minority stress and eating disorders measures were not available in CHIS, precluding our ability to examine whether those factors mediated the relationships between weight and chronic disease. Researchers should consider adding questions to collect data on these types of variables. In addition, future analyses may consider examining BMI as a continuous predictor of chronic disease to examine potential nonlinear associations with chronic diseases and compare those by sexual orientation.

Future research

Despite these limitations, current population-based studies of chronic health disorders provide a start to a broader understanding of sexual minority health in general and sexual minority men's health specifically. Future research should include the potential factors that might contribute to greater weight and chronic disease in sexual minority populations, including the intersections of gender, sexual identity, ethnicity, and socioeconomic factors. Studies of the influence of minority stress on sexual minority men's health should also examine the role of gay cultural norms regarding appearance as an added stressor that could impact health.

Conclusion

This study found stronger detrimental associations between weight status and chronic disease among gay and bisexual men, despite these men having greater socioeconomic advantage and lower average BMI than heterosexual men. Future research should examine mechanisms, including intersectional minority stress processes, which may contribute to greater chronic disease risk for this population and specific subpopulations. Preventing and reducing chronic diseases is critically important for all men, and particularly among gay and bisexual men.

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Address correspondence to:
 Emma V. Sanchez-Vaznaugh, ScD
 Department of Health Education
 College of Health and Social Sciences
 San Francisco State University
 1600 Holloway Avenue
 HSS Building, Room 326
 San Francisco, CA 94132

E-mail: emmav@sfsu.edu