Original article

Relationships between Sexual Orientation, Weight, and Health in a Population-Based Sample of California Women

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A B S T R A C T

Background: Most biomedical research has reported associations between weight and physical health problems; little is known about whether those associations vary by sexual identity.
Methods: Pooled data from the 2003 through 2013 waves of the California Health Interview Survey was used to construct logistic regression models to examine whether the associations between weight and four chronic conditions (type 2 diabetes, hypertension, heart disease, and asthma) varied by sexual identity.
Results: A total of 97,720 heterosexual and 2,822 lesbian/bisexual women comprised the analytic sample. There was a significant interaction between weight status and sexual identity ($p < .001$) for all four chronic diseases. Among lesbian/bisexual women, weight status was positively associated with heart disease, hypertension, asthma, and diabetes, although the associations between any weight status and heart disease, and between overweight and asthma, were not statistically significant. Among heterosexual women, weight status was positively and significantly associated with heart disease, hypertension, asthma, and diabetes. Except for overweight and heart disease, these associations remained significant after adjustment for covariates.
Conclusion: This study underscores the importance of disaggregating analyses by sexual identity in studies that examine weight–chronic disease associations.

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In the past 20 years, studies have observed significant health disparities associated with minority sexual identification in the areas of mental health, physical health, substance use, and access to and quality of health care services (Institute of Medicine, 2011). Research to highlight these disparities has been made possible with the addition of sexual identity questions to population health surveillance instruments; yet, collectively, these studies tell a partial and fragmented story.

Promoting healthy weight is a major public health policy goal in the United States, given that greater body weight has been associated with elevated likelihood of chronic diseases (Franks & Atabaki-Pasdar, 2017). However, the limited but growing body of

research involving sexual minorities has primarily examined differences in either body weight or in health outcomes according to sexual identity. Less clear is whether the associations between body weight and chronic diseases vary according to sexual identity among women.

In relation to body weight, a recent systematic review of the literature (Eliason et al., 2015) identified 37 studies since 2006, with two-thirds of the studies finding statistically significant differences in weight between sexual minority and heterosexual women. In contrast, research on physical health among sexual minority women (Eliason, 2014) has not revealed any substantial evidence for elevations of any chronic physical health problems measured on typical health surveillance surveys, except for asthma. For example, a review of the literature found that out of 10 studies, only 1 study found higher diabetes prevalence among sexual minority women (and only for women over 40 years of age). None of 12 studies that reported hypertension rates found higher prevalence in sexual minority women. A more recent

study using the National Health Interview Survey, a population-based survey of U.S. adults, provided age-adjusted estimates of physical health disorders by sexual identity and found higher diabetes prevalence and cancer rates among lesbian/bisexual women, but reported no differences in heart disease and asthma between heterosexual and sexual minority women (Ward, Joestl, Galinksky, & Dahlhamer, 2015).

Given that sexual minority women typically have greater body weight than heterosexual women, we would expect a higher likelihood of chronic disease among sexual minority women. The adverse effects of body weight on chronic diseases among sexual minority women may be masked by combining all body weight groups or by not explicitly considering variations in chronic disease and body weight within and between women based on sexual identity. To tease out differences in body weight and chronic disease patterns between sexual minority and heterosexual women, this study investigated whether the associations between body weight and chronic diseases varied by sexual identity using data from one of the largest state health surveys in the United States.

Methods

Study Population

Data were drawn from cross-sectional samples combining the 2003, 2005, 2007, 2009, and 2011 to 2012 waves of the California Health Interview Survey (CHIS). Conducted biennially from 2001 to 2009 and annually since 2011, CHIS is a population-based, random digit dial telephone survey of civilian households. CHIS has been previously found to be comparable to estimates from National Center for Health Statistics surveys such as the Behavioral Risk Factor Surveillance System. Respondents were interviewed in English, Spanish, Mandarin, Cantonese, Vietnamese, or Korean in all waves. CHIS data are weighted to adjust for differential nonresponse and households without telephones. Respondents with any "other" ethnicity or multiple ethnicities, and/or had missing information on the covariates of interest were excluded from the analysis. The final analytic dataset included 100,542 adult females: 97,720 heterosexual and 2,822 lesbian or bisexual women, ranging in age from 18 to 70 years. Because the study involved deidentified secondary data, it was exempted from institutional review board review from the authors' academic institution.

Measures

Dependent variables

The dichotomous dependent variables included four chronic health outcomes: heart disease, hypertension, asthma, and type 2 diabetes. These outcomes were assessed with the following questions: "Has a doctor ever told you that you have diabetes or sugar diabetes?" followed by, "Were you told that you had type 1 or type 2 diabetes?" Questions for other conditions were, "Has a doctor ever told you that you have [high blood pressure, heart disease, asthma]?" For descriptive purposes, we also created a continuous composite measure of chronic diseases by summing the presence of the four chronic diseases (range, 0–4).

Independent variables

Based on widely used standards, the CHIS reports body mass index (BMI), calculated as weight in kilograms divided by height in meters squared, using self-reported height and weight.

Respondents were grouped using standard classifications as follows: underweight and normal weight (BMI < 24.99 kg/m^2), overweight (BMI 25–29.99 kg/m^2), obese class I (BMI 30–34.99 kg/m^2), and obese classes II and III (BMI ≥ 35 kg/m^2). Because of small sample sizes, we grouped respondents in obese classes II and III, as well as underweight and normal weight categories. Sexual identity was defined by the following question: "Do you think of yourself as straight or heterosexual, as gay (lesbian) or homosexual, or bisexual?" Respondents over the age of 70 were excluded from this analysis because data on sexual identity were not collected in this population.

Other covariates

CHIS collects race or ethnicity using the Office of Management and Budget race or ethnicity classifications: African American, Asian, Latino/Hispanic, and White. Other racial or ethnic groups were excluded because of small sample sizes ($<3.5\%$ of the sample and too diverse to make meaningful inferences for this combined group). Other covariates in the analyses were age (in years as a continuous variable), nativity, marital status (married, separated/divorced/widowed, living with partner, never married), educational attainment (less than high school, completed high school, some college, college degree, some graduate school or higher), annual household income adjusted for household size, based on a standard measure previously employed in the Luxemburg income studies (Smeeding, 2000; $<\$15,000$; $\$15,001-\$30,000$; $\$30,001–\$50,000$; $\$50,001-\$75,000$; $\geq\$75,001$) insurance status (currently uninsured, uninsured anytime during the past 12 months, and insured all past 12 months), current smoking status (defined as having smoked ≥ 100 cigarettes in a lifetime and currently smoke cigarettes daily or some days), and household smoking (smoking in the home none of the time, sometimes, or every day).

Statistical Analysis

We estimated rates of chronic diseases, weight status, and distributions of other variables for the sample overall, and compared those by sexual identity, using χ^2 statistics and t tests to assess the statistical significance of any observed differences. To formally test whether the associations between weight status and each chronic disease varied significantly by sexual identity, we used the overall sample to estimate an unadjusted logistic regression model with each of the chronic diseases (separately) as a dichotomous outcome and a cross-product term between the levels of weight status and sexual identity. We subsequently adjusted the model for demographic characteristics (age and marital status), socioeconomic factors (income adjusted for household size and educational attainment), insurance status, current smoking, household smoking, nativity, and survey year. Following recommendations (Henneckens & Buring, 1987), we present the data and report results separately for each sexual identity group. All analyses were conducted using Stata statistical software, version 14.0 (StataCorp, College Station, TX), taking into account CHIS's complex sampling design. After pooling multiple cross-sectional cycles of CHIS data, 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 $p < .05$ were considered statistically significant, including the tests of interaction.