Title
Sexual Identity Disparities in Smoking and Secondhand Smoke Exposure in California: 2003-2013.

Authors
Max, Wendy B
Stark, Brad
Sung, Hai-Yen
et al.

Sexual Identity Disparities in Smoking and
Secondhand Smoke Exposure in California: 2003-2013

ABSTRACT

Objectives. We determined smoking prevalence, smoking behavior, and secondhand smoke (SHS) exposure of LGB-identified Californians; compared these with heterosexuals; and analyzed changes over the last decade.

Methods. We analyzed the 2003-2013 California Health Interview Surveys, using multivariate logistic regression models to examine the impact of sexual identity on smoking behaviors. We conducted time trend analyses for each smoking behavior.

Results. Lesbian and bisexual women smoke at higher rates than heterosexual women, and female bisexual smokers were less likely to be light smokers than heterosexuals. Among men, smoking prevalence was higher among gays and bisexuals than among heterosexuals; and gay smokers were more likely to be daily smokers and bisexual smokers were more likely to be light smokers than heterosexuals. Sexual minority men and women were more likely to be exposed to SHS at home than heterosexuals. Smoking prevalence and SHS exposure have fallen among sexual minorities.

Conclusions. Sexual identity disparities in smoking and SHS exposure exist in California. Bisexual women and men are particularly at risk. Interventions should consider the needs of these groups and of all sexual minority smokers.

INTRODUCTION

The lesbian, gay, and bisexual (LGB)-identified population in the U.S. smokes at higher rates than the rest of the population.[1-7]   California LGB-identified smokers also smoke at high rates.[8-11] Tang and colleagues[8] used the 2001 California Health Interview Survey (CHIS) to estimate LGB smoking rates. They found higher rates among lesbians (25.3%) compared to heterosexual women (14.9%) and among gay men (33.2%) compared to heterosexual men (21.3%). Gruskin and colleagues[10] used the 2002 California Tobacco Survey to compare smoking prevalence in the LGB and general populations. They found that smoking rates were higher among lesbians (22.2%), bisexual women (22.6%), and women who have sex with women (22.7%) than in the general female population (9.1%). Gay men had significantly higher smoking rates (19.6%) than the general male population (13.9%). These differences persisted after controlling for other tobacco use-related characteristics. Bye and colleagues[9] analyzed the California LGB Tobacco Use Survey of 2004, and found that gay and bisexual men smoked at a rate 50% higher than all men in California; lesbian and bisexual women smoked at a rate nearly three times that of all California women. Although adult smoking prevalence has continued to decline in California, it is unknown whether this declining trend also occurs in the LGB population.

Other smoking behaviors, including smoking intensity and daily vs. nondaily smoking, have not been examined among the California LGB population. Among the California general population, the average number of cigarettes smoked per day fell from 19 in 1992 to 14 in 2008,[12] and nondaily smokers represented 14.8 percent of smokers in 1992 but increased to 28.1 percent in 2008.[12] It is not known whether the declining smoking intensity and the shifting from daily to nondaily smoking have also occurred in the LGB population. Given the high rates of smoking prevalence reported among LGBs, it is likely that secondhand smoke (SHS) exposure is also high, but this has not been documented previously.

The purpose of this paper is to determine the smoking prevalence, smoking behavior patterns, and SHS exposure of LGB-identified Californians; compare these with heterosexuals; and analyze the changes in these behaviors over the last decade.

METHODS

Data Source

The CHIS is a telephone survey of California households that has been conducted every two years since 2001. It is the largest health survey conducted in any state. It contains data on smoking behavior, other risk behaviors, socioeconomic characteristics, and healthcare utilization. CHIS employs a multi-stage geographically stratified random-digit-dial design, yielding a sample representative of California's non-institutionalized household population. Adult sample sizes to date average roughly 47,000 per cycle. Since 2007, the CHIS has included a cell phone sample, which in 2011/12 accounted for 22% of the adult interviews. For the 2001 through 2009 surveys, data were collected over a period of roughly 9 months within each two-year cycle and are weighted based on the 2000 Census population for California. Beginning with the 2011-12 CHIS, data are collected continuously across the two-year cycle, allowing the release of one-year estimates for each calendar year, and are weighted based on the 2010 Census. In order to obtain sufficient sample size for sexual minority subpopulations, we pooled data from the 2003 – 2013 surveys. Because the full 2013-14 public use dataset was not yet available, we accessed one-year 2013 estimates through the CHIS Data Access Center. Our analyses were restricted to those respondents aged 18-70 who identified as heterosexual, lesbian, gay, or bisexual, resulting in a retained study sample size of 83,299 men and 115,338 women. Because the sexual identity question is only available in the confidential CHIS dataset, all analyses were conducted through the CHIS Data Access Center.

Measures

Sexual identity. We deftermine LGB status based on a sexual identity question which has been asked for all CHIS respondents between the ages of 18 and 70 since 2003: "Do you think of yourself as straight or heterosexual, as gay/lesbian or homosexual, or bisexual?" Fewer than 1% of the survey respondents responded "other", "not sexual, celibate, or none", or were skipped due to proxy interview. These respondents were excluded from all analyses in this study. Accordingly, we classified respondents as either iheterosexual, gay, lesbian, or bisexual.

Smoking behavior. Current smokers are defined as those who report having smoked at least 100 cigarettes in their lifetime and now smoke everyday or some days. Current smokers were further classified into daily smokers and occasional smokers depending on whether they now smoke cigarettes every day or some days. We also classified current smokers into light smokers and non-light smokers. Light smokers comprise both occasional smokers and daily smokers who smoke fewer than 10 cigarettes per day..

SHS exposure. SHS exposure was analyzed only among nonsmokers, defined as respondents who are not current smokers. Although smokers may also suffer the consequences of SHS exposure, it is difficult to separate the impact of active and passive smoking for them, and thus we focused on nonsmokers. Nonsmokers who report that someone smoked inside the home at least 1 day per week were defined as being exposed to SHS at home.

Covariates. We included the following sociodemographic covariates based on our review of the literature: age, race/ethnicity, education, and poverty level. Poverty level was measured using the ratio of family income to the family's poverty threshold as defined by the U.S. Census Bureau.[15] Age and poverty level were included as continuous variables in all regression analyses. For descriptive purposes, we also show age in four categories (18-25; 26-34; 35-49; and 50-70 and poverty level in four categories (0.00-0.99; 1.00-1.99; 2.00-2.99; and ≥3.00). Age-squared was also included in our regression analyses to control for non-linear relationships between age and outcome measures. Race/ethnicity was classified as Hispanic, non-Hispanic (NH) White, NH African American, NH Asian, and NH Other/Multiple. We grouped education into 4 categories

based on the highest level attained: less than high school diploma, high school diploma, some college, and college degree or higher.

Statistical Analyses

All analyses were conducted for males and females separately. Cross-tabulations were used to describe the frequency distribution of each categorical sociodemographic variable (race/ethnicity and education) and survey year, while both means and cross-tabulations were used to summarize continuous demographic variables (age and poverty Level) and their categorical recodes respectively by sexual identity. Separate chi-square tests tests were performed to compare gay/lesbian and bisexual subgroups with the heterosexual reference group, as well as the bisexual subgroup with the gay/lesbian reference group. T-tests were used to compare continuous sociodemographic variables age and poverty level by sexual identity.

We analyzed the association between sexual identity and smoking behaviors as well as SHS exposure using multivariate logistic regression models, controlling for age, age squared, poverty level, year, race/ethnicity and education. These models were used to estimate adjusted odds ratios (AORs) and their 95% confidence intervals (CIs) for each sexual orientation subgroup, with heterosexual as the reference group. Wherever (3-level) sexual identity was treated as a predictor, we specified contrast estimation in the models to obtain coefficients and p values indicating any significant differences in outcome likelihood between gay/lesbian and bisexual subgroups. For both men and women, we combined gay/lesbian and bisexual subgroups for the analysis of SHS exposure at home due to small sample sizes.

We conducted time trend analyses for each smoking-related outcome measure. For each gender*sexual identity subgroup, we estimated multivariate logistic regression models of each outcome on predictor year, controlling for age, age squared, race/ethnicity, education, andpoverty level. These models were used to estimate AORs and their 95% CIs, reflecting the biennial incremental impact of year on smoking outcome likelihood between 2003 and 2013, within each gender*sexual identity domain.

We conducted an additional analysis stratified by gender only, to examine differences in time trends between sexual identity subgroups using an interaction term of sexual identity*year, as recommended by Lee and colleagues.[16]

Survey data analysis procedures were utilized in this study due to the complex multistage sample design of the CHIS. Analyses were conducted by incorporating the appropriate sampling weights to account for selection probabilities from the sampling design and to adjust for survey nonresponse. All analyses were conducted using SAS 9.3[17] with PROC SURVEYLOGISTIC for logistic regression and PROC SURVEYFREQ, PROC SURVEYREG, and PROC SURVEYMEANS for statistical calculation. The jackknife repeated replication method was used to obtain accurate standard errors of all estimates. We considered statistical significance as a two-tailed p-value < 0.05.

RESULTS

Between 2003 and 2013 in California, 3.1% of women identified as lesbian (1.3%) or bisexual (1.8%). Among men, 3.7% identified as gay (2.6%) or bisexual (1.1%). There were differences in the distribution of the sample over time between lesbian and heterosexual women, between bisexual women and heterosexual women, and between bisexual men and heterosexual men (Table 1), with larger proportions of lesbian and bisexual samples in more recent year than in earlier years.

Socioeconomic Characteristics

There were statistically significant differences in the distribution of sociodemographic characteristics between heterosexual and sexual minority women, as shown in Table 1. The racial/ethnic distribution of lesbians and of bisexual women differed from that of heterosexual women. Bisexual women were younger (32.8 years) than both heterosexual women (41.8 years) and lesbians (41.7 years). Heterosexual, lesbian, and bisexual women all had different profiles of education, with lesbians having the greatest percentage of women with a college degree or higher. There were also differences in poverty levels among the 3 sexual identity groups for women, with lesbians having the greatest percentage in the highest poverty level group.

Self-identified heterosexual, gay, and bisexual men also differed significantly across many sociodemographic characteristics (Table 1). Gay men differed by race/ethnicity from heterosexual men, with more gay men being NH White (54.8%) than heterosexual men (44.3%). Similar to women, bisexual men were younger (36.8 years) than both

heterosexual men (41.0 years) and gay men (40.6 years). Gay men differed from both heterosexual and bisexual men in terms of education. There were differences between all three sexual identity groups in terms of poverty levels.

Smoking Behavior

There were significant differences in smoking behavior by sexual identity after controlling for socioeconomic characteristics, as shown in Table 2. Among women, lesbian and bisexual women smoke at significantly higher rates than heterosexual women (20.2%, 23.6%,and 11.5% respectively), and are more than twice as likely to be current smokers (AOR=2.09 for lesbians, and 2.37 for bisexual women). While there were no significant differences in daily smoking rates, bisexual smokers were less likely (AOR=.67) to be light smokers than heterosexual smokers. Sexual minority women were almost twice as likely to be exposed to SHS at home (AOR=1.72) as heterosexual women.

Men showed similar differences in smoking behavior by sexual identity. Smoking prevalance among gay, bisexual, and heterosexual men was 20.9%, 26.6%, and 18.8% respectively. Gay and bisexual men were more likely to be current smokers than heterosexual men (AOR=1.46 and 1.56 respectively), and gay smokers were more likely to be daily smokers than heterosexuals (AOR=1.45). Bisexual male smokers were more likely to be light smokers than both heterosexual male smokers (AOR=1.67) and gay smokers. Sexual minority men were more than twice as likely to be exposed to SHS at home as heterosexual men (AOR=2.35).

Time Trends in Smoking Behavior

The prevalence of current smoking among bisexual women decreased significantly over the time period from 2003-2013, with adjusted odds falling an average of 16% during each 2-year period (Table 3). Heterosexual women smokers' light smoking odds increased over time, by an average of 13% every 2 years. Increasingly fewer heterosexual women were exposed to SHS at home, with adjusted odds falling an average of 19% every 2 years from 2003-2012

Among men, both heterosexual and bisexual men showed declining likelihood of current smoking, with rates of decline of 16% for bisexuals and 4% for heterosexuals every 2 years. The odds of daily smoking also declined by 5% every 2 years among heterosexual male smokers. All three sexual identity groups experienced increases in light smoking rates among smokers, ranging from 12% for heterosexual men, to 32% for gay men, to 61% for bisexual men over each 2-year period. All men showed a pattern of reduced SHS exposure at home over the 2003-2012 time period, with reductions averaging 11% for heterosexual men and 20% for sexual minority men each 2 years.

Our comparison of time trends between sexual identity groups (results not shown) found that current smoking is declining more rapidly for bisexual women and men compared to heterosexuals, and that light smoking is increasing more rapidly among bisexual male smokers compared to heterosexual male smokers.

DISCUSSION

Our findings are consistent with other studies that have reported higher rates of smoking in sexual minority groups than among heterosexuals.[1-11] We found that in California, not only do LGB men and women smoke at greater rates than heterosexuals, but there were also differences by sexual identity in daily smoking rates (for men) and light smoking rates among smokers (for men and women). Bisexual women smokers were less likely to be light smokers than heterosexuals, and gay smokers were more likely to be daily smokers while bisexual male smokers were more likely to be light smokers than heterosexual smokers. We also found that LGB men and women had greater rates of SHS exposure at home than heterosexuals.

Our estimates of smoking prevalence in the LGB community are lower than those of Cochran and colleagues,[18] who used the National Health and Nutrition Examination Survey (NHANES) data for 2003-2010 to examine smoking behaviors among LGB adults in the US. They reported current smoking prevalence for females of 21.8% for heterosexuals, 35.8% for lesbians, and 22.4% for bisexuals, compared to our findings of 11.5%, 20.2%, and 23.6% respectively. For males, they reported current smoking prevalence for males of 29.6% for heterosexuals, 28.9% for gays, and 36.6% for bisexuals, compared to our findings of 18.8%, 20.9%, and 26.6% respectively. The

difference likely results from several factors. Most importantly, overall smoking prevalence in California is lower than the US average. Our study includes 3 more recent years of data, and smoking prevalence has been falling over time. Finally, our sample of LGB adults is considerably larger than the NHANES sample. However, the relative patterns of smoking prevalence by gender and sexual orientation we find in California are similar to their findings for the US, with bisexual men and women having the highest current smoking rates and heterosexual men and women having the lowest rates.

A recent report issued by the California Department of Public Health (CDPH)[19] found that during 2005-2010, lesbian women's smoking prevalence was 1.5 times higher than that of heterosexual women (24.4% vs. 9.8%); we found the differential to be 0.8 times (20.17% vs. 11.46%). CDPH reported that gay men's smoking prevalence was more than 50% higher than for heterosexual men (25.8% vs. 16.0%); we found it to be 11% higher for gay men (20.86% vs. 18.75%). The differences are likely due to our analysis covering a more extended time period, including more recent years, and the use of a different survey – the California Adult Tobacco Survey – by the CDPH.

There is a paucity of information about the patterns of daily versus occasional smoking and intensity of smoking among LGB smokers. We found that bisexual women were less likely to be light smokers than heterosexual women, gay men were more likely to be daily smokers than heterosexual men, and bisexual men were more likely to be light smokers than both gay and heterosexual men. The differences in the pattern of smoking behavior among sexual minority men and women highlight the importance of of developing smoking cessation interventions that consider the differences within the LGB community, not just the differences between the LGB and heterosexual community.[20]

We found that current smoking prevalence has fallen during the last decade in the LGB population, specifically among bisexual men and women whose prevalence declined at rates significantly greater than that for heterosexuals. Light smoking has increased over time for gay and bisexual men but not among sexual minority women, and the rate of increase for bisexual men was greater than that for heterosexual men. We also found that SHS exposure at home has fallen for sexual minority men but not for sexual minority women.

We found that bisexual men and women had the greatest odds of being current smokers, consistent with other studies.[21] This group may be particularly vulnerable to stressors, such as poverty, violence, substance abuse, and mental health issues, even more so than lesbians and gay men.[22] Bisexuals may experience lack of acceptance from both the heterosexual community and the lesbian/gay community,[23] resulting in less willingness to be open, and thus less support. Our results add to the evidence that bisexuals may experience worse health outcomes than all other sexual orientation groups due to disproportionately higher smoking rates. Higher smoking and SHS exposure rates are particularly troubling, given that the LGB population has a number of other risk factors for negative health outcomes that may be compounded by tobacco exposure. For example, gay men have greater rates of HIV than heterosexual men, and smoking has been shown to lead to poorer clinical outcomes among those with HIV, including greater likelihood of detectable viral load.[24] HIV-positive smokers have been found to be at greater risk than HIV-positive nonsmokers for cardiovascular disease, HPV-associated cancers, lung cancer, tuberculosis, COPD, pneumonia, bone fractures, and other serious threats, both HIV-related and not.[25]

State-level tobacco environments as defined by cigarette prices, tobacco taxes, and tobacco control funding; tobacco control policies; and tobacco prevalence and norms; have been found to impact LGB smoking.[26] LGB men and women living in states with more restrictive tobacco environments (such as California) are less likely to have ever smoked, and in those states there are smaller sexual orientation disparities in smoking. Thus, even tobacco control policies that do not specifically target LGB smokers will be beneficial to this community.

Limitations

We acknowledge some limitations of our study. First, from 2005 through 2013 the CHIS question about sexual identity was only asked of respondents aged 18-70. Thus, our results cannot be generalized to those outside this age group. Second, despite combining multiple years of data, sample size for some of the analyses remained an issue. For example, we were forced to combine lesbian and bisexual women, and gay and bisexual men for analyses related to SHS exposure due to small samples. Third,

the CHIS does not include questions about SHS exposure in the workplace or other non-home settings. As a result, our analyses underestimate SHS exposure. Bars are part of the culture of the LGB community, and despite smokefree laws, bars remain a common place of exposure, but we were not able to assess this exposure in our study. Fourth, the CHIS collects information on cigarette smoking only and we were not able to analyze the use of other tobacco products, such as cigars, smokeless tobacco, or e-cigarettes.

Conclusions

Disparities in smoking and SHS exposure by sexual identity are evident in California. The LGB population is particularly vulnerable to the negative health impact of tobacco as a result of other health risk factors. While California has a strong tobacco control program, there remains a need to expand upon the few interventions and policies that have targeted the LGB community. Bisexual men and women are particularly at risk of smoking, and interventions need to consider the unique needs of this population compared to other sexual minorities.

Smoking prevalence and SHS exposure have fallen over the last decade among California adults, and the LGB community has benefitted from this reduction. Nonetheless, the LGB community continues to smoke at higher rates that merit the development of targeted tobacco control efforts.

References