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Cigarette smoking disparities among sexual minority cancer survivors

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ABSTRACT

Objective. Sexual minority (i.e., lesbian, gay, and bisexual) adults smoke cigarettes at higher rates than heterosexual adults. Smoking after receiving a cancer diagnosis is a major health concern, yet risk of continued smoking among sexual minority cancer survivors is as yet unknown. The current study examines current smoking among sexual minority vs. heterosexual adult cancer survivors.

Method. Data drawn from the 2010 Behavioral Risk Factor Surveillance System survey in five states (Alaska, California, Massachusetts, New Mexico, and Wisconsin) included items about sexual orientation, cancer diagnosis, and tobacco use. The analytic sample included 124 sexual minority and 248 propensity score matched heterosexual adult cancer survivors.

Results. Bivariate analysis showed that sexual minority cancer survivors had twice the odds of current smoking as their heterosexual counterparts (OR = 2.03, 95%CI:1.09–3.80). In exploratory analyses stratified by sex, sexual minority disparities in prevalence of smoking post-cancer showed a trend toward significance among females, not males.

Conclusion. The current study offers preliminary evidence that sexual minority status is one variable among many that must be taken into account when assessing health behaviors post-cancer diagnosis. Future research should identify mechanisms leading from sexual minority status to increased rates of smoking and develop tailored smoking cessation interventions.

Introduction

Although tobacco cessation is a focus of cancer prevention programs, efforts to curb smoking among those already diagnosed with cancer have lagged (Gandini et al., 2008; Bellizzi et al., 2005). Smoking after receiving a cancer diagnosis can lead to secondary cancers and poor cancer outcomes (Ostroff et al., 1995). Examination of factors that may increase a cancer survivor's likelihood of continuing to smoke post-cancer diagnosis could inform tobacco cessation intervention efforts. By identifying at-risk survivors, tobacco cessation programs can be tailored to unique sociodemographic groups.

Sexual minority adults (i.e., those who identify as lesbian, gay, or bisexual, or have sex with persons of the same sex) have higher rates of cigarette smoking than heterosexual adults (Lee et al., 2009; Blosnich et al., 2013), but the increased risk of continued smoking among sexual minority cancer survivors is undocumented (Tang et al., 2004; Boehmer et al., 2012).

This study examines rates of current smoking among sexual minority and heterosexual adult cancer survivors, matched on age, race, education, and employment status. We hypothesize that sexual minority adults will report higher lifetime and current rates of cigarette smoking, as well as more attempts to quit, than their heterosexual counterparts. We also report exploratory analyses stratified by sex.

Methods

Survey data

Data were drawn from the 2010 Behavioral Risk Factor Surveillance System (BRFSS), a national survey conducted by the Centers for Disease Control (http://www.cds.gov/brfss). Sexual orientation items were included at the discretion of each state, and five states provided data including assessment of sexual orientation and cancer survivorship: Alaska, California, Massachusetts, New Mexico, and Wisconsin. The sample from each state consisted of non-institutionalized adults, age

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18+, contacted via random-digit dialing. Details about BRFSS methodology are published elsewhere (Centers for Disease Control, 2012).

Variables

Demographics

We examined: gender (female/male), age, race/ethnicity (non-Hispanic white/Hispanic or non-white), education (greater than high school diploma/less than high school diploma), and employment status (unemployed/employed full or part time).

Sexual minority status

Sexual minority status was assessed with a single item with four response categories: "heterosexual/straight," "homosexual/gay/lesbian," "bisexual," or "other" (Blosnich et al., 2014). For the purpose of these analyses, we excluded individuals who indicated "other" sexual orientations ($n = 92$), categorized gay, lesbian, and bisexual respondents as sexual minorities, and assessed sexual minority men and sexual minority women separately.

Cancer survivorship status

Cancer survivorship status was assessed with a single item asking whether participants had ever been told by a health professional that they had cancer (no/yes).

Smoking variables

Lifetime history of smoking was assessed by asking participants whether during their lifetime they had ever smoked more than 100 cigarettes (no/yes). Current smoking was assessed by asking whether participants smoke every day, some days, or not at all (not at all/some or every day). Attempts to quit smoking were assessed by asking whether participants had tried to quit smoking in the past 12 months (no/yes).

Participants

The sample included those who reported sexual orientation and had been diagnosed with cancer, resulting in 124 sexual minority and 3918 heterosexual adult cancer survivors.

We matched controls from among the 3918 heterosexual cancer survivors to the sexual minority cancer survivors on a 2:1 basis by age, sex, race, education, employment status, and state of residence using propensity score modeling with nearest-neighbor matching (Kurth et al., 2006).

Statistical analysis

Following selection of propensity matched controls, we compared lifetime smoking, current smoking, and attempts to quit between sexual minority and heterosexual cancer survivors using chi-square analyses; from these same analyses we derived odds ratios and 95% confidence intervals. We then stratified by sex and conducted exploratory analyses examining smoking variables among sexual minority vs. heterosexual male cancer survivors, and among sexual minority vs. heterosexual female cancer survivors. The conservative Fisher's exact test was used in situations where cell sizes were smaller than 10. Analyses were conducted with R 2.12 PSMatch3 package and SPSS 20.0.

Results

Following propensity matching, there were no statistically significant differences in demographic characteristics between sexual minority survivors and heterosexual controls (Table 1).

Bivariate analysis of a lifetime history of smoking showed no significant difference between sexual minority and heterosexual cancer survivors (57.7% vs. 51.2%, respectively). Bivariate analysis of current smoking showed that a significantly greater proportion of sexual minority than heterosexual cancer survivors reported current smoking (17.2% vs. 10.7%, $p = 0.02$). Bivariate analysis of attempts to quit smoking in the last 12 months showed that a greater proportion of sexual minority than heterosexual cancer survivors who currently smoked reported trying to quit smoking (81.8% vs. 66.7%), though this difference was not statistically significant ($p = 0.20$). See Table 2.

Exploratory analyses stratified by sex showed trend-level results for females and not for males. There were no significant differences between sexual minority and heterosexual males or between sexual minority and heterosexual females in lifetime history of smoking. However, while there was no significant difference between sexual minority and heterosexual male cancer survivors in current smoking, sexual minority female cancer survivors showed a statistical trend toward higher rates of current smoking than heterosexual female cancer survivors (18.2% vs. 8.7%, respectively; $p = 0.06$). A higher proportion of both sexual minority male cancer survivors relative to heterosexual male survivors (90.0% vs. 69.2%, $p = 0.44$) and sexual minority female cancer survivors relative to heterosexual female survivors (75.0% vs. 63.6%, $p = 0.25$) reported trying to quit smoking in the past 12 months, though again these results did not reach statistical significance.

Discussion

The current study offers preliminary information about cigarette smoking among sexual minority cancer survivors. Results suggest that while lifetime history of smoking is high for all cancer survivors

Table 1
Demographic characteristics, drawn from the 2010 Behavioral Risk Factor Surveillance System survey ($N = 372$).

	Heterosexual ($n = 248$)	LGB ($n = 124$)	Heterosexual men ($n = 122$)	Gay/bi men ($n = 59$)	Heterosexual women ($n = 126$)	Lesbian/bi women ($n = 65$)
Age, mean (SD)	62.2 (12.2)	62.1 (12.7)	64.8 (10.6)	65.3 (11.2)	59.8 (13.2)	59.2 (13.5)
Range	27–87	27–90	32–85	42–90	27–87	27–87
White, *n* (%)	215 (86.7)	102 (82.3)	109 (89.3)	49 (83.1)	106 (84.1)	53 (81.5)
Education, *n* (%)						
>HS diploma	208 (83.9)	99 (79.8)	103 (84.4)	49 (83.1)	105 (83.3)	50 (76.9)
Employed, *n* (%)	105 (42.3)	50 (40.3)	46 (37.7)	20 (33.9)	59 (46.8)	30 (46.2)
State of residence, *n* (%)						
Alaska	6 (2.4)	2 (1.6)	3 (2.5)	1 (1.7)	3 (2.4)	1 (1.5)
California	39 (15.7)	19 (15.3)	20 (16.4)	8 (13.6)	19 (15.1)	11 (16.9)
Massachusetts	110 (44.4)	54 (43.5)	62 (50.8)	32 (54.2)	48 (38.1)	22 (33.8)
New Mexico	55 (22.2)	27 (21.8)	20 (16.4)	11 (18.6)	35 (27.8)	16 (24.6)
Wisconsin	38 (15.3)	22 (17.7)	17 (13.9)	7 (11.9)	21 (16.7)	15 (23.1)
Sex, *n* (%)						
Female	126 (50.8)	65 (52.4)				

Table 2
Odds ratios and 95% confidence intervals comparing sexual minority to heterosexual cancer survivors on smoking-related variables, drawn from the 2010 Behavioral Risk Factor Surveillance System survey ($N = 372$).

	Heterosexual ($n = 248$)	LGB ($n = 124$)	OR[a] (95% CI)
Ever smoked, n (%)	127 (51.2)	71 (57.7)	1.30 (0.84–2.01)
Currently smoke, n (%)	24 (9.7)	22 (17.9)	2.03 (1.09–3.80)
Tried to quit, n (%)	16 (66.7)	18 (81.8)	2.25 (0.57–8.91)
	Heterosexual men ($n = 122$)	Gay/bi men ($n = 59$)	OR[a] (95% CI)
Ever smoked, n (%)	70 (57.4)	38 (65.5)	1.41 (0.74–2.70)
Currently smoke, n (%)	13 (10.7)	10 (17.2)	1.75 (0.72–4.26)
Tried to quit, n (%)	9 (69.2)	9 (90.0)	4.00 (0.37–43.14)
	Heterosexual women ($n = 126$)	Lesbian/bi women ($n = 65$)	OR[a] (95% CI)
Ever smoked, n (%)	57 (45.2)	33 (50.8)	1.25 (0.69–2.27)
Currently smoke, n (%)	11 (8.7)	12 (18.2)	2.37 (0.99–5.71)
Tried to quit, n (%)	7 (63.6)	9 (75.0)	1.71 (0.29–10.30)

[a] Heterosexual survivors are the reference group.

(Gandini et al., 2008), disparities exist between heterosexual and sexual minority cancer survivors in continued smoking post-cancer diagnosis. This confirms previous research showing that risk behaviors observed more commonly among sexual minority than heterosexual adults may persist into cancer survivorship (Boehmer et al., 2011; Kamen et al., 2014) and adds to the burgeoning literature on the health of LGBT cancer survivors (Jabson et al., 2015). Given the high rates of smoking among sexual minority adults (King et al., 2012), it is perhaps unsurprising that rates remain high post-cancer diagnosis; however, the long-term health ramifications of this disparity are yet unknown.

The current study offers a first perspective on the importance of attending to differences between sexual minority males and females. Often these distinct groups are treated as a monolithic whole in examinations of sexual minority health disparities (Sell & Becker, 2001; Institute of Medicine, 2011). In this study, disparities in continued smoking post-cancer were significant at a trend level among sexual minority women but not among men, in contrast to previous research that found no difference in smoking rates between heterosexual and sexual minority women (Boehmer et al., 2012). There is some indication that smoking rates are higher among younger (under age 50) sexual minority women compared to their heterosexual counterparts (Gruskin et al., 2001). These results need to be replicated in a larger sample to inform tailored smoking cessation efforts.

Limitations of the current study include its cross sectional nature; as all data were collected in 2010, we can draw no conclusions about temporal or causal relations between variables assessed. The BRFSS also relies on self-report methodology, which could lead to recall bias. Reports of sexual minority status, in particular, can be biased in survey-based studies (Midanik et al., 2007). The BRFSS also uses single-item measures and did not assess type of cancer or age at cancer diagnosis. Future studies could use full, validated scales to assess variables and cancer status in a more nuanced fashion. The current study included data from only five states, thus limiting generalizability. Power was also limited by data available through the BRFSS; achieved power for analyses varied from 0.64 to 0.97. Larger, better-powered studies are needed.

Conclusion

Despite limitations, the current study provides an important perspective on disparities in smoking-related variables among sexual minority cancer survivors. Future research and interventions to address these disparities must take into account factors unique to sexual minority populations, such as minority stress (Meyer, 2003). Additionally, our data did not include information about transgender status. Transgender individuals may be particularly prone to health disparities, and federal health surveillance should include items to identify this vulnerable population (Agency for Healthcare Research and Quality, 2012). Finally, the current study emphasizes that health disparity research must begin to look for patterns of difference between lesbian women, gay men, and bisexual adults in order to develop tailored prevention programs.

Conflict of interest

Drs. Kamen, Blosnich, Lytle, Janelsins, Peppone, and Mustian declare that they have no conflicts of interest.

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