



Waterpipe tobacco smoking among sexual minorities in the United States: Evidence from the National Adult Tobacco Survey (2012–2014)



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HIGHLIGHTS

- We found that lesbian/gay and bisexual respondents reported higher prevalence of lifetime waterpipe smoking (WTS)
- Furthermore in gender-stratified models, we found that bisexual women reported the highest prevalence of lifetime WTS
- In assessing current WTS, lesbian/gay and bisexual respondents reported higher prevalence of WTS compared to their heterosexual counterparts
- Additionally, in gender-stratified models assessing current WTS, bisexual women reported the highest prevalence of current WTS followed by gay men.

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ABSTRACT

Objective: The current study examined differences in waterpipe smoking (both lifetime and current) comparing sexual minority populations - those identifying with lesbian, gay, or bisexual identity - to their heterosexual counterparts using a nationally representative dataset.

Methods: The current study used pooled data from the 2012–2013 & 2013–2014 National Adult Tobacco Survey (NATS). Log-Poisson multivariable regression models were deployed to determine the prevalence of waterpipe smoking behavior among sexual minority individuals controlling for sociodemographic characteristics and stratified by current gender status.

Results: In fully-adjusted models assessing lifetime WTS, lesbian/gay and bisexual respondents reported higher prevalence of WTS compared to their heterosexual counterparts. This trend held true in gender-stratified models among gay men [gay men: PR 1.25, 95%CI [1.06, 1.47] and women ([lesbians: PR 1.38, 95%CI [1.12, 1.69] and bisexual women: 1.69, 95%CI [1.45, 1.97]). In fully-adjusted models assessing current WTS, lesbian/gay and bisexual respondents reported higher risk of WTS compared to their heterosexual counterparts. This trend held true in gender-stratified models, only for among gay men [gay men: PR 1.56, 95%CI [1.18, 2.05] and bisexual women: 2.38, 95%CI [1.84, 3.09]).

Conclusions: Among the US general adult population, sexual minorities exhibited increased prevalence of current waterpipe smoking compared to their heterosexual counterparts. This pattern is also shaped by gender and variation of sexual orientation identification (e.g., lesbian/gay vs. bisexual). This warrants development of tailored interventions aimed at decreasing waterpipe smoking among sexual minority populations.

1. Introduction

Smoking is an important risk factor when assessing population-level health of sexual minority populations and health disparities within sexual minority populations (Blosnich, Jarrett, & Horn, 2011; Ortiz,

Duncan, Blosnich, Salloum, & Battle, 2015). Sexual minority typically refers to individuals whose sexual behavior (i.e., sexually engaged to those of the same-sex and/or gender), or identity (i.e., lesbian, gay, bisexual), or attraction (i.e., attracted to those of the same-sex and/or gender) differs from the majority of society and can include those who

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are transgender and/or genderqueer (Mayer et al., 2008). Several studies have established that sexual minority populations are at elevated risk of smoking compared to their heterosexual counterparts, which is exhibited throughout the life-course (Balsam, Beadnell, & Riggs, 2012; Corliss et al., 2013). Additionally, researchers have established differences in smoking patterns among sexual minority populations by gender; wherein for example, more recent research has established that sexual minority women are more likely to smoke compared to their sexual minority men counterparts (Emory et al., 2015; Gamarel et al., 2016; Operario et al., 2015).

Explanations for these disparities remain unclear, yet researchers have proposed several possible reasons, which include: persistent targeted marketing by the tobacco industry (Lee, Matthews, McCullen, & Melvin, 2014; Stevens, Carlson, & Hinman, 2004); pro-tobacco community norms (Offen, Smith, & Malone, 2008; Smith, Offen, & Malone, 2005); and discrimination (Blosnich & Horn, 2011) and stress (Lick, Durso, & Johnson, 2013). While rates of cigarette smoking are declining within the general population (Jamal et al., 2014; Jamal et al., 2015), rates of use of other types of tobacco products are on the rise. Studies assessing smoking disparities among sexual minority populations have focused largely on cigarette smoking and to a lesser extent have considered other forms of tobacco smoking (Blosnich, Lee, & Horn, 2013; Lee, Griffin, & Melvin, 2009). Despite the large evidence base supporting disparities in use of cigarettes based on sexual orientation, far less is known about other tobacco products such as waterpipe tobacco smoking (WTS; also known as hookah). An important gap in the literature is to determine if disparities extend to other tobacco products and whether the strong interaction between gender, sexual orientation and tobacco use also exist relative to WTS.

1.1. Waterpipe tobacco smoking (WTS)

WTS typically refers to tobacco consumed via methods in which smoke passes through water before it is inhaled and is most commonly referred to as hookah smoking in the US (Maziak, Ward, Afifi Soweid, & Eissenberg, 2004). WTS has potentially similar deleterious effects on lung health as cigarette smoking (Raad et al., 2011), as well potential to negatively impact cardiovascular health outcomes (Layoun et al., 2014) and pulmonary functioning like cigarette smoking (Sibai et al., 2014). Novel biomedical research has revealed that WTS may result in worse lung functioning as a result from longer sustained volumes of inhaled smoke during a WTS session exposing individuals to similar types of carcinogens and toxic heavy metals found in cigarette smoke (Akl et al., 2010). Along with WTS demonstrating similar health risks as cigarette use, (Bou Fakhreddine, Kanj, & Kanj, 2014) WTS has also been linked to nicotine dependence (Cobb, Ward, Maziak, Shihadeh, & Eissenberg, 2010). Although evidence highlights the negative health effects of WTS, the general perception of WTS is that it is less harmful than cigarettes (Rezk-Hanna, Macabasco-O'Connell, & Woo, 2014).

Researchers have been concerned with the uptake of WTS in the U.S. One area of concern has centered on assessing WTS behaviors in terms of social desirability and acceptance; wherein researchers have emphasized WTS' relationship to social rituals and the uptake in social settings such as clubs (Carroll et al., 2014; Kassem et al., 2014). Connections between social settings facilitating greater uptake of WTS in the general population, might even raise further concern for sexual minority populations. Tobacco disparities scholars, who focus on sexual minority populations, have written extensively about the long socio-historical relationship between targeted tobacco advertisements and social venues frequented by sexual minorities (Lee et al., 2009).

1.2. Sexual minorities & WTS smoking prevalence

Recent results from the National Adult Tobacco Survey (NATS) have revealed that sexual minority populations demonstrate a higher

prevalence of WTS (Agaku, King, & Dube, 2014; King, Dube, & Tynan, 2012). For example, King et al.'s study (2012) highlighted that LGBT respondents revealed a significantly higher prevalence (6.1%) of current WTS than their heterosexual counterparts (1.5%). Using NATS data, Salloum et al. (2015) also showed that 21% of LGBT respondents had *lifetime* WTS, compared to 9.8% of heterosexual respondents, translating into statistically higher odds of *lifetime* WTS. A limitation with this study is that it grouped all sexual minorities together, wherein health scientists studying sexual minority populations have identified the need to separate lesbian/gay populations from their bisexual counterparts (Institute of Medicine, 2011).

Bisexual populations have exhibited very differing patterns of health outcomes and behaviors than their lesbian/gay counterparts. Specifically in relation to smoking behaviors, studies have established that bisexual populations are more likely to smoke compared to their lesbian/gay counterparts (Fredriksen-Goldsen, Kim, Barkan, Muraco, & Hoy-Ellis, 2013; Gamarel et al., 2016). However previous studies have yet to capture: 1) whether higher WTS prevalence rates among sexual minority populations translates into higher prevalence profiles among sexual minority subpopulations in multivariate modeling (e.g., lesbian/gays separated from their bisexual counterparts) compared to their heterosexual counterparts; 2) if such prevalence profiles varies based upon *current* or *lifetime* WTS; 3) if these prevalence profiles differ by gender; and lastly, 4) how cigarette smoking status impacts WTS behaviors.

1.3. Study purpose, goals & hypotheses

With the increase in hookah bars nationally, and the well-established connections between smoking, bars, and sexual minorities (Matthews et al., 2014; Matthews, Hotton, DuBois, Fingerhut, & Kuhns, 2011) there might exist similar relationships between WTS and smoking among sexual minorities (Kates et al., 2016).

To fill this important gap in the literature, we used data from a nationally representative sample of US-based adults to evaluate whether sexual minority subpopulations are at higher risk of current WTS compared to their heterosexual counterparts, stratifying based on gender. We aimed to explore these differences taking into consideration current smoking status and sociodemographic characteristics. Based on past research, we hypothesized that sexual minority adults will exhibit higher prevalence of WTS compared to their heterosexual counterparts, and this relationship will vary by both gender and sexual orientation. Specifically, we hypothesized that bisexuals exhibit higher prevalence of WTS compared to both their heterosexual and lesbian/gay counterparts. Additionally, we expected this relationship to be even more exacerbated when comparing bisexual women to lesbian and heterosexually-identified women.

2. Methods

2.1. Sample

As population health scientists have acknowledged (Institute of Medicine, 2011), obtaining large enough samples of sexual minority populations within nationally representative datasets can be challenging. One approach has been to pool data across several waves of cross-sectional data, which is the approach we have taken considering the relatively small number of sexual minorities in one wave of the NATS. Thus, this allowed us to create a large enough sample size to produce confidence in our results. We pooled two waves of data from the NATS (2012–2013 and 2013–2014). NATS is a stratified, national landline and cellular telephone survey of non-institutionalized US adults aged ≥ 18 years residing in all 50 U.S. states and the District of Columbia. Respondent selection varied by phone type. Both survey administration questionnaires were comprised of a series of questions pertaining to general health, cigarette smoking, other tobacco use and

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