Title: Smoking prevalence among lesbian, bisexual and queer women in Sydney remains high: analysis of trends and correlates

Running title: Smoking prevalence among LBQ women remains high

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Abstract:
Introduction and Aims: To investigate smoking prevalence trends and correlates among lesbian, bisexual and queer-identifying (LBQ) women in Sydney, Australia.
Design and Methods – Data from 5007 respondents to a repeated cross-sectional community survey were used to examine smoking trends between 2004 and 2014. Multinomial logistic regression was used to examine smoking correlates.

Results – 30% of respondents were current smokers including 48% of 16-24 year olds. A slight decrease in all-ages smoking over time was not reflected in the youngest age group. LBQ women who smoke have fewer economic, social and psychological resources than both women who never smoke and ex-smokers. High levels of alcohol and illicit drug use are also correlated with current smoking.
Discussion and conclusions – Population-wide interventions have failed to address the persistently high prevalence of smoking among this sample of LBQ women. Tailored interventions may find utility focusing on personal resilience to deal with general and sexuality-specific stressors, as well as attending to poly-substance use. Acknowledgment of LBQ women as a priority group for tobacco reduction is urgently needed. We call on tobacco control agencies to consider sexuality and gender orientation in policy and partner with LGBT community organisations to develop culturally appropriate interventions.

Keywords: smoking, lesbian, bisexual, queer, women

Introduction

Since 1999, successive National Tobacco Strategies have used legislation on tobacco advertising, promotion, labelling, taxation and restriction on smoking in public places to reduce the rate of smoking in the Australian population. As a result of these strong measures, Australia is a tobacco control success story. The smoking rate among the general population (aged 14 years and over) nearly halved from 29% in 1991 to 16% in 2013.[1]

However, smoking remains a major public health focus in Australia, as the “single most preventable cause of ill health and death” (pg62).[2] The National Tobacco Strategy 2012-2018 committed to reduce the national adult daily smoking rate to 10% by 2018,[3] with priority areas identified to support this ambitious target. This recognised that population-wide strategies needed to be supplemented by targeted approaches if they were to reach groups where levels of smoking appeared intransigent, including people with a lower socio-economic status, people with mental illness, prisoners, Aboriginal and Torres Strait Islanders, and people living in rural and remote areas.

One population group with persistently high smoking rates, but unmentioned in the 2012-2018 Strategy, are people who identify as lesbian, gay, bisexual or transgender (LGBT).[4, 5] The 2013 Australian population-based National Drug Strategy Household Survey (NDSHS) found 30% of

homosexual and bisexual women and men were current smokers[1] compared to 15% of heterosexual people. Australian community surveys provide similar evidence. The 2012 Private Lives survey of LGBT people reported 26% were current smokers.[6] A recent study of men who have sex with men found 40% were current smokers (G. Prestage, unpublished data, August 2015), while a 2012 survey of 13-24 year old young people found 50% used tobacco.[7] These high rates are reflected internationally[4, 8-11].

The disparity in smoking between heterosexual and non-heterosexual women is especially stark. A re-analysis of 2013 NDSHS data by sexual identity and gender[12] showed 24% of lesbian, gay or bisexual women were current smokers compared to 11% of heterosexual women. In 2003 the Australian Longitudinal Study of Women's Health (ALSWH) reported 25% of 22-27 year old heterosexual women smoked compared to 46% of lesbian and bisexual women.[13] A recent national online survey of 521 women reported smoking rates of 67% among queer/pansexual women, 44% among bisexual women and 44% among lesbians (R. McNair, unpublished data, August 2015). Community surveys in New South Wales (NSW) and Western Australia (WA) have reported that a third or more of community-engaged lesbian, bisexual or queer (LBQ) women smoke.[14-17] (The adoption of the term 'queer' is not uncommon in Australia, North America or Europe. This reflects a desire for more inclusive, open and unstable sexuality and gender categories.) A recent Queensland study found 49% of 13-24 year old LBQ women reported smoking[7]. These rates are echoed by studies in the US and Canada [18-20] and contrast to smoking among Australian women which is at an all-time low of 13% across all ages and 17% among 18-24 year old women[21]. Despite overwhelming evidence of persistent disparities in smoking rates there has been little research to explain this health inequity and no Australian tobacco control policy has acknowledged sexual minority women as a priority group for attention.

Reasons for the disparity between heterosexual and LGBT people are complex. A systematic review found stress, depression, alcohol use and victimisation were experienced at higher rates, and internalised homophobia and reactions to disclosure of sexual orientation, unique to LGBT people could be explaining factors.[8] Unfortunately this review did not attend to gender differences. One US analysis of sexual minority women smokers found correlates of smoking included lack of health insurance, frequent attendance at LGBT bars or clubs and fewer perceived deterrents to smoking.[20] A recent qualitative study reported smoking was a way for young sexual minority women to deal with stressors faced by young people in general, as well as sexuality-related stressors[22]. It has also been

widely reported that smoking is an ingrained part of LGBT culture.[22, 23] In summary, the international literature suggests that while smoking among LBQ women may have similar correlates as the general population, there are some unique correlates.

The authors run SWASH (formerly the Sydney Women and Sexual Health survey), a Sydney-based cross-sectional survey of LBQ women's health initiated in 1996 and run every two years since. The survey covers a wide range of general health and wellbeing topics including, since 2004, questions on smoking behaviour. While the survey has consistently reported high levels of smoking,[15] this comprehensive dataset has never been systematically analysed for changes in smoking over time overall and in young women, nor the correlates of smoking.

Methods

Sampling and participants

Recruitment takes place during the Sydney Gay and Lesbian Mardi Gras season (February). Up to 1000 women complete the survey each season, using a modified version of the Time-Location convenience sampling used for Australian HIV behavioural surveillance[24] and often employed for hidden populations that cluster in locations. Researchers work closely with ACON Health (NSW's leading health promotion organisation specialising in HIV prevention and support, and LGBT health) to maximise recruitment and diversity. The primary recruitment site is Fair Day – a highly significant community and family open-air free daytime event with entertainment, stalls and food attended by up to 80,000 people [see figure 1]. Other recruitment sites included community organisations, sporting groups, Mardi Gras-season club nights and other events aimed at LBQ women. Excepting 2008 where all recruitment was at Fair Day, the proportion recruited at other events varied between 28 and 52% between 2006 and 2014. Attending women aged 16 years and over are invited to self-complete the SWASH questionnaire. Recruitment takes place in public spaces and entertainment venues, so women who wish to avoid completing the questionnaire can easily do so although recruiters report that few women explicitly refuse a verbal offer to contribute. Ethical approval was provided by the University of Sydney (2012/2610), University of NSW (HREC 09/025), and ACON Health; participants received no compensation. Full methods are detailed in the 2014 report.[15]

Insert Figure 1 here.

Participants who self-reported heterosexual identity (709) were dropped from the dataset, as were those not reporting smoking status (241), giving a sample size of 5,077 for survey years 2004, 2006, 2008, 2010, 2012 and 2014 (Dataset 1). This was analysed for trends in smoking rates among LBQ women over the decade to enable comparison to the general population. For the analysis of correlates of smoking, data for 2010, 2012 and 2014 were combined into Dataset 2. We chose more than one year to maximise sample size, but restricted analysis to three iterations due to unreliability of recall of participation earlier than 2010, and possible changes in population characteristics over a longer time period. Participants in the 2012 and 2014 iterations were asked whether they had completed earlier surveys, and those who had (n=241) were deleted as were those with missing data for the variables of interest (n=479), giving a sample size of 2,044.

Analysis variables

Smoking status was determined by asking "Do you currently smoke cigarettes or other tobacco? (daily, more than weekly, less than weekly, ex-smoker, never smoked/less than 100 in lifetime" [1], and was retained as a three-level variable (current, never and ex-smoker). Variables correlated with smoking status were identified from the literature and matched to corresponding SWASH variables. The measures chosen were: age, sexual identity (lesbian/gay, bisexual, or queer/other – approximately 5% of participants identified as "other"), highest education achieved (dichotomised to <undergraduate degree level vs degree plus), annual income before tax (dichotomised to <$60,000 vs $60,000 plus), attendance at an LGBT dance party, bar or venue/night in the last 6 months (Fair Day is not in this category), regular (2+ times in the last 6 months) binge-drinking (more than 5+ standard drinks on a single occasion[25], asked as how often do you drink 5 or more drinks on a single occasion), any illicit drug use in the last 6 months (participants were asked how often they had used a comprehensive list of illicit drugs in the last 6 months), experience of any anti-LGBT harassment in the last 12 months, high/medium versus low levels of current (last four weeks) psychological distress measured by the Kessler 6 scale [26, 27] (a validated 6-point screening scale for measuring non-specific psychological distress, cutoff scores were low=0-7 and medium/high=8-14), ever diagnosed with a mental health disorder by a health professional, and LGBT community connection (we asked if participants felt connected to a LGBTQ community in their everyday life; dichotomised to very or mostly vs somewhat, rarely or never).

Analysis

Descriptive statistics were used to analyse smoking status among all ages and those aged 16-24 years for 2004-2014 using Dataset 1. Descriptive statistics were used to assess the association between smoking status and identified potential correlates in Dataset 2. Variables associated with smoking status at $p \leq 0.1$ in univariate analysis were entered into a backward stepwise multinomial logistic regression (MLR) model, with survey year retained as an a priori control variable. Covariates that did not maintain significance at $p \leq 0.05$ with smoking status when other factors were held constant were removed to derive the final model. All data analyses were carried out using SPSS version 22 (copyright IBM Corporation, Armonk, NY, USA).

Results

Smoking status 2004-2014

Figure 2 presents smoking status by survey year for all ages, and for those aged 16-24 years, using dataset 1. Approximately 1/5 of women surveyed each iteration were aged 16-24 (n=234, 22% in 2014). Examining all ages, the proportion of current smokers varied from 36% in 2004 to 30% in 2014. The proportion who had never smoked varied between 32% in 2006 and 43% in 2014. There is a modest but statistically significant (χ^2 test, $p<0.001$) downward trend in smoking for all ages. Among 16-24 year old women there were consistently higher levels of current smoking, ranging between 45% and 51%, but the variation was not statistically significant (χ^2 test, $p=0.467$).

Insert Figure 2 here.

Correlates of smoking

Examining dataset 2 (Table 2), over one-third of women (34%) reported they were current smokers, 25% were ex-smokers and 41% had never smoked. At the univariate level, smoking status was associated with age, sexuality, income, education, attendance at an LGBT event, regular binge-drinking, illicit drug use, anti-LGBT harassment, psychological distress and diagnosis with a mental health disorder. However, LGBT community connectedness was not associated. Variables correlated with smoking status at the univariate level and survey year were entered into a MLR model. In

developing the final model, current psychological distress was no longer significantly associated with smoking status.

Insert Table 1 here.

Compared to women who never smoked, current smokers were less likely to identify as queer/other than as lesbian, were less educated and earned less. Current smokers were also more likely to report regular binge drinking, illicit drug use, anti-LGBT harassment and to have received a mental health diagnosis than non-smokers.

Insert Table 2 here.

Compared to ex-smokers, current smokers were younger, less educated, earned less, were more likely to have attended an LGBT event and to report illicit drug use.

Discussion

Analysis of cross-sectional survey data from 2004-2014 revealed a consistently high rate of smoking (30%) among LBQ women connected to the Sydney LGBT community. This compares to 13% of women in the general Australian population (2013).[1] Our findings echo persistent and convincing evidence that LBQ women in Australia smoke at significantly higher levels [1, 7, 12, 16, 17, 28, 29] than their heterosexual peers[1] as reflected internationally.[18-20]

That we did find a slight reduction over time is heartening. However, our analysis revealed no reduction in high smoking rates among 16-24 year old LBQ women. Despite intensive public health interventions these women are initiating smoking at similar rates (48%) to a decade ago. This is in stark contrast to the general population: smoking among 16-24 year old NSW women has dropped from 24% in 2004 to 16% in 2014.[30] The National Tobacco Strategy 2012-2018 recognises some groups have a higher prevalence of smoking and that targeted approaches are needed.[3] Significant efforts have been made to develop new or refine existing interventions, for example for Aboriginal and Torres Strait Island communities. Our findings demonstrate that LBQ women need similar attention.

We conducted the first Australian analyses of the correlates of smoking among LBQ women connected to the Sydney LGBT community to provide a better understanding of what produces and supports persistent high rates of smoking prevalence. Many findings supported previous international research. LBQ women smokers were more likely to have lower education attainment and a lower income than women who had never smoked. The same correlates were relevant when looking at current smokers compared to those who had ceased. These correlates have been reported before in LBQ women and the general population.[31, 32] Echoing previous research associating smoking with depression and victimisation, [8, 32] we also found LBQ women smokers were more likely to have had a past mental health diagnosis and recent experiences of anti-LGBT harassment. Although significantly associated with smoking at univariate level, we found that current psychological distress was also age-associated (younger women being more distressed) and in multivariate analysis smoking and distress were no longer associated. We note that nearly half (42%; Table 1) reported medium or high current psychological distress, higher than women in the general Australian population (13% report high or very high psychological distress as per the Kessler-10 psychological distress scale, equivalent to the Kessler-6 medium/high category used here [33]). Previous research show that some sexual minority women see smoking as a way to deal with general and sexuality-related stressors.[22, 34] Our analysis suggests that those who take up and those who continue smoking have fewer economic, social and psychological resources than women who never smoke. Future interventions may find utility focusing on personal resilience to deal with general and sexuality-specific stressors, ensuring that imagery and messaging don't alienate target audiences by using stereotypes,[35] and attending to accessibility issues. A recent systematic review of LGBT smoking cessations interventions found culturally-tailored programs produced high quit rates.[35]

We did not find an association between bisexual identity and smoking as found elsewhere (e.g.[19]). This may be because we have not targeted a representative sample of bisexual women. We also note that this study did not control for age, although bisexual women were younger as in our sample.

Alcohol and illicit drug use are interrelated risk factors for and correlates of smoking in LBQ women.[10, 32] A plethora of research shows the consumption of illicit drugs and alcohol among LGBT people is higher than their heterosexual peers.[1, 10, 15-17, 36] That is, while drug and alcohol use may be a recognised correlate of smoking for the general population, higher rates of use among LBQ women means the burden may be higher. Poly-substance use among LBQ women also raises a question about the utility of single focus interventions (i.e. only addressing smoking).

Our analyses also produced new insights about the correlates of smoking among LBQ women connected to the Sydney LGBT community. Women who never smoked or who no longer smoke were least likely to report recent attendance at LGBT bars and clubs; this echoes previous research [8, 20, 37]. However, a sense of LGBT community connection was not a correlate, suggesting the mode of engaging with community is important rather than the mere fact of engaging (although in this highly connected sample there may be a ceiling effect). We draw attention to this distinction between connection and mode of engagement as some studies have used attendance as a measure of community involvement.[20] Indeed one study found that a sense of community connection was associated with a reduced likelihood of smoking; that is, community connection – through the social support it offers – may be protective.[37] Further research should explore how different mode of engaging – bars, sporting groups, community groups, activist groups, friendship groups - support or do not support smoking, and develop interventions accordingly.

That attendance at LGBT bars and clubs was a correlate of smoking among our sample, despite significant efforts to restrict smoking in entertainment venues in Australia demonstrates a significant failure of population-wide interventions. Several international studies have demonstrated similar failures of laws restricting tobacco use in venues; smoking remained an important part of LGBT socialising. [22, 23] A synergy between substance use and attendance at LGBT bars and clubs suggests a particular pattern of engaging with community or of performing identity.[22, 37, 38] Tailored interventions need to articulate a nuanced understanding of cultures, communities and identities.[39] Interventions that engage directly with the meaning of smoking in LGBT culture and venue-based socialising, as one social-branding program in the US did [40] or disrupting its place as a marker of identity, may be more salient.[41] Our findings also suggest value in developing ways for younger LBQ women to connect with peers without smoking as an aid to connection. An example of this is ACON Health's recent Smoke Free Still Fierce campaign (http://www.acon.org.au/who-we-are-here-for/women/smoke-free-still-fierce-project/).

Age was not a significant variable when comparing smokers and non-smokers. This indicates these proportions are similar across age groups, with younger women being more likely than older women both to smoke and be never-smokers (and less likely to be ex-smokers). The association between age and decreasing likelihood of current smoking lends support to the importance of smoking for identity formation and a means to engage with community; as women age the importance of smoking may

reduce as patterns in socialising change, connections to community strengthen, or networks solidify. Further research into smoking among older LBQ women and intersections with ways of socialising is needed.

Limitations

We surveyed a sample of women attached to the Sydney LGBT communities; our findings are not generalizable to all LBQ women in Australia. However, this is the most populous city in Australia with a long history of LGBT community organisation and we believe our findings are still relevant to smoking cessation issues within other LGBT communities. The SWASH survey was not designed with the intention of conducting smoking specific analyses, thus there may be unexamined cofounders of smoking status such as incidence of smoking-related illness. The cross-sectional survey methods may not adequately sample the population each iteration. However, our respondent characteristics such as age and socio-economic markers have remained constant over many survey iterations.[15]

Conclusion

Despite continued evidence of persistently high prevalence of smoking among LBQ women in Australia, this group is not recognised as a priority group. In our sample, in demonstrating younger LBQ women connected to the Sydney LGBT community continue to smoke at alarming rates, our findings demonstrate that population-wide interventions have failed to address this issue. Tackling the intransigence in LBQ women's smoking rates requires both policy acknowledgment and prioritisation of LBQ women. Our analyses add to the literature attempting to understand what produces and supports smoking in this population group. We call on tobacco control agencies to consider sexuality and gender orientation in policy and partner with LGBT community organisations to develop culturally appropriate interventions to support smoking cessation among LBQ women and prevent smoking uptake in the next generation.

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Table 1: Characteristics of SWASH survey participants by smoking status (combined data for years 2010-2014)

	Current smoker n (%)	**Never smoked n (%)**	**Ex-smoker n (%)**	**Total n (%)**	**χ^2 (p)**
Survey year					
2010	268 (36)	274 (37)	193 (26)	735	
2012	194 (35)	241 (43)	122 (22)	557	
2014	241 (32)	321 (43)	190 (25)	752	
All years	703 (34)	836 (41)	505 (25)	2044	8.439 (0.077)
Age, years					
Mean (standard deviation)	30	33	37	33	F(2,2041)=55.8
Range (years)	17-63	16-70	18-81	16-81	75, **p<0.001**[1]
Sexual identity					
Lesbian	477 (33)	597 (41)	376 (26)	1450	
Bisexual	130 (43)	114 (38)	56 (19)	300	
Queer/other	96 (33)	125 (42)	73 (25)	294	**14.317 (0.006)**
Highest education					
Below university degree	402 (43)	313 (33)	218 (23)	933	
University degree or higher	301 (27)	523 (47)	287 (26)	1111	**61.656 (<0.001)**
Annual income (before tax)					
<$60,000	496 (40)	470 (38)	260 (21)	1226	
$60,000 +	207 (25)	366 (45)	245 (30)	818	**52.856 (<0.001)**
Attended LGBT party/bar last 6 months					
Yes	587 (38)	608 (39)	343 (22)	1538	
No	116 (23)	228 (45)	162 (32)	506	**43.102 (<0.001)**
Binge-drinking[2] last 6 months					
Never/1-2 times	245 (25)	475 (49)	250 (26)	970	**75.034 (<0.001)**
More than twice	458 (43)	361 (34)	255 (24)	1074	

Illicit drug use last 6 months					
No	204 (21)	510 (52)	267 (27)	981	**162.926**
Yes	499 (47)	326 (31)	238 (22)	1063	**(<0.001)**
Experienced anti-LGBT harassment last 12 months					
No	417 (31)	597 (44)	350 (26)	1364	**27.164 (<0.001)**
Yes	286 (42)	239 (35)	155 (23)	680	
Current psychological distress[3]	444 (31)	617 (43)	368 (26)	1429	**23.368 (<0.001)**
Low distress	259 (42)	219 (36)	137 (22)	615	
Medium/high distress					
Ever received a mental health diagnosis					
No	320 (30)	495 (46)	254 (24)	1069	**29.772 (<0.001)**
Yes	383 (39)	341 (35)	251 (26)	975	
Feel connected to a LGBT community					
Very/mostly	370 (36)	415 (40)	240 (23)	1025	3.210 (0.201)
Somewhat/rarely/never	333 (33)	421 (41)	265 (26)	1019	

[1]ANOVA test

[2]5 or more standard alcoholic drinks on one occasion[25]

[3]Assessed using the Kessler 6 screening scale[26]

Table 2: Multinomial logistic regression models for correlates of smoking status among SWASH survey participants (combined data for years 2010-2014)

	Current smoker v Never smoked				**Current smoker vs Ex-smoker**			
	Univariate		Multivariate		Univariate		Multivariate	
	OR (95% CI)	p	AOR (95% CI)	p	OR (95% CI)	p	AOR (95% CI)	p
Age (per year)	0.97 (0.96, 0.98)	**<0.001**	1.00 (0.99, 1.02)	0.474	0.94 (0.93, 0.95)	**<0.001**	0.96 (0.95, 0.98)	**<0.001**
Sexual identity								
Lesbian	1 (ref)	-	1 (ref)	-	1 (ref)	-	1 (ref)	-
Bisexual	1.42 (1.08, 1.89)	**0.012**	1.12 (0.82, 1.52)	0.479	1.83 (1.30, 2.57)	**0.001**	1.34 (0.93, 1.93)	0.112
Queer/other	0.96 (0.72, 1.29)	0.791	0.68 (0.49, 0.93)	**0.018**	1.04 (0.74, 1.45)	0.832	0.74 (0.52, 1.05)	0.092
Highest education level below degree	2.23 (1.82, 2.74)	**<0.001**	2.01 (1.60, 2.52)	**<0.001**	1.76 (1.40, 2.21)	**<0.001**	1.37 (1.06, 1.76)	**0.015**
Annual income under $60,000 (before tax)	1.87 (1.51, 2.31)	**<0.001**	1.37 (1.07, 1.7)	**0.013**	2.26 (1.78, 2.87)	**<0.001**	1.48 (1.13, 1.94)	**0.004**
Attended LGBT	1.90 (1.48,	**<0.00**	1.27 (0.96,	0.093	2.39 (1.82,	**<0.0**	1.66 (1.23,	**0.00**

bar/party last 6 months	2.44)	**1**	1.68)		3.14)	**01**	2.24)	**1**
Binge-drinking 2+ times last 6 months	2.46 (2.00, 3.02)	**<0.001**	1.82 (1.45, 2.29)	**<0.001**	1.83 (1.45, 2.31)	**<0.001**	1.16 (0.89, 1.50)	0.263
Illicit drug use last 6 months	3.83 (3.09, 4.74)	**<0.001**	3.04 (2.40, 3.84)	**<0.001**	2.74 (2.16, 3.48)	**<0.001**	1.97 (1.51, 2.56)	**<0.001**
Current medium/high psychological distress	1.64 (1.32, 2.04)	**<0.001**	-	-	1.57 (1.22, 2.01)	**<0.001**	-	-
Experienced anti-LGBT harassment last 12 months	1.71 (1.38, 2.12)	**<0.001**	1.29 (1.02, 1.63)	**0.032**	1.55 (1.22, 1.97)	**<0.001**	1.17 (0.90, 1.52)	0.245
Ever received mental health diagnosis	1.74 (1.42, 2.13)	**<0.001**	1.54 (1.23, 1.91)	**<0.001**	1.21 (0.96, 1.52)	0.101	1.08 (0.85, 1.38)	0.522

Figure 1: Scene shot at Sydney Gay and Lesbian Mardi Gras Fair Day, February 2015. Credit: Michelle Ring, ACON Here for Women

Figure 2: Smoking status among LBQ women across 6 iterations of the SWASH survey, comparing the proportion of respondents who are current smokers, ex smokers and have never smoked among all ages and among ages 16-24 years.