

Sexual orientation identity in relation to smoking history and alcohol use at age 18/19: cross-sectional associations from the Longitudinal Study of Young People in England (LSYPE)

Gareth Hagger-Johnson,^{1,2,3} Rafik Taibjee,^{3,4} Joanna Semlyen,⁵ Isla Fitchie,⁶ Julie Fish,⁷ Catherine Meads,⁸ Justin Varney^{3,9}

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For numbered affiliations see end of article.

Correspondence to

Dr Gareth Hagger-Johnson; g.hagger-johnson@ucl.ac.uk

ABSTRACT

Objectives: Information about the health behaviours of minority groups is essential for addressing health inequalities. We evaluated the association among lesbian, gay or bisexual (LGB) sexual orientation identity and smoking and alcohol use in young people in England.

Design: Data drawn from wave 6 of the Longitudinal Study of Young People in England (LSYPE).

Setting: Self-completion questionnaires during home visits, face-to-face interviews and web-based questionnaires.

Participants: Data from 7698 participants (3762 men) with information on sexual orientation identity and health behaviours at age 18/19.

Outcome measures: Cigarette smoking history, alcohol drinking frequency and risky single occasion drinking (RSOD).

Results: LGB identity was reported by 3.1% of participants (55 gay, 33 lesbian, 35 bisexual male, 111 bisexual female), 3.5% when adjusting for the survey design. Adjusting for a range of covariates, identification as lesbian/gay was found to be associated with smoking (OR=2.23, 95% CI 1.42 to 3.51), alcohol drinking >2 days/week (OR=1.99, 95% CI 1.25 to 3.17) and RSOD (OR=1.80, 95% CI 1.13 to 2.86) more than weekly. Bisexual identity was associated with smoking history (OR=1.84, 95% CI 1.30 to 2.61) but not alcohol drinking >2 days/week (OR=1.20, 95% CI 0.79 to 1.81) or RSOD (OR=1.04, 95% CI 0.71 to 2.86).

Conclusions: In a sample of more than 7600 young people aged 18/19 years in England, lesbian/gay identity is associated with cigarette smoking, drinking alcohol frequency and RSOD. Bisexual identity is associated with smoking but not RSOD or frequent alcohol drinking.

INTRODUCTION

Knowledge about the health behaviours of sexual minority groups is necessary for monitoring health inequalities, developing public health policies, allocating resources and targeting high risk groups for interventions.^{1 2} It is

ARTICLE SUMMARY

Article focus

- Studies, mainly from the USA, have found an association between lesbian, gay or bisexual (LGB) sexual orientation and cigarette smoking.
- Previous results for alcohol use are mixed, therefore the association should be evaluated.

Key messages

- LGB orientation identity is associated with higher rates of smoking history in a population sample of English 18/19-year-olds, compared with heterosexual or 'straight' identity.
- Lesbian or gay (compared with heterosexual) identity is associated with increased risk of drinking alcohol more than twice per week and risky single occasion drinking (RSOD).
- Bisexual (compared to heterosexual) identity is associated with smoking but not alcohol drinking frequently or RSOD.
- Recording sexual orientation is necessary for describing health inequalities and among young people, there is a very low refusal rate (0.1%).

Strengths and limitations of this study

- This cohort is among the first in the UK to record sexual orientation identity.
- Smoking history was available but not current smoking status at age 18/19 years.
- Data on the quantity of alcohol typically consumed was not available.
- Numbers of LGB participants were small, which could be addressed by a large prospective cohort study of LGB people.

estimated that between 1.5%³ and 5%⁴ of the UK population are lesbian, gay or bisexual (LGB). Estimates can vary, depending on whether identity, sexual behaviour and/or same-sex attraction are used to define sexual orientation.^{3 5 6} Additionally, estimates can vary by age and ethnic group.³ Relatively few

research studies include a measure of sexual orientation identity, particularly in the UK. As a result, the evidence based on health inequalities experienced by LGB people is very sparse. Exceptions include the National Attitudes of Sexual Attitudes and Lifestyles (NATSAL; 1990–1991, 1999–2001, 2010–2012), National Statistics Opinions Survey (in 2008–2009), ONS Integrated Household Survey (from 2009), the LSYPE (from 2009), Health Survey for England (from 2010) and the Scottish Health Survey (from 2008).

Cigarette smoking is a prevalent behaviour among young people.⁷ Many studies have shown an association between LGB orientation and cigarette smoking,^{8–13} mostly in the USA but also in Mexico¹⁴ and the UK.¹⁵ The association is usually found in men and women and in different age groups, particularly in young LGB people.^{8 14} Occasionally, the association is found to be stronger in women.¹⁵ Some studies used sexual orientation identity as a measure of sexual orientation, some used same-sex attraction and some used multiple measures.¹¹

Alcohol use is also common among young people, but evidence supporting an association between LGB identity and alcohol use is mixed,¹⁶ with evidence for possible effect modification by sex. A systematic review found increased risk of alcohol dependence in LGB men and women and an association between lesbian and bisexual (LB) identity and alcohol misuse in women only.¹⁷ A pooled analysis of data from 14 countries found greater alcohol intake and more risky single occasion drinking (RSOD) in lesbian women but not gay men, compared with heterosexuals.¹⁶ Studies reporting an association between gay/bisexual male (hereafter, GB men) identity and heavier alcohol use are fewer. One study found an association specifically in relation to GB men under 50.¹⁸ There is evidence of a higher prevalence of heavy and potentially hazardous alcohol use among GB men recruited from recreational spaces, gay pride events and web surveys.¹⁹

Several studies have found an association among lesbian/bisexual women (hereafter, LB women) compared with heterosexual women for greater alcohol intake,^{6 20 21} alcohol dependence^{17 22} and RSOD.^{15 23} One study found increased risk of alcohol use among LB women and ‘mostly heterosexual’ males, but not gay males.²⁴ Similar patterns have been observed among adolescents during the transition period to early adulthood,^{24–26} among University students,²⁷ in midlife, across the adult age range,^{15 18 23} when using behavioural definitions of sexual orientation⁶ and in different countries including Mexico¹⁴ and the UK.^{6 15 23 28}

The aim of our study was to estimate the association between LGB orientation identity and cigarette smoking history, frequency of drinking alcohol more than twice per week and RSOD, in young people (age 18/19) in England.

METHODS

The Longitudinal Study of Young People in England (LSYPE) is a prospective cohort study of English school

pupils with repeated annual follow-ups.²⁹ At recruitment in 2004, participants (N=15 770) were typically aged 13/14 years. The cohort was created to evaluate the transitions made by young people from secondary and tertiary education into adulthood. Pupils and parents were invited to participate by letter, using databases of schools to identify potential participants. Schools were defined as socio-economically deprived if they fell within the lowest quintile of schools ranked according to the proportion of pupils in receipt of school meals. Socioeconomically deprived schools were over-sampled by a factor 1.5 and ethnic minorities to achieve N=1000 per ethnic group. Annual home interview visits incorporated a computer-assisted self-completion element, including questions about smoking (most recently in 2006, typical age 15/16), alcohol consumption and sexual orientation identity (both in 2009, age 18/19). In 2009, participants were offered a home visit (face-to-face interview and computer-assisted self-completion questionnaire), telephone interview or web questionnaire.

Sexual orientation identity

Sexual orientation identity was measured in 2009 with the question, ‘Which of the following best describes how you think of yourself?’ for the web questionnaire (N=2690, 40.4%), and for the home visit (N=848, 12.7%) and telephone interview (N=3118, 46.8%), ‘I will now read out a list of terms people sometimes use to describe how they think of themselves: Heterosexual or straight; LGB, Other. As I read the list again please say “yes” when you hear the option that best describes how you think of yourself’. These response options are recommended by the Office of National Statistics.³ The refusal rate for this question was 0.1%, and 0.3% reported ‘Other’.

Cigarette smoking

Cigarette smoking was last measured in 2006 (typical age 15/16 years) with the question, ‘Do you ever smoke cigarettes at all?’ followed by six response options (I have never smoked, I have only ever tried smoking once, I used to smoke sometimes but I never smoke a cigarette now, I sometimes smoke cigarettes now but I don’t smoke as many as one a week, I usually smoke between one and six cigarettes a week, I usually smoke more than six cigarettes a week). These were grouped into smoker (sometimes or weekly smoking) versus non-smoker.

Weekly alcohol drinking

Alcohol drinking was measured in 2009 with the question, ‘Thinking about the last 12 months, about how often did you usually have an alcoholic drink?’ with seven response options (Almost every day, Five or six days a week, Three or four days a week, Once or twice a week, Once or twice a month, Once every couple of months, Once or twice a year). Responses were grouped

into 'more than twice per week' versus 'less than twice per week'.

Risky single occasion drinking

Participants were asked, 'On those days when you did have an alcoholic drink, how often would you say you got drunk?' followed by six response options (Every time, Most times, Around half the time, Less than half the time, Rarely, Never). This information was combined with alcohol drinking frequency to identify participants who reported drunkenness more than 52 times per year, broadly equivalent to drinking alcohol to intoxication more than once per week.

Demographic covariates

Age and sex were recorded at baseline in 2004. Pupils self-reported their ethnic group and responses were grouped into five categories: White, Mixed, Indian/Pakistani/Bangladeshi, Black Caribbean/Black African, Chinese; grouped into 'ethnic minority' (1) or white (0). The maximum of either parent's educational attainment was recorded on a six-point scale ranging from 'no qualification' (0) to 'degree or equivalent' (6). Occupational social class was recorded on an eight-point scale ranging from 'never worked or long term unemployed' (1) to 'higher managerial and professional occupations' (8), for one or both parents. Parental education attainment and occupational class are both considered indicators of parental SES.

Statistical analysis

For descriptive analyses, χ^2 tests were used to identify significant differences for gay/bisexual versus heterosexual participants for each study variable. Logistic regression was used to identify whether the mode of survey administration (home visit, telephone interview or web questionnaire) influenced reporting of LGB identity. For the main analysis, logistic regression was used to calculate ORs that summarised the relative risk of cigarette smoking, weekly alcohol drinking and hazardous alcohol drinking among

weekly alcohol drinkers, according to sexual orientation identity (gay vs heterosexual and bisexual vs heterosexual). We minimally adjusted the ORs for age and sex, and then additionally adjusted the estimates for ethnic minority status, parental education and social class. Ethnicity and SES are possible confounding factors because they may be associated both with sexual identity and with health behaviours. We also combined gay/lesbian and bisexual into a single 'LGB' category for additional analysis. Sample weights were used to obtain correct SEs, allowing for over-sampling of schools with low SES and for ethnic minority pupils at recruitment. Although statistical power for evaluating possible effect modification by gender and SES was low, previous studies have shown sex differences (particularly for alcohol use). We, therefore, ran separate models for males and females in supplementary analyses. In sensitivity analysis, we additionally controlled for mode of survey administration, to evaluate whether this influenced the results. All analyses were performed with Stata V.12.1.

RESULTS

The analytic sample comprised 7698 participants with data on sexual orientation identity, smoking history and alcohol use in addition to covariates (home visit=12.2%, telephone interview=47.6%, web questionnaire=40.1%). Compared with the recruitment sample and adjusting for the study design, the analytic sample contained slightly fewer men (49.4% vs 53.9%, $p<0.001$), fewer ethnic minorities (9.9% vs 14.9%, $p<0.001$), fewer participants whose parents had less than secondary school level educational qualifications (17.0% vs 29.2%, $p<0.001$) and fewer participants with parents who were unemployed or had routine occupations (8.1% vs 15.5%, $p<0.001$).

Unweighted descriptive statistics for study variables are shown in table 1. A total of 3% were classified as LGB (55 gay men, 33 lesbian women, 34 bisexual men, 108 bisexual women, 3229 heterosexual men, 3197 heterosexual women). There were fewer women (37.5%) in the 'LG' category than men, but more women (76.0%) in the 'bisexual' category than men. When using sample

Table 1 Descriptive statistics for study variables (unweighted), according to sexual orientation identity in 2009, N(%)

Study variables (N=7698)*	Lesbian or gay (n=88, 1.1%)	Bisexual (n=146, 1.9%)	Heterosexual (n=7464, 97.0%)	p Value†	p Value‡	p Value§
Female	33 (37.5)	111 (76.0)	3792 (50.8)	0.001	0.014	<0.001
Ethnic minority¶	12 (13.6)	12 (8.2)	2112 (28.3)	<0.001	0.003	<0.001
Parental education (less than secondary)	13 (14.8)	26 (17.8)	1715 (23.0)	0.02	0.07	0.14
Parental occupation (routine or unemployed)	10 (11.4)	18 (12.3)	900 (12.1)	0.97	0.84	0.92
History of cigarette smoking (age 15/16)	35 (39.8)	60 (41.1)	1649 (22.1)	<0.001	<0.001	<0.001
Alcohol drinking >2 days/week (age 18/19)	33 (37.5)	38 (26.0)	1467 (19.7)	<0.001	<0.001	0.057
Risky single occasion drinking (age 18/19)	40 (45.5)	48 (32.9)	1985 (26.6)	<0.001	<0.001	0.090

*Analytic sample (N=7698) comprises participants with available data on age, sex, ethnic group, parental education, occupational social class, smoking history and alcohol use.

†p Value for lesbian/gay/bisexual versus heterosexual.

‡p Value for gay/lesbian versus heterosexual.

§p Bisexual versus heterosexual.

¶Unweighted frequency (ethnic minority groups were over-sampled).

Table 2 Association between sexual orientation identity and smoking, alcohol drinking >2 days/week and risky single occasion drinking (RSOD)

N=7698	History of cigarette smoking vs non-smoker		Alcohol drinking >2 days/week vs ≤2 days/week or never		>Weekly RSOD vs ≤weekly	
	Minimally adjusted†	Fully adjusted‡	Minimally adjusted†	Fully adjusted‡	Minimally adjusted†	Fully adjusted‡
Model 1						
Lesbian or gay (vs heterosexual)	2.34*** (1.50, 3.65)	2.23** (1.42, 3.51)	1.99*** (1.29, 3.09)	1.99** (1.25, 3.17)	1.82*** (1.16, 2.84)	1.80* (1.13, 2.86)
Bisexual (vs heterosexual)	1.94*** (1.37, 2.75)	1.84** (1.30, 2.61)	1.26 (0.84, 1.89)	1.20 (0.79, 1.81)	1.11 (0.76, 1.61)	1.04 (0.71, 2.86)
Model 2						
Lesbian, gay or bisexual (vs heterosexual)	2.08*** (1.57, 2.76)	1.98*** (1.49, 2.63)	1.53*** (1.15, 2.03)	1.48* (1.10, 1.99)	1.35* (1.01, 1.79)	1.29 (0.96, 1.74)

Values shown are ORs (95% CIs).

***p<0.001, **p<0.01, *p<0.05.

Analytic sample comprises participants with available data on age, sex, ethnic group, parental education and occupational social class, smoking and alcohol use. Sample weights are applied.

†Adjusted for age and sex.

‡Adjusted for age, sex, ethnic minority status, parental educational attainment, parental occupational social class.

weights to correct for over-sampling of ethnic minority groups and schools with higher socioeconomic deprivation; however, the proportion of participants classified as LGB was 3.5% (1.3% LG, 2.2% bisexual).

Compared to the web survey, participants completing the telephone interview were more likely to report heterosexual than LGB identity (OR=1.55, 95% CI 1.16 to 2.06). There were no significant differences in reporting heterosexual identity between the home visit and the web survey (OR=1.16, 95% CI 0.77 to 1.73), although this test may be under-powered (there were 33 LGB participants for face-to-face interviews, 86 for telephone interviews and 115 for web questionnaires).

Results from the logistic regression analyses are shown in table 2, minimally adjusted for age and sex and then after further adjustments for ethnic minority status, parental educational attainment and occupational social class (parental SES). Sample weights were used in the models to correct for over-sampling of ethnic minority groups and socioeconomically deprived schools at recruitment.

Lesbian or gay participants were more than twice as likely to have a history of cigarette smoking, and bisexual participants nearly twice as likely to have smoked, compared to heterosexual participants. Adjustment for ethnic minority status and parental SES did not change these results materially. Similar results were found when combining participants into LGB versus heterosexual.

Participants who identified themselves as lesbian or gay were nearly twice as likely to drink alcohol more than twice a week, even after adjustment for several covariates, compared with heterosexuals. There was no association between bisexual identity and drinking alcohol more than twice a week. When combining LGB participants together, the association was weaker but remained significant, in both minimally and fully adjusted models.

Lesbian or gay participants were approximately 1.8 times more likely to report RSOD more than weekly, compared to heterosexuals. This association was only slightly weaker in the fully adjusted model. There was no association between bisexual identity and RSOD. The combined LGB category was associated with this measure only in the minimally adjusted model.

In supplementary analyses separating males and females, the pattern of results for smoking history was very similar for both genders (see online supplementary table S1), although it was weaker for bisexual males. For alcohol drinking greater than twice per week however, the association was stronger in males than in females. The size of the association was similar for gay men and lesbian women, although CIs were wider for lesbian women. No association was apparent for bisexual men, although there was a non-significant trend towards increased risk for bisexual women. For RSOD, the association was stronger and significant in males but a weaker non-significant trend was suggested for females. Bisexual males appeared to be at decreased risk of RSOD compared with heterosexuals, but this was not significant. These supplementary results should be interpreted with caution, given the small

numbers of participants involved. The study may be under-powered to examine how sex modifies the association between sexual orientation and health behaviours.

DISCUSSION

In a community-dwelling sample of more than 7600 young adults in England, men and women reporting a LGB identity were around twice as likely to have a history of cigarette smoking than those reporting a heterosexual identity at age 18/19 years. Lesbian and gay participants were nearly twice as likely to report drinking alcohol more than twice per week, and more likely to report RSOD more often than weekly. Bisexual participants were no more likely to report RSOD than heterosexuals.

Strengths of the study include the large sample which was representative of an entire school year in England at recruitment, typically from the birth years 1990/1991. Data from the UK on sexual orientation identity are exceptionally rare, particularly for young cohorts.^{6 22} Adjusting for the sample design, 3.5% of this cohort identified as LGB at age 18/19 years. The refusal rate for the sexual orientation identity question was low, particularly in the web survey, and differences in how this question was administered were not found to influence results materially. Several major cohort studies in the USA have included questions on sexual orientation identity in recent years.^{10 18} In the UK however, data on health inequalities in LGB identified adults have historically come from cross-sectional surveys recruited using snowball sampling,²³ gay pride events and internet surveys,¹⁹ which do not address issues of representativeness fully, even when a heterosexual control group is available. Recruitment from recreational spaces, particularly before the smoking ban, may have introduced bias into earlier studies. The long-demonstrated association between LGB orientation and smoking¹¹⁻¹³ appears to have persisted, even in this young cohort.

A clear limitation of our study was that smoking status was last assessed in 2006 (age 15/16), 2 years before sexual orientation was last recorded. Participants may have changed their sexual orientation identity²⁷ or smoking status between 2006 and 2009, and so the data cannot establish an association between LGB identity and current smoking. Smoking is not known to influence sexual orientation identity, making reverse causation unlikely. It is worth noting however, that young people who begin smoking tend to continue into adulthood³⁰ and two-thirds of smokers begin before age 18,⁷ suggesting that many participants with a smoking history will have continued to smoke. A second limitation is that statistical power may not have been available to detect smaller associations, owing to the relatively small proportion of participants in sexual minority groups, particularly for supplementary analyses of men and women separately. Larger sample size would allow more detailed comparisons to be made, such as LG versus bisexual participants. A third limitation was that aspects of sexual

orientation other than identity (eg, attraction and behaviour) were not available. Finally, the percentage of participants identifying as LGB may have been underestimated, particularly if this had not been disclosed to parents, who might have been in the home during telephone and home interviews. Although the refusal rate for the question was low, some participants who identify as LGB might have responded 'heterosexual' for this and other reasons, which might include socially desirable responding. This would lead to misclassification bias, leading us to have underestimated the size of any associations found. Results were similar when additionally controlling for mode of survey administration (home visit, telephone, web survey), mitigating concerns that the results are driven by the method of data collection. Results do not generalise to young people who adopt an LGB identity after age 18/19 years.

Although our finding that LGB orientation is associated with smoking history is largely consistent with other studies,^{11–13} the results concerning drinking alcohol to intoxication differ from prior reports. In several USA studies, the association between LGB identity and hazardous alcohol use tends to be stronger among LB women,^{16 17 24} and in a systematic review, LB identity in women was associated with alcohol dependence and heavy alcohol consumption (>14 units/week) but not GB identity in men.¹⁷ It is important to emphasise however, that our study measured alcohol drinking frequency and frequency of drinking to intoxication, not dependence or misuse. Studies from the USA involving younger cohorts have found similar associations to our own, between LGB identity and alcohol use.^{20 27 31–33} The extent to which gender modifies this association is not known however, and larger samples of LGB people will be needed for more detailed analyses.^{24 34}

Our results show that LG (but not bisexual) identity among English young people, is associated with more frequent and riskier single occasion drinking. Environmental differences between the UK and USA could influence the behaviours of adults who identify as LGB. Such influences might include the age of consent, legal drinking age, laws concerning discrimination, availability of social support and recreational spaces for socialising. A study of students with same-sex sexual experiences found that greater LGB resources were associated with less smoking in women but increased risk of binge drinking in men.³⁵ Future international comparisons are necessary, and a pooled meta-analysis of individual participant data (MIPD) would be very valuable.

It is important to identify the underlying mechanisms that connect LGB identity to health behaviours. There is apparently no evidence for genetic covariance between sexual orientation identity and health behaviours, and we suggest that sexual orientation itself is unlikely to cause smoking and alcohol use. Several possible mechanisms have been proposed, which require further investigation. The concept of 'minority stress' is often invoked to explain how heterosexism and homophobia are internalised,²²

perhaps leading people to self-medicated psychological distress with cigarettes or alcohol. A recent review found support for this theory, particularly in explaining associations with victimisation and substance use.³⁶ Alternatively, LGB young people may socialise or have socialised in recreational spaces where cigarettes and alcohol are easily available, where peer norms encourage engagement in these behaviours²⁷ or to appear older than their actual age. Concern with appearance could motivate smoking as a weight management strategy. Smoking may be sexually arousing for some individuals and subcultures, particularly when seen to signify masculinity.³⁷ Other commentators have noted the role of the tobacco industry in targeting LGB smokers.³⁸ Early adoption of unhealthy behaviours among LGB young people may increase risk of chronic disease in later life.^{39 40} Longitudinal repeated measures data will be necessary to identify the antecedents and consequences of unhealthy behaviours for LGB young people in the UK, across the life course. In our view, there is a clear need for a large prospective cohort study of LGB people in the UK, with repeated measures of health behaviours and health outcomes. This may require a heterosexual control group.

Despite recent equality and diversity legislation and the inclusion of sexual orientation in the National Health Service (NHS) Equality Delivery System, sexual orientation identity is rarely monitored by NHS organisations or measured in epidemiological studies. To improve the evidence base, support international comparisons and allocate public resources appropriately, data about sexual orientation should be collected routinely.^{1 2} Questions about sexual orientation can be adopted at low cost and have relatively low refusal rates, particularly among young people. Wider measurement of sexual orientation will ultimately help reduce health inequalities.

Author affiliations

¹MRC Centre of Epidemiology for Child Health, University College London, London, UK

²Department of Epidemiology and Public Health, University College London, London, UK

³Gay and Lesbian Association of Doctors and Dentists (GLADD), London, UK

⁴Merton Medical Practice, London, UK

⁵Department of Psychology, London Metropolitan University, London, UK

⁶Department of Psychology, University of Cambridge, Cambridge, UK

⁷Department of Social Work, De Montfort University, Leicester, UK

⁸Health Economics Research Group, Brunel University, London, UK

⁹NHS Barking & Dagenham/London Borough of Barking and Dagenham, London, UK

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