Correlates and subgroups of injecting drug use in UK gay and bisexual men: findings from the 2014 Gay Men's Sex Survey

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Abstract

Background. Evidence to understand which gay and bisexual men (GBM) inject drugs remains scant, especially in the UK. We describe correlates of last-year injecting in UK GBM, and characterise subgroups of GBM who inject drugs by types of drugs used.

Methods. Using data from the 2014 Gay Men's Sex Survey, an opportunistic internet-based survey conducted of GBM living in the UK, we examined via logistic regression correlates with any injecting of six drugs (amphetamine/speed, crystal methamphetamine, heroin, mephedrone, GHB/GBL, and ketamine) in the last year. We estimated latent class models to understand underlying subgroups of injecting drug use among GBM reporting injecting drug use in the last year.

Results. Injecting was most common in GBM who were of middle age, who were HIV seropositive, and who lived in London, and was significantly associated with sexual risk with multiple partners in the last year, whether steady or non-steady. Most GBM who engaged in injecting either injected crystal methamphetamine, mephedrone or both (class 1, chemsex, 88.6% of injectors), whereas a smaller group had a focus on opiates (class 2, opiate, 7.9%). A small but identifiable subgroup (class 3, eclectic, 3.5%) engaged in injecting across the range of drugs examined.

Conclusions. This is the first epidemiological analysis to describe subgroups of injecting, and to describe correlates of injecting drug use, in UK GBM. Implications for design of harm reduction services include a need to focus on injecting drug use beyond opiates, currently the focus of most harm reduction services.

Keywords. injecting drug use; gay and bisexual men; latent class analysis; observational epidemiology

1. Introduction

While drug use in gay and bisexual men (GBM) is consistently higher than in the general population (Lea et al., 2013; Melendez-Torres et al., 2016a), injecting drug use by gay and bisexual men (GBM) remains sparsely documented and poorly understood in the UK (Public Health England, 2016). This is despite increasing media attention from 2013 onwards (Kirby and Thornber-Dunwell, 2013; Shaw, 2017). Recent evidence from Australian GBM indicates a prevalence of drug injecting of 4.7% in the last six months, with lifetime prevalence of 10.6% (Bui et al., 2018), but epidemiological description of injecting drugs among UK GBM remains scant. While previous surveys document low levels of injection drug use among GBM in Europe (The EMIS Network, 2013), the emergence of 'chemsex', or the sexualised use of crystal methamphetamine, GHB, mephedrone and ketamine (Bourne et al., 2015a), has sparked concern about the current extent of injection drug use in this population. Injecting use of chemsex drugs may be a particularly salient feature of high-risk sexual practices, given the use of these drugs to enhance sexual performance and increase the number of partners in a coital session (Bourne et al., 2015b), and we have previously described the relationship between chemsex drug use before sex and sexual risk at the level of the sexual encounter (Melendez-Torres et al., 2016b). Major cross-sectional surveys of drug use by GBM have not been able to recruit enough GBM who inject drugs for comparison (Sewell et al., 2017). Data from the Unlinked and Anonymous Monitoring survey of people who inject drugs compared GBM and non-GBM among men who inject drugs and found that GBM were more likely to have recently begun injecting and to engage in high-risk sexual practices; however, this survey was unable to describe patterns within GBM who inject drugs (Glass et al., 2017). Not all injecting drug use may be related to sex, and different profiles of injecting drug use may exist among GBM. We present an observational epidemiological study based on cross-sectional survey data from a large number of GBM across the UK in which we

describe demographic and socio-sexual correlates of drug injecting and characterise subgroups of GBM injectors by types of drugs used.

2. Methods

We used data from the Gay Men's Sex Survey, a convenience sample survey of GBM living in the UK, and the longest-running community-based survey of GBM in the UK. GBM were recruited to an internet-based survey in late summer 2014 via dating websites, Facebook adverts and geosocial networking apps. Because of the recruitment methods used, a response rate is not available. We included in this analysis GBM over the age of 16 who identified as gay, bisexual or with another non-heterosexual identity; that is, men who described being sexually attracted to men.

2.1. Correlates with last-year injecting

Because injecting was relatively rare in this sample, we examined any injecting in the last year of any of six drugs (amphetamine/speed, crystal methamphetamine, heroin, mephedrone, GHB/GBL, and ketamine) as our binary dependent variable. We tested a set of bivariate logistic regression models, with independent variables including age group, region of residence, academic qualifications, full-time employment, HIV testing history, gay identity (defined as 'gay' or 'bisexual and other non-heterosexual'), and number of steady and non-steady partners and condom-unprotected anal intercourse (cUAI) in the last year. For both steady and non-steady partners, we constructed variables relating to both the quantity of partners and the sexual risk behaviours associated with each of those partnerships. This led to a four-category variable for non-steady partners: respondents reported one or more non-steady partners, but with no cUAI in any of those partnerships; respondents reported one non-steady partner with no cUAI in that partnership; respondents reported one non-steady partner with cUAI in that partnership; and respondents reported two or more non-steady partners with cUAI in two or more partnerships. Of note is that respondents could report both steady and

non-steady partners in the last year. We constructed a similar variable for steady partners. Independent variables were chosen on the basis of our prior work in understanding drug use patterns in GBM (Melendez-Torres et al., 2016a), and account for both demographic characteristics and behavioural risk factors. We then included significant predictors in a multivariable model. Because of the sparseness of our outcome, we confirmed the robustness of the multivariable analysis using a logistic regression model with penalised likelihood estimation, which was developed for use with rare outcomes. A significance level of $p<0.05$ was used in all analyses.

2.2. Latent class models

We then estimated latent class models to examine potential subgroups of GBM who inject drugs by type of drug injected in the last year. We estimated models using full information maximum likelihood and weakly informative data-driven prior distributions to stabilise estimation. We tested these models with a successive number of classes, starting with two classes, until we reached an optimal solution on scaled relative entropy (roughly equivalent to R^2 in a linear regression). We then interpreted the latent classes by examining the conditional probabilities of injecting different drugs within each class (i.e. how likely those in each latent class were to have injected each of the six drugs). All models were implemented in Stata v 14 (Statacorp, College Station, TX).

3. Results

Of the 16,464 GBM in our sample, 303 (1.81%) reported injecting in the last year. An additional 176 GBM (1.05%) reported ever injecting, but more than 12 months ago. In total, 16,288 GBM (97.14%) report never injecting drugs. More than half of the sample (52.97%) was between the ages of 30 and 59, and nearly a quarter (24.10%) of the sample was from the London integrated region. More than two-third (67.20%) reported that their last HIV test was negative (see Table 1).

3.1. Correlates with last-year injecting

Based on bivariate regressions, GBM between the ages of 30 and 59 were most likely to have injected drugs and those between the ages of 16 and 19 were least likely to inject (see Table 1). GBM reporting injecting drug use were more likely to live in London than other regions of the UK. Compared to GBM who last tested negative for HIV, GBM who tested positive were more likely to have injected, and GBM who had never received a test result were less likely to have injected. GBM who did identified as gay were more likely to have injected than those who did not. Neither education nor full-time employment was significantly associated with last-year injecting.

Sexual history in the last year was associated with last-year injecting. Compared to GBM who had one or more steady partners but had not engaged in cUAI, GBM with no steady partners or one or more steady partners with cUAI were more likely to have injected in the last year. Associations with non-steady partners showed a similar trend but GBM with non-steady partners and no cUAI were no more or less likely to inject than those with no non-steady partners.

Multivariable models presented a similar picture, though sexual identity was no longer a significant correlate of last-year injecting and not all UK regions were significantly different from London in last-year injecting. Multivariable model results were similar with penalised quasi-likelihood estimation.

3.2. Latent class models

We tested a two-class, three-class and four-class solution and chose a three-class solution (see Table 2) because it had the optimal balance between fit to the data and complexity based on relative squared entropy.

The first class, *chemsex injecting drug use*, was defined by use of mostly crystal methamphetamine and mephedrone, as these were the two highest conditional probabilities in

the class. That is, this class was composed mostly of GBM who inject drugs who used either or both of these drugs but little use of other drugs. Use of ketamine in this class was about the same in the sample of GBM who inject drugs as a whole. In contrast, use of heroin was almost non-existent in this class. This class composed 88.6% of GBM reporting last-year injecting drug use.

The second class, *opiate injecting drug use*, was characterised by low probabilities across all drugs, though heroin was most injected in this class and notably crystal methamphetamine, mephedrone and ketamine injecting were much rarer in this class than in the sample of GBM who inject drugs as a whole. This class composed 7.9% of GBM reporting last-year injecting drug use.

Finally, the third class, *eclectic injecting drug use*, was characterised by high injecting across all drugs, but most notably across amphetamine, crystal methamphetamine, mephedrone and ketamine. That is, this class was composed of GBM most of whom injected all four of these drugs in the last year. GHB injecting was also more than eight times as likely in this class as in the sample of GBM who inject drugs as a whole. Only 3.5% of GBM reporting last-year injecting drug use belonged to this class.

4. Discussion

This is the first epidemiological analysis describing subgroups of injectors among GBM living in the UK, and the first to describe correlates of injecting drug use in UK GBM. We were able to describe subgroups within the sample of GBM reporting injecting drugs in the last year. Most GBM who engaged in injecting either injected crystal methamphetamine, mephedrone or both, whereas a smaller group described engaging in generic injecting practices with a focus on opiates. A small but identifiable subgroup engaged in injecting across the range of drugs examined. As compared to the most recent evidence in injecting drug use on GBM in Australia (Bui et al., 2018), our study showed lower prevalence of

injecting (1.81% in the last year in this analysis vs 4.7% in the last six months in their study) and no relationship between employment and injecting drug use. While we did not find a significant relationship in bivariate models, they found that unemployment was predictive of higher prevalence of injecting drug use. Like their study, we found that injecting drug use was positively associated with middle age, known HIV seropositive status and more sexual partners in the recent past. Moreover, as compared to estimates of population prevalence of injecting in the United Kingdom at 3.0 per 1,000 population (European Monitoring Centre for Drugs and Drug Addiction, 2017), our study showed a much higher prevalence.

A key implication for design of harm reduction services is that the vast majority of GBM who reported injecting drug use were injecting drugs associated with chemsex, and not opiates, for whom most harm reduction services in the UK are designed (Bourne et al., 2015a). Harm reduction services for a variety of injecting behaviours, that is to say, for chemsex drugs in which injecting use is generally related to sexual behaviour and not just for opiates, should be available to all GBM. In addition, it is important to understand the small but potentially very high-risk group of GBM who reported eclectic injecting drug use (class 3), though our data do not permit an understanding of safe injecting practices and contexts.

4.1. Limitations

We drew on a community-based sample of GBM known to be at higher sexual risk (Dodds et al., 2006; Prah et al., 2016). Because data collection was internet-based, we under-represent GBM with less structured access to internet services. In addition, we only asked about injection of six different types of drugs. The cross-sectional nature of our data mean that temporality (and thus causality) cannot be established between correlates and drug use. Future research should seek to understand correlates of membership in different types of injection drug use to better inform intervention targeting.

4.2. Conclusions

Evidence to support an informed response to injecting drug use in GBM remains scant. However, these analyses provide preliminary epidemiologic intelligence to support service design and provision to minimise the harms accruing from injecting drug use among gay men and other GBM.

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Table 1. Correlates with last-year injecting in GBM. *p<0.05, **p<0.01, ***p<0.001

Variable	Distribution in the analysis sample (%)	n/N (%) reporting last year injecting	OR (95% CI)	adjusted OR (95% CI)
Age range				
16-19	7.50	3/1,254 (0.24)	0.23* (0.07, 0.72)	0.42 (0.13, 1.36)
20-29	35.23	62/5,887 (1.05)	Ref	Ref
30-59	52.97	229/8,685 (2.64)	2.54*** (1.92, 3.38)	1.56** (1.13, 2.16)
60+	5.30	9/885 (1.02)	0.97 (0.48, 1.95)	0.98 (0.47, 2.06)
Highest qualification				
No secondary qualifications, O-levels, GCSE	17.66	43/2,903 (1.48)	Ref	
A-levels	33.76	91/5,550 (1.64)	1.11 (0.77, 1.60)	
University degree	48.59	156/7,988 (1.95)	1.32 (0.94, 1.86)	
Employment				
Employed full-time	58.74	177/9,733 (1.82)	Ref	
Not employed full-time	41.26	117/6,838 (1.71)	0.94 (0.74, 1.19)	
Where respondent lives				
London integrated region and centre	24.10	128/3,950 (3.24)	Ref	Ref
North of England	23.67	51/3,880 (1.31)	0.40*** (0.29, 0.55)	0.65* (0.45, 0.93)
Midlands and East of England	21.14	50/3,465 (1.44)	0.44*** (0.31, 0.61)	0.71 (0.49, 1.03)
South of England	22.32	47/3,658 (1.28)	0.39*** (0.28, 0.54)	0.50*** (0.34, 0.73)
Devolved nations	8.77	21/1,438 (1.46)	0.44*** (0.28, 0.70)	0.69 (0.41, 1.17)
HIV testing history				
Last test negative	67.20	123/11,233 (1.09)	Ref	Ref
Never received a test result	23.98	14/4,009 (0.35)	0.32*** (0.18, 0.55)	0.68 (0.38, 1.20)
Test positive	8.82	166/1,474 (11.26)	11.46*** (9.02, 11.57)	5.54*** (4.18, 7.36)
Sexual identity				
Gay	84.41	272/13,991 (1.94)	Ref	Ref
Other	15.59	25/2,585 (0.97)	0.49*** (0.33, 0.74)	0.71 (0.44, 1.12)

Steady male partners for cUAI in the last year				
Steady partner(s), no cUAI	16.79	20/2,541 (0.79)	Ref	Ref
No steady partner	40.89	127/6,189 (2.05)	2.64*** (1.64, 4.24)	1.29 (0.78, 2.14)
1 steady cUAI partner	34.53	80/5,226 (1.53)	1.96** (1.20, 3.21)	1.51** (1.42, 4.53)
2+ steady cUAI partners	7.78	58/1,178 (4.92)	6.53*** (3.91, 10.90)	2.22** (5.27, 12.67)
Non-steady male partners for cUAI in the last year				
Non-steady partner(s), no cUAI	38.37	26/5,825 (0.45)	Ref	Ref
No non-steady partners	26.86	21/4,078 (0.51)	1.15 (0.65, 2.05)	1.22 (0.67, 2.22)
1 non-steady cUAI partner	13.10	22/1,989 (1.11)	2.49** (1.41, 4.41)	2.54** (1.42, 4.53)
2+ non-steady cUAI partners	21.67	215/3,290 (6.53)	15.59*** (10.36, 23.48)	8.17*** (5.27, 12.67)

Table 2. Latent classes of injecting drug use in GBM.

Drug	**% (n)**	**Class 1 (%)**	**Class 2 (%)**	**Class 3 (%)**
Amphetamine	5.94 (18)	2.43	15.97	71.90
Crystal meth	60.07 (182)	63.54	11.79	81.67
Heroin	3.63 (11)	0.002	37.35	18.82
Mephedrone	60.40 (183)	63.34	10.28	99.67
GHB/GBL	1.98 (6)	1.21	4.20	16.43
Ketamine	11.88 (36)	9.49	0.06	98.92