LIVERPOOL JOHN MOORES UNIVERSITY

LJMU Research Online

Hibbert, MP, Brett, CE, Porcellato, LA and Hope, VD

Image and performance enhancing drug use among men who have sex with men and women who have sex with women in the UK.

http://researchonline.ljmu.ac.uk/id/eprint/13993/

Article

Citation (please note it is advisable to refer to the publisher's version if you intend to cite from this work)

Hibbert, MP, Brett, CE, Porcellato, LA and Hope, VD (2020) Image and performance enhancing drug use among men who have sex with men and women who have sex with women in the UK. International Journal of Drug Policv. ISSN 0955-3959

LJMU has developed **LJMU Research Online** for users to access the research output of the University more effectively. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LJMU Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain.

The version presented here may differ from the published version or from the version of the record. Please see the repository URL above for details on accessing the published version and note that access may require a subscription.

For more information please contact researchonline@ljmu.ac.uk

http://researchonline.ljmu.ac.uk/

Image and performance enhancing drug use among men who have sex with men and women who have sex with women in the UK

Word count: 3,626

Country of focus: United Kingdom

Background: The use of image and performance enhancing drugs (IPEDs) among men who have sex with men (MSM) and women who have sex with women (WSW) is rarely studied, with most of this research focused on anabolic androgenic steroid use among MSM. To address this gap, the extent of recent IPED use and the associated factors are explored in a community-recruited sample of MSM and WSW

Methods: Data from the UK LGBT Sex and Lifestyles Survey was used, which recruited through social-media advertising and community organisations (April-June 2018). Participants were asked if they had taken any IPEDs (e.g. anabolic steroids, growth hormone, hCG, Melanotan, non-prescribed diet pills) in the past 12 months. Factors associated with recent (in past 12 months) IPED use among MSM and WSW were investigated using stepwise binary logistic regression.

Results: 1,658 MSM and 1,507 WSW were included in the analysis. Among MSM, 3.4% (n=57) had recently taken IPEDs, 60% of those taking IPEDs had used psychoactive drugs. In the multivariable analysis, IPED use among MSM was associated with psychoactive drug use, Viagra use, higher body dissatisfaction, and lower sexual satisfaction. Among WSW, 4.1% (n=62) had recently taken IPEDs, and 50% of those taking IPEDs had used psychoactive drugs. In the multivariable analysis, IPED use among WSW was associated with being aged 45 years and over, recent STI diagnosis, recent sexual contact without consent, and higher body dissatisfaction.

Conclusion: IPED use was reported by around 1-in-25 MSM and WSW, and was associated with a number of health and psychological problems. Research to better understand the drivers and impacts of IPED use among MSM and WSW, and how this compares to use among heterosexual people is needed.

Keywords: image and performance enhancing drug use; men who have sex with men; women who have sex with women; harm reduction.

Introduction

Image and performance enhancing drugs (IPEDs) are a group of substances that people take to alter their appearance or physical abilities, and include anabolic androgenic steroids (AAS), growth hormones, weight loss drugs and skin tanning agents, such as, melanotan (Begley, McVeigh, & Hope, 2017). Whilst IPEDs can be consumed both orally and through intramuscular and subcutaneous injection, administration through injection is most common. Evidence indicates an increase in the range and availability of IPEDs, through online promotion and retail, with this probably related to increases in polydrug use and overall use (Sagoe et al., 2015; Salinas, Floodgate, & Ralphs, 2019). In the UK at least, this is corroborated by data indicating an increase in the number of people who are accessing needle and syringe programs that report using IPEDs (McVeigh & Begley, 2017). There are a number public health and health problems associated with the use of IPEDs, particularly AAS, such as cardiovascular conditions and sexual dysfunction (Begley et al., 2017), and injecting IPEDs in particular has been associated with hepatitis C infection (Hope et al., 2016). Polydrug use is common, with the concomitant use of a range of psychoactive substances, particularly cocaine and amphetamines often reported (Hope et al., 2017). A systematic review investigating motivations for injecting IPEDs identified numerous motivations including body image disturbance, a drive for muscularity, increasing strength and enhancing appearance (Brennan, Wells, & Van Hout, 2017).

Research into IPED use has mostly been on samples predominantly composed of heterosexual men (Hope et al., 2016; Rowe, Berger, Yaseen, & Copeland, 2017; Van de Ven et al., 2018), or samples composed mostly of gay and bisexual men recruited from gyms mainly used by this group (Bolding, Sherr, & Elford, 2002; Ip et al., 2017); with the participants often using AAS. In England and Wales, being a man who has sex with men (MSM) was associated with increased odds of HIV and Hepatitis B among men using IPEDs (Hope et al., 2016). In the USA, homosexual men using AAS reported more HIV and STI diagnoses and greater sexual risk taking behaviour compared to heterosexual men using AAS (Ip et al., 2017). Therefore, both sexual risk and injecting drug use may compound a person's risk for HIV acquisition among people who use IPEDs. In terms of psychological harms, research from Australia and New Zealand found that among gay and bisexual men, thoughts about using AAS were associated with lower quality of life and greater dissatisfaction with muscularity and height, but this was not observed for actual AAS use (Griffiths, Murray,

Dunn, & Blashill, 2017). A small study in the USA investigating AAS use in women, including homosexual women (3/12), found that women who used AAS were more likely to meet the criteria for substance-dependence disorder, be diagnosed with a psychiatric illness, and have a history of sexual abuse compared to women who did not use anabolic androgenic steroids (Ip et al., 2010).

Another group of IPEDs are weight loss drugs or diet pills, and in Massachusetts, USA, adolescent gay men and young lesbian and bisexual women were at greater odds of using diet pills than heterosexual adolescent men and women (Watson, Adjei, Saewyc, Homma, & Goodenow, 2017). The same trend has also been observed in Minnesota adolescents (Watson et al., 2018), and use of dieting supplements has been associated with depressive symptoms in the USA (Vrany, Hawkins, Wu, & Stewart, 2018). However, much of the research into the use of diet pills that considers MSM and women who have sex with women (WSW) focuses specifically on adolescents and is based on samples from the USA.

Overall, knowledge about the extent of IPED use among adult MSM and particularly adult WSW is currently limited. MSM and WSW experience of body image pressures that may be very different to those of heterosexuals because of their sexuality, for example the use of gay dating apps has been associated with weight stigma, objectification and social comparison among MSM (Filice, Raffoul, Meyer, & Neiterman, 2019). Furthermore, MSM may face additional pressures not experienced by heterosexual men such as a community focus on sex, status, and competition, which has found to predict mental health among gay and bisexual men in addition to more traditional community stressors (e.g. stigma and discrimination) (Pachankis et al., 2020). MSM also have an increased risk of blood borne viruses through sexual transmission (Martin et al., 2013), and this risk might be increased further through IPED use, particular where these are injected (Begley et al., 2017). The use of IPED among women is under researched compared to men, with sexuality rarely considered; we are not aware of any studies that have looked at the extent of IPED use among WSW. Studies indicate that the use of psychoactive drugs is more common among MSM and WSW than among heterosexual people (Booker, Rieger, & Unger, 2017; Office of National Statistics, 2014), thus the proportion of MSM and WSW using IPEDs may also differ to that among the general population. A better understanding of the extent of IPED use among MSM and WSW, and the associated demographic characteristics, wellbeing and psychosocial

issues, is therefore needed to inform appropriate responses.

Internationally, very little research has examined the socio-demographic, psychosocial and sexual factors associated with the use of IPEDs among MSM and WSW, with the few studies undertaken typically having either small sample sizes or recruiting from a limited setting (such as a gyms), and mainly focused on MSM. We use data from a large national community survey to examine the extent of IPED use among MSM and WSW in the UK and to investigate the factors associations with their use.

Methods

Data were collected using an online cross-sectional survey of LGBT people living in the UK. Ethical approval was obtained from Liverpool John Moores University Ethics Committee (approval reference: 18/PHI/011). The methods of the LGBT Sex and Lifestyles Survey have been published elsewhere (Hibbert, Brett, Porcellato, & Hope, 2019; Hibbert, Porcellato, Brett, & Hope, 2019), but briefly, a national convenience sample of MSM, WSW and trans people was obtained between April-June 2018 by using Facebook advertising targeting LGBT people, as well as through social media posts by a range of LGBT community organisations. The adverts directed potential study participants to an online survey, which was divided into three sections: demographics, sexual health and drug use, and psychological wellbeing. Informed consent was obtained by the participants being initially directed to the online participant information sheet and then being asked to agree to take part. As our main focus was on assessing the overall extent of IPED use, and those who use IPEDs often use more than one type of IPED, we used a single general question to measure use. In the survey section about drug use participants were asked if they had "taken any image or performance enhancing drugs in the past 12 months (e.g. anabolic steroids, growth hormone, hCG, Melanotan, non-prescribed diet pills)?" Participants could respond 'yes', 'no', or 'prefer not to say', with participants responding with the latter being excluded from the analysis.

Participants were grouped as MSM and WSW based on the gender they identified as (male/female) and if they reported having sex with someone of the same gender. Questions regarding sexual health, such as genitourinary medicine (GUM) clinic attendance, HIV status, STI diagnoses, sexual behaviour and sexualised drug use were adapted from research on similar topics (Mercer et al., 2016; Weatherburn et al., 2013). Aligned with previous

research, drug use and sexualised drug use was asked with regards to specific drugs, with individuals drugs listed rather than grouped, as this is likely to elicit more accurate reporting (Ryan et al., 2018). Participants were asked about drug use unrelated to IPEDs and were given a list of 14 substances (including an 'other, please specify:' option) and asked if they had taken any of these in the past 12 months, then asked if they had been under the influence of these during sex in the past 12 months, or had these immediately before or during sex in the past 12 months. Eleven of these substances were grouped as psychoactive substance use in the past 12 months (amphetampine, cannabis, cocaine, crack cocaine, crystal methamphetamine, esctacy, GHB/GBL, heroin, ketamine, mephedrone, and poppers/amyl nitrates). These substances were also grouped for sexualised drug use. Sex under the influence of alcohol and Viagra use for sex were both analysed separately.

Sexual self-efficacy is a person's confidence in practicing protected sex, and was measured among MSM using a previously validated tool (Alvy et al., 2011). Participants were grouped as having low sexual self-efficacy if they responded 'disagree' or 'strongly disagree' to half of the tool's questions. The Internalised Homophobia (IHP) scale (Herek, Cogan, Gillis, & Glunt, 1998) was used to measure internalised stigma among MSM and WSW. In line with the measurement instructions, participants were grouped as having high internalised homophobia if they responded 'disagree' or 'strongly disagree' to any of the questions in the measurement tool.

Body dissatisfaction was measured using a modified version of the Objectified Body Consciousness scale (Hyde & McKinley, 2006), where higher scores indicated greater body dissatisfaction. Sexual satisfaction was measured using the New Sexual Satisfaction Scale (Stulhofer, Busko, & Brouillard, 2010), where higher scores indicate greater sexual satisfaction, and psychological wellbeing was measured using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), where higher scores indicate greater life satisfaction.

All analyses were conducted using SPSS 25. Stepwise binary logistic regression analyses were used to explore factors associated with recent IPED use for MSM and WSW seperately (entry $p<0.05$, removal $p>0.10$). Factors significant at the bivariate level ($p<0.05$) were included in the multivariable model. Descriptive chi-square analyses were conducted to compare the use of psychoactive drugs between those using IPEDs and those not using IPEDs

amongst MSM and WSW (Fisher exact tests were used where cells <=5).

Results

Of the 4,690 surveys started, 3,676 participants completed the survey (completion rate 78%). There were 1,663 (45%) participants who identified as MSM, and 1,513 (41%) who identified as WSW (the other 500 participants did not report having sex with someone of the same gender). Participants who completed the survey were more likely to be female (48% vs. 38%, $p<0.001$), in a relationship (64% vs. 57%, $p<0.01$), and university educated (58% vs. 49%, $p<0.01$), but did not differ on any other demographic characteristics where information were available. The IPED question was answered by 1,658 MSM and 1,507 WSW (five MSM and six WSW answered 'prefer not to say' and so were excluded). Overall, the majority of participants identified as homosexual/gay/lesbian (72%), with a median age of 27 years (IQR 22-35, range 18-76). The majority of participants were of white ethnicity (96%) and 36% were single/not in a relationship.

The use of IPEDs in the past 12 months was reported by 57 MSM (3.4%). MSM using IPEDs had a slightly higher median age (Median=30, IQR 25-38) compared to MSM who had not used IPEDs (Median=28, IQR 23-36). Factors associated with IPED use among MSM are displayed in Table 1. One MSM identified as heterosexual and had used IPEDs, so was removed from the analysis. Due to the correlation between satisfaction with life and loneliness ($r=-0.57$, $p<0.001$), only satisfaction with life was included in the multivariable analysis. Having taken psychoactive substances in the past 12 months, taken Viagra or other erectile dysfunction drug for sex in the past 12 months, and having a greater body dissatisfaction and a lower sexual satisfaction score were independently associated with IPED use in the past 12 months among MSM in the multivariable analysis.

Table 1 about here

IPED use in the past 12 months was reported by 62 WSW (4.1%). WSW using IPEDs had a slightly lower median age (Median=24, IQR 19-31) compared to WSW who had not used IPEDs (Median=27, IQR 22-34). Factors associated with IPED use among WSW are displayed in Table 2. Due to the correlation between satisfaction with life and loneliness ($r=-0.56$, $p<0.001$), only satisfaction with life was included in the multivariable analysis. Being

aged 35-49, diagnosed with an STI in the past 12 months, experiencing sexual contact without consent in the past 12 months, and having a greater body dissatisfaction score were independently associated with IPED use in the past 12 months among WSW in the multivariable analysis.

Table 2 about here

To further investigate the use of psychoactive drugs and other substances among those using IPEDs, associations between specific drugs and IPED use in the past 12 months were examined for MSM and WSW (Table 3). Overall, 40% of MSM had used one or more of the 11 substances asked about in the past 12 months (the two most commonly used were poppers and cannabis), as had 37% of the WSW (the two most commonly used were cannabis and cocaine powder). MSM who had used IPEDs in the past 12 months were more likely to have taken amphetamines, cocaine, crystal methamphetamine, ecstasy, GHB/GBL, ketamine, and mephedrone in the same period. WSW who had used IPED in the past 12 months were more likely to have taken cocaine in the same time period.

Table 3 about here

Discussion

Overall, we found that IPED use in the last year was reported by around 1-in-25 MSM and WSW, and the lifetime use of IPEDs will almost certainly be higher. We found that recent IPED use was associated with a number of psychological and health problems, such as psychoactive drug use and STI diagnoses. Unsurprisingly, body dissatisfaction was associated with the use of IPEDs among both MSM and WSW. Although this differs to research among gay and bisexual men using AAS in Australia and New Zealand (Griffiths et al., 2017), this could be due to the different measures used for body dissatisfaction, or due to our study focusing on a wider range of IPEDs. Whilst previous research has found body image dissatisfaction is common among heterosexual men who use IPEDs (Brennan et al., 2017), MSM may be subject to additional body image pressures such as from using gay dating apps (Filice et al., 2019), as well as community pressures relating to sex, status and competition (Pachankis et al., 2020).

Previous research had found a lower subjective quality of life among those who

thought about using AAS but not among those who actually used them (Griffiths et al., 2017); however, our study found that the use of IPEDs was associated with lower satisfaction with life among MSM in the multivariable analysis and among WSW in the bivariate analysis. Again, this could be due to differences in measurements and definitions used in the two studies (Griffiths et al., 2017). Regardless, these associations between IPED use and body dissatisfaction and satisfaction with life among MSM & WSW need further investigation.

A higher proportion of MSM using IPEDs had been diagnosed with an STI recently, were living with HIV, and were more likely to have had greater than 10 male anal intercourse partners in the past 12 months, which is similar to previous research (Hope et al., 2016; Ip et al., 2017). However, these findings were not significant in the multivariable analysis, possibly due to the overlap with taking Viagra or other erectile dysfunction drug, which has been associated with condomless sex (Sanchez & Gallagher, 2006). Men using AAS tend to take erectile dysfunction drugs to combat an unwanted side-effect of AAS use (Begley et al., 2017), and therefore may be more likely to avoid using a condom when trying to maintain an erection (Sanchez & Gallagher, 2006). Additionally, IPED use was associated with lower sexual self-efficacy among MSM in bivariate analyses, indicating a lack of confidence in consistent condom use, which may also indicate a higher level of sexual risk taking among this group. IPED use among MSM was related to lower sexual satisfaction scores, possibly due to the impact IPED use has on sexual functioning (Begley et al., 2017). Further research is needed to investigate whether sexual satisfaction, sexual risk behaviours, and the use of erectile dysfunction drugs are inter-related, and to inform sexual risk reduction promotion among MSM using IPEDs.

Psychoactive substance use was associated with IPED use among MSM and WSW, which has been found among people using IPEDs in England and Wales generally (Hope et al., 2017). Although, a study in the USA that compared heterosexual and homosexual men using AAS found that heterosexuals did not use illicit drugs more than homosexuals (Ip et al., 2017). Whilst our study did not compare IPED use with that among heterosexuals, it is interesting that IPED use among MSM was associated with the drugs commonly linked to 'chemsex' in the UK (i.e. crystal methamphetamine, GHB/GBL, ketamine, mephedrone)(Bourne, Reid, Hickson, Torres Rueda, & Weatherburn, 2014). It has been suggested that one possible motivation for chemsex is internalised homophobia

(Weatherburn, Hickson, Reid, Torres-Rueda, & Bourne, 2017), and internalised homophobia was associated with IPED use among MSM in our bivariate analyses, but whether this is a motivating factor for both IPED use and chemsex among some MSM would need further research. Additionally, there could be a common factor related to both chemsex and IPED use, such as the desire for a muscular body, which may explain this association.

The use of IPEDs among WSW was also associated with recent STI diagnosis, and this difference remained at the multivariable level. Additionally, WSW who use IPEDs were more likely to have attended a GUM clinic compared to WSW who had not used IPEDs, identifying a possible location for the provision of harm reduction for WSW about IPED use. WSW who used IPEDs were more likely to have received sexual contact without consent in the past 12 months, similar to a previous study that had identified an association between historical sexual abuse and AAS use among women (Ip et al., 2010). However, the measure in our study was of IPED use generally, rather than just AAS use; therefore, it is unclear whether this association may be IPED use generally or with use of specific IPEDs such as AAS or diet pills. Regardless of the specific IPED used, it appears sexual assault might be a factor in influencing decisions to use IPEDs, and services providing support to those who have experienced sexual assault need to be made aware of this association, as well as the potential physical and psychological issues associated with IPED use among WSW.

Previous research indicated that diet pill use among 'sexual minority' adolescents was higher than among their heterosexual peers (Watson et al., 2017; Watson et al., 2018), and although a higher proportion WSW aged 18-24 years old had use an IPED compared to older adults in our study, in multivariable analyses IPED use among WSW was associated with being aged 45 years and over. However, the definition of IPED use in this study was broader than diet pills, and participants had to be aged over 18 years to take part. These findings indicate further research is needed to understand the demographic variations in the extent and nature of IPED use among WSW in the UK, including whether certain ages are associated with the use of particular IPEDs (i.e. diet pills vs. AAS).

This cross-sectional study obtained a large national sample of MSM and WSW from across the UK, and found around 1 in 25 had used IPEDs in the past 12 months. This level of use limits our studies power to explore associations. Therefore, the associations found with IPED use in this study may be attenuated due to this small number of participants using

IPEDs in our sample, and the effects in the population are likely to be larger.

The main focus of the drug use data collection in The LGBT Sex and Lifestyles Survey was around sexualised drug use, and so detail on the specific IPEDs used was not collected. Whilst this limits our exploration of the possible reasons and motivations for IPED use, our findings highlight the need for further research into IPED use among MSM and WSW, in particular to investigate whether the associations between IPED use and wellbeing differs with the type of IPED used and how this may be related to the reasons and motivations for use. Caution is needed in generalising the study findings due to the cross-sectional nature of our study. Therefore, causation cannot be inferred from the associations found with IPED use. There is limited data on the size and nature of the LGBT population in the UK, so it is difficult assess the representativeness of the sample. Compared to the general population, the sample in this study is slightly younger and less ethnically diverse, which may be reflective of online recruitment methods. Although our study relied upon self-report measures, standardised tools and questions were used where possible in an attempt to minimise recall bias.

In conclusion, more research is needed into the use of IPEDs among MSM and WSW internationally, and whether the psychosocial associations are similar to those observed in heterosexual men and women who use IPEDs. This study highlights the need for further research into IPED use among both MSM and WSW, and the need to understand whether IPED use is heterogeneous among these groups, which has been suggested for people using IPEDs generally (Begley et al., 2017), and for women using weight loss drugs (Germain, McLean, & Leavey, 2019). Health services that are likely to come in contact with people using IPEDs (e.g. general practice, sexual health services, needle and syringe programmes) should be aware of potentially compounding factors that MSM and WSW who use IPEDs face. These settings may also provide an opportunity to discuss ways to reduce the potential harms associated with IPED use, and potentially provide psychosocial support to address issues, such as body dissatisfaction and satisfaction with life, or referrals to services that can provide specialist psychological support for potentially compounding issues related to IPED use, like internalised homophobia and historical sexual assault.

Acknowledgements

The researchers would like to thank everyone who participated in the survey, as well

as CliniQ, COAST, GALOP, the Gay Men's Health Collective and LGB&T Partnership for their contribution to the design and recruitment of the survey.

Funding

This project was funded through a postgraduate Liverpool John Moores University Scholarship.

References

Alvy, L. M., McKirnan, D. J., Mansergh, G., Koblin, B., Colfax, G. N., Flores, S. A., & Hudson, S. (2011). Depression is associated with sexual risk among men who have sex with men, but is mediated by cognitive escape and self-efficacy. *Aids and Behavior, 15*(6), 1171-1179.

Begley, E., McVeigh, J., & Hope, V. (2017). *Image and Performance Enhancing Drugs: 2016 National Survey Results*. Retrieved from: https://www.ipedinfo.co.uk/resources/downloads/2016%20National%20IPED%20Info%20Survey%20report%20FINAL.pdf [Accessed 03/02/2020]

Bolding, G., Sherr, L., & Elford, J. (2002). Use of anabolic steroids and associated health risks among gay men attending London gyms. *Addiction, 97*(2), 195-203.

Booker, C. L., Rieger, G., & Unger, J. B. (2017). Sexual orientation health inequality: Evidence from Understanding Society, the UK Longitudinal Household Study. *Preventive Medicine, 101*, 126-13132.

Bourne, A., Reid, D., Hickson, F., Torres Rueda, S., & Weatherburn, P. (2014). *The Chemsex study: drug use in sexual settings among gay and bisexual men in Lambeth, Southwark and Lewisham.* Retrieved from: https://www.lambeth.gov.uk/sites/default/files/ssh-chemsex-study-final-main-report.pdf [Accessed 17/10/2019]

Brennan, R., Wells, J. S. G., & Van Hout, M. C. (2017). The injecting use of image and performance-enhancing drugs (IPED) in the general population: a systematic review. *Health Soc Care Community, 25*(5), 1459-1531.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *J Pers Assess, 49*(1), 71-75.

Filice, E., Raffoul, A., Meyer, S. B., & Neiterman, E. (2019). The influence of Grindr, a geosocial networking application, on body image in gay, bisexual and other men who have sex with men: An exploratory study. *Body Image, 31*, 59-70.

Germain, J., McLean, C., & Leavey, C. (2019). One size does not fit all: Tackling the issue of weight loss drug use. In K. van de Ven, K. Mulrooney, & J. McVeigh (Eds.), *Human Enhancement Drugs*. UK: Routledge.

Griffiths, S., Murray, S. B., Dunn, M., & Blashill, A. J. (2017). Anabolic steroid use among gay and bisexual men living in Australia and New Zealand: Associations with demographics, body dissatisfaction, eating disorder psychopathology, and quality of life. *Drug And Alcohol Dependence, 181*, 170-176.

Herek, G. M., Cogan, J. C., Gillis, J. R., & Glunt, E. K. (1998). Correlates of internalized homophobia in a community sample of lesbians and gay men. *Journal of the Gay and Lesbian Medical Association, 2*, 17-26.

Hibbert, M. P., Brett, C. E., Porcellato, L. A., & Hope, V. D. (2019). Psychosocial and sexual characteristics associated with sexualised drug use and chemsex among men who have sex with men (MSM) in the UK. *Sexually Transmitted Infections, 95*(5), 342-350.

Hibbert, M. P., Porcellato, L. A., Brett, C. E., & Hope, V. D. (2019). Associations with drug use and sexualised drug use among women who have sex with women (WSW) in the UK: Findings from the LGBT Sex and Lifestyles Survey. *International Journal of Drug Policy, 74*, 292-298.

Hope, V. D., Harris, R., McVeigh, J., Cullen, K. J., Smith, J., Parry, J. V., Ncube, F. (2016). Risk of HIV and Hepatitis B and C Over Time Among Men Who Inject Image and Performance Enhancing Drugs in England and Wales: Results From Cross-Sectional Prevalence Surveys, 1992-2013. *Jaids-Journal of Acquired Immune Deficiency Syndromes, 71*(3), 331-337.

Hope, V. D., McVeigh, J., Smith, J., Glass, R., Njoroge, J., Tanner, C., Desai, M. (2017). Low levels of hepatitis C diagnosis and testing uptake among people who inject image and performance enhancing drugs in England and Wales, 2012-15. *Drug Alcohol Depend, 179*, 83-86.

Hyde, J. S., & McKinley, N. M. (2006). A measure of objectified body consciousness for preadolescent and adolescent youth. *Psychology of Women Quarterly, 30*(1), 65-76.

Ip, E. J., Barnett, M. J., Tenerowicz, M. J., Kim, J. A., Wei, H., & Perry, P. J. (2010). Women and Anabolic Steroids: An Analysis of a Dozen Users. *Clinical Journal of Sport Medicine, 20*(6), 3475-481.

Ip, E. J., Yadao, M. A., Shah, B. M., Doroudgar, S., Perry, P. J., Tenerowicz, M. J., Pope, H. G., Jr. (2017). Polypharmacy, Infectious Diseases, Sexual Behavior, and Psychophysical Health Among Anabolic Steroid-Using Homosexual and Heterosexual Gym Patrons in San Francisco's Castro District. *Subst Use Misuse, 52*(7), 959-968.

Martin, T. C. S., Martin, N. K., Hickman, M., Vickerman, P., Page, E. E., Everett, R., Nelson, M. (2013). Hepatitis C virus reinfection incidence and treatment outcome among HIV-positive MSM. *AIDS, 27*(16), 2551-2557.

McVeigh, J., & Begley, E. (2017). Anabolic steroids in the UK: an increasing issue for public health. *Drugs-Education Prevention and Policy, 24*(3), 278-285.
Mercer, C. H., Prah, P., Field, N., Tanton, C., Macdowall, W., Clifton, S., Sonnenberg, P. (2016). The health and well-being of men who have sex with men (MSM) in Britain: Evidence from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *BMC Public Health, 16*, 525.

Office of National Statistics. (2014). *Drug misuse: Findings from the 2013/14 Crime Survey for England and Wales*. Retrieved from: https://www.gov.uk/government/publications/drug-misuse-findings-from-the-2013-to-2014-csew/drug-misuse-findings-from-the-201314-crime-survey-for-england-and-wales [Accessed 17/10/2019]

Pachankis, J. E., Clark, K. A., Burton, C. L., Hughto, J. M. W., Bränström, R., & Keene, D. E. (2020). Sex, status, competition, and exclusion: Intraminority stress from within the gay community and gay and bisexual men's mental health. *Journal of Personality and Social Psychology*,

Rowe, R., Berger, I., Yaseen, B., & Copeland, J. (2017). Risk and blood-borne virus testing among men who inject image and performance enhancing drugs, Sydney, Australia. *Drug Alcohol Rev, 36*(5), 658-666.

Sagoe, D., McVeigh, J., Bjornebekk, A., Essilfie, M. S., Andreassen, C. S., & Pallesen, S. (2015). Polypharmacy among anabolic-androgenic steroid users: a descriptive metasynthesis. *Substance Abuse Treatment Prevention and Policy, 10*.

Salinas, M., Floodgate, W., & Ralphs, R. (2019). Polydrug use and polydrug markets amongst image and performance enhancing drug users: Implications for harm reduction interventions and drug policy. *International Journal of Drug Policy, 67*, 43-51.

Sanchez, T. H., & Gallagher, K. M. (2006). Factors associated with recent sildenafil (viagra) use among men who have sex with men in the United States. *Journal Of Acquired Immune Deficiency*

Syndromes (1999), 42(1), 95-100.
Stulhofer, A., Busko, V., & Brouillard, P. (2010). Development and bicultural validation of the new sexual satisfaction scale. *J Sex Res, 47*(4), 257-268.

Van de Ven, K., Maher, L., Wand, H., Memedovic, S., Jackson, E., & Iversen, J. (2018). Health risk and health seeking behaviours among people who inject performance and image enhancing drugs who access needle syringe programs in Australia. *Drug Alcohol Rev, 37*(7), 837-846.

Vrany, E. A., Hawkins, M. A. W., Wu, W., & Stewart, J. C. (2018). Depressive symptoms and weight loss behaviors in U.S. adults. *Eating behaviors, 29*, 107-113.

Watson, R. J., Adjei, J., Saewyc, E., Homma, Y., & Goodenow, C. (2017). Trends and disparities in disordered eating among heterosexual and sexual minority adolescents. *The International journal of eating disorders, 50*(1), 22-31.

Watson, R. J., VanKim, N. A., Rose, H. A., Porta, C. M., Gahagan, J., & Eisenberg, M. E. (2018). Unhealthy weight control behaviors among youth: Sex of sexual partner is linked to important differences. *Eating disorders, 26*(5), 448-463.

Weatherburn, P., Hickson, F., Reid, D., Torres-Rueda, S., & Bourne, A. (2017). Motivations and values associated with combining sex and illicit drugs ('chemsex') among gay men in South London: findings from a qualitative study. *Sexually Transmitted Infections, 93*(3), 203-206.

Weatherburn, P., Schmidt, A. J., Hickson, F., Reid, D., Berg, R. C., Hospers, H. J., Network, E. (2013). The European Men-Who-Have-Sex-With-Men Internet Survey (EMIS): Design and Methods. *Sexuality Research and Social Policy, 10*(4), 243-257. 7

Table 1. Bivariate and multivariable analyses for factors associated with IPED use in the past 12 months among MSM.

	Total (N=1,658)		Taken IPED (n=57)		Bivariate	Adjusted model†
	n or *mean*	Column % or *SD*	n or *mean*	Row % or *SD*	OR (95% CI)	aOR (95% CI)
Sexuality						
Homosexual	1,419	86%	47	3%	ref.	
Bisexual	153	9%	3	2%	0.58 (0.18, 1.90)	
Queer	49	3%	5	10%	3.32 (1.26, 8.75)	
In another way	36	2%	1	3%	0.83 (0.11, 6.22)	
Age						
18-24	535	32%	14	3%	ref.	
25-34	645	39%	20	3%	1.19 (0.60, 2.38)	
35-44	279	22%	17	6%	2.41 (1.17, 4.98)	
>=45	190	7%	6	3%	1.17 (0.44, 3.10)	
Ethnicity						
White	1,580	95%	57	4%	ref.	
Person of colour	75	5%	0	0%	-	
Country of Birth						
UK	1,443	87%	50	3%	ref.	
Not UK	180	11%	5	3%	0.80 (0.31, 2.02)	
Education						
University or higher	984	59%	35	4%	ref.	
Qualifications at 18	471	28%	11	2%	0.65 (0.33, 1.29)	
Qualifications at 16 or lower	162	10%	9	6%	1.60 (0.75, 3.38)	
Work Status						
Full time	1,048	63%	41	4%	ref.	
Part time	115	7%	2	2%	0.44 (0.10, 1.82)	
Student	266	16%	6	2%	0.57 (0.24, 1.35)	
Unemployed	60	4%	1	2%	0.42 (0.06, 3.08)	
Other (sick leave, retired, carer)	160	10%	7	4%	1.12 (0.50, 2.55)	
Relationship status						
Living with partner	587	35%	24	4%	ref.	
Relationship not living with partner	320	19%	9	3%	0.68 (0.31, 1.48)	
Relationship with multiple	35	2%	4	11%	3.03 (0.99, 9.26)	
Single	713	43%	20	3%	0.68 (0.37, 1.24)	
Population density per hectre						
<5	368	22%	14	4%	ref.	
5 - 20	345	21%	14	4%	1.07 (0.50, 2.28)	
20 - 41	401	24%	14	3%	0.92 (0.43, 1.95)	
>41	525	32%	15	3%	0.74 (0.36, 1.56)	
Internalized homophobia						
Low	1,067	64%	27	3%	ref.	
High	570	34%	30	5%	2.14 (1.26, 3.64)	
Discrimination sexuality in the past 12 months						
None	877	53%	28	3%	ref.	
Any setting	715	43%	27	4%	1.19 (0.70, 2.04)	
Perceived health						

Fair/good/very good	1,467	88%	49	3%	ref.	
Very poor/poor	191	12%	8	4%	1.27 (0.59, 2.71)	
Diagnosed STI in the past 12 months						
None	1,418	86%	44	3%	ref.	
STI diagnosis	177	11%	11	6%	2.07 (1.05, 4.09)	
Not stated	63	4%	2	3%	1.02 (0.24, 4.32)	
Attended GUM in the past 12 months						
No	802	48%	26	3%	ref.	
Yes	826	50%	31	4%	1.16 (0.69, 1.98)	
Not sure	18	1%	0	0%	-	
No. of men anal intercourse in the past 12 months						
0-1	813	49%	24	3%	ref.	
2-5	454	27%	17	4%	1.28 (0.68, 2.41)	
6-10	178	11%	5	3%	0.95 (0.36, 2.53)	
>10	209	13%	11	5%	1.83 (0.88, 3.79)	
No. of men without condom anal intercourse in the past 12 months						
0-1	1,182	71%	37	3%	ref.	
2-5	309	19%	11	4%	1.14 (0.58, 2.27)	
6-10	80	5%	3	4%	1.21 (0.36, 4.00)	
>10	79	5%	6	8%	2.54 (1.04, 6.22)	
Sexual contact without consent in the past 12 months						
No	1,530	92%	48	3%	ref.	
Yes	79	5%	5	6%	2.09 (0.81, 5.40)	
Unsure	35	2%	2	6%	1.87 (0.44, 8.03)	
HIV status						
Negative	1,309	79%	41	3%	ref.	
Negative, on PrEP	98	6%	6	6%	2.02 (0.84, 4.88)	
Positive	75	5%	5	7%	2.21 (0.85, 5.76)	
Don't know	174	10%	5	3%	0.92 (0.36, 2.35)	
Sexual self-efficacy						
High	1,558	94%	49	3%	ref.	
Low	77	5%	7	9%	3.08 (1.35, 7.04)	
Psychoactive drug use	650	39%	34	6%	2.45 (1.41, 4.21)	1.92 (1.04, 3.55)
Under the influence of alcohol during sex	1,092	66%	40	4%	1.27 (0.71, 2.30)	
Taken Viagra for sex	201	12%	18	9%	3.64 (2.03, 6.51)	4.13 (2.09, 8.14)
Sexualised drug use	608	37%	31	5%	2.17 (1.27, 3.72)	
Body dissatisfaction	*41.7*	*12.2*	*49.9*	*10.1*	*1.07 (1.04, 1.10)*	*1.07 (1.04, 1.10)*
Loneliness score	*5.5*	*1.8*	*6.1*	*1.9*	*1.21 (1.04, 1.40)*	
Satisfaction with life	*20.2*	*7.3*	*17.9*	*8.0*	*0.96 (0.92, 0.99)*	
Sexual satisfaction score	*41.4*	*9.1*	*37.5*	*10.3*	*0.96 (0.93, 0.98)*	*0.95 (0.93, 0.98)*

† Factors included in the multivariable model: Sexuality, Age, Internalised homophobia, Diagnosed STI in the past 12 months, No. of men without condom anal intercourse in the past 12 months, Sexual self-efficacy, Psychoactive drug use, Taken Viagra for sex, Sexualised drug use, Body dissatisfaction, Satisfaction with life, Sexual satisfaction

Table 2. Bivariate and multivariable analyses for factors associated with IPED use in the past 12 months among WSW.

	Total (n=1,507)		Taken IPED (n=62)		Bivariate	Adjusted model†
	n or *mean*	% or *SD*	n or *mean*	Row % or *SD*	OR (95% CI)	aOR (95% CI)
Sexuality						
Homosexual	844	56%	30	4%	ref.	
Bisexual	496	33%	25	5%	1.44 (0.84, 2.48)	
Heterosexual	5	0.3%	1	20%	6.78 (0.74, 62.54)	
Queer	80	5%	4	5%	1.43 (0.49, 4.16)	
In another way	81	5%	2	2%	0.69 (0.16, 2.93)	
Age						
18-24	538	38%	32	6%	ref.	ref.
25-34	571	39%	16	3%	0.47 (0.26, 0.87)	0.93 (0.48, 1.80)
35-44	218	19%	8	5%	0.62 (0.28, 1.36)	1.97 (0.83, 4.70)
>=45	114	4%	6	0%	0.89 (0.36, 2.17)	4.42 (1.58, 12.33)
Ethnicity						
White	1,463	97%	61	4%	ref.	
Person of colour	43	3%	1	2%	0.55 (0.07, 4.04)	
Country of Birth						
UK	1,341	89%	55	4%	ref.	
Not UK	130	9%	7	5%	1.33 (0.59, 2.99)	
Education						
University or higher	817	54%	27	3%	ref.	
Qualifications at 18	504	33%	26	5%	1.59 (0.92, 2.76)	
Qualifications at 16 or lower	152	10%	9	6%	1.84 (0.92, 2.76)	
Work Status						
Full time	780	52%	26	3%	ref.	
Part time	175	12%	8	5%	1.39 (0.62, 3.12)	
Student	332	22%	18	5%	1.66 (0.90, 3.08)	
Unemployed	37	2%	1	3%	0.81 (0.11, 6.10)	
Other (sick leave, retired, carer)	166	11%	8	5%	1.47 (0.65, 3.30)	
Relationship status						
Living with partner	626	42%	23	4%	ref.	
Relationship not living with partner	402	27%	18	4%	1.23 (0.66, 2.31)	
Relationship with multiple	43	3%	1	2%	0.62 (0.08, 4.74)	
Single	435	29%	20	5%	1.26 (0.69, 2.33)	
Population density per hectre						
<5	392	26%	17	4%	ref.	
5 - 20	430	29%	19	4%	1.02 (0.52, 1.99)	
20 - 41	366	24%	13	4%	0.81 (0.39, 1.70)	
>41	304	20%	13	4%	0.99 (0.47, 2.06)	
Internalized homophobia						
Low	994	66%	35	4%	ref.	
High	483	32%	26	5%	1.56 (0.93, 2.62)	
Discrimination sexuality in the past 12 months						
None	760	50%	26	3%	ref.	
Any setting	692	46%	31	4%	1.32 (0.78, 2.25)	

Perceived health						
Fair/good/very good	1,245	83%	40	3%	ref.	
Very poor/poor	262	17%	22	8%	2.76 (1.61, 4.73)	
Diagnosed STI in the past 12 months						
None	1,439	96%	58	4%	ref.	ref.
STI diagnosis	20	1%	4	20%	5.95 (1.93, 18.37)	5.84 (1.71, 19.98)
Not stated	48	3%	0	0%	-	-
Attended GUM in the past 12 months						
No	1,191	79%	40	3%	ref.	
Yes	296	20%	22	7%	2.31 (1.35, 3.95)	
Not sure	12	1%	0	0%	-	
Number of women sexual partners in the past 12 months						
0-1	1,193	79%	41	3%	ref.	
2-4	267	18%	17	6%	1.91 (1.07, 3.42)	
>=5	45	3%	4	9%	2.74 (0.94, 8.02)	
Sexual contact without consent in the past 12 months						
No	1,355	90%	43	3%	ref.	ref.
Yes	101	7%	15	15%	5.32 (2.84, 9.96)	3.86 (1.94, 7.71)
Unsure	31	2%	3	10%	3.27 (0.96, 11.17)	2.43 (0.68, 8.76)
Psychoactive substance use	550	37%	31	6%	1.77 (1.07, 2.95)	
Under the influence of alcohol during sex	946	63%	48	5%	2.07 (1.13, 3.78)	
Sexualised drug use	255	17%	20	8%	2.44 (1.41, 4.23)	
Body dissatisfaction	*42.4*	*12.9*	*52.8*	*8.6*	*1.09 (1.06, 1.12)*	*1.10 (1.07, 1.13)*
Loneliness score	*5.5*	*1.7*	*6.4*	*1.6*	*1.38 (1.19, 1.61)*	
Satisfaction with life	*20.6*	*7.3*	*16.5*	*6.0*	*0.93 (0.89, 0.96)*	
Sexual satisfaction score	*43.8*	*10.0*	*42.5*	*8.9*	*0.99 (0.96, 1.01)*	

† Factors included in the multivariable model: Age, Diagnosed STI in the past 12 months, Perceived health, Attended a GUM in the past 12 months, Number of women sexual partners in the past 12 months, Sexual contact without consent in the past 12 months, Under the influence of alcohol during sex, Body dissatisfaction, Satisfaction with life.

Table 3. Psychoactive drug use in the past 12 months between IPED users and non-IPED users among MSM and WSW

	MSM					WSW				
Substance†	IPED use (n=67)	Column %	No IPED use (n=1577)	Column %	p value	IPED use (n=62)	Column %	No IPED use (n=1439)	Column %	p value
Amphetamine	6	9%	57	4%	0.006	4	6%	37	3%	0.085
Cannabis	23	34%	460	29%	0.051	27	44%	466	32%	0.067
Cocaine	27	40%	331	21%	<0.001	12	19%	153	11%	0.032
Crystal methamphetamine	4	6%	35	2%	0.041	0	0%	0	0%	-
Ecstasy	14	21%	195	12%	0.005	7	11%	109	8%	0.283
GHB/GBL	7	10%	60	4%	0.001	0	0%	3	0%	1.000
Ketamine	8	12%	106	7%	0.028	2	3%	36	3%	0.669
Mephedrone	9	13%	75	5%	<0.001	1	2%	6	0%	0.256
Poppers (amyl nitrates)	24	36%	542	34%	0.177	8	13%	106	7%	0.107
Any substance	34	51%	616	39%	<0.001	31	50%	519	36%	0.026

† Eight participants reported crack cocaine use, none had used IPEDs; and one person reported using heroin, they had not taken an IPED.