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Differences in Alcohol and Other Drug Use and Dependence Between Transgender and Cisgender Participants from the 2018 Global Drug Survey

Dean J. Connolly, MA (Cantab), MSc,^{1,2} Emma Davies, MSc, PhD,³ Michael Lynskey, MSc, PhD,¹
Larissa J. Maier, PhD,^{4,5} Jason A. Ferris, PhD,⁶ Monica J. Barratt, PhD,^{7,8}
Adam R. Winstock, MD,^{9,10} and Gail Gilchrist, PhD¹

Abstract

Purpose: The purpose of this study was to compare five gender groups (cisgender women, cisgender men, transgender women, transgender men, people with nonbinary/other identities) on measures of use of and dependence on seven substances.

Methods: A two-stage approach to assessing gender allowed 126,648 participants from the 2018 Global Drug Survey (GDS) to be classified to one of these five gender groups. Participants were asked to disclose use of each substance in the preceding 12 months. The Alcohol Use Disorders Identification Test and the Severity of Dependence Scale were used to assess dependence. Multivariable logistic regression generated odds ratios (ORs) to measure the association between gender and each substance use/dependence outcome, with cisgender women as the reference group.

Results: The sample comprised 43,331 cisgender women, 81,607 cisgender men, 215 transgender women, 254 transgender men, and 1241 people with nonbinary/other identities. Relative to cisgender women, nonbinary/other participants reported greater odds of last 12-month use of all substances (adjusted odds ratio [AOR] = 1.66–2.30), except alcohol (lower odds; AOR = 0.42), and greater odds of dependence on cannabis (AOR = 2.39), 3,4-methylenedioxymethamphetamine (AOR = 1.64) and alcohol (AOR = 3.28), adjusting only for age (all $p < 0.05$).

Conclusion: Transgender 2018 GDS respondents, particularly those with nonbinary/other identities, had greater odds of reporting most substance use outcomes than cisgender women. These findings suggest that a nuanced approach to gender reporting in surveys and treatment centers is required to understand the needs of transgender people who use substances.

Keywords: alcohol, drugs, substance dependence, substance use disorder, substance use, transgender

¹National Addiction Centre, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom.

²Early Intervention Service, Newham Centre for Mental Health, East London NHS Foundation Trust, London, United Kingdom.

³Department of Psychology, Faculty of Health and Life Sciences, Oxford Brookes University, Oxford, United Kingdom.

⁴Department of Clinical Pharmacy, University of California, San Francisco, San Francisco, California, USA.

⁵Early Postdoc Mobility Grantee (P2ZHP1_174812), Swiss National Science Foundation, Bern, Switzerland.

⁶Centre for Health Services Research, Faculty of Medicine, The University of Queensland, Brisbane, Australia.

⁷Social and Global Studies Centre and Digital Ethnography Research Centre, RMIT University, Melbourne, Australia.

⁸National Drug and Alcohol Research Centre, UNSW Sydney, Sydney, Australia.

⁹Institute of Epidemiology and Health Care, University College London, London, United Kingdom.

¹⁰Global Drug Survey, London, United Kingdom.

Introduction

TRANSGENDER IS AN umbrella term which usually describes individuals for whom there is an incongruity between their experienced gender identity and the male/female sex they were assigned at birth.^{1,2} Cisgender people are those whose gender identity matches their birth-assigned sex. Although many transgender and cisgender people identify comfortably within the gender binary (man/woman), for an increasing number of people, collectively termed “non-binary,” this does not represent their experience.³ Although not all nonbinary people identify as transgender and there is some variation in the definition of the term, all identities other than cisgender man and cisgender woman were considered transgender for the purposes of this article, based on their shared gender minority status.

The population prevalence of transgender identity has not yet been accurately described. However, the few studies which report on regional and national estimates indicate that transgender people are a minority, making up between 0.3% and 1.2% of the adult population.^{4–9} The Minority Stress Model asserts that minority or marginalized groups who are chronically exposed to discrimination will experience worse mental health outcomes, particularly related to suicidality and substance use.¹⁰

Gender Minority Stress Models contextualize this for transgender people and propose that if transgender people have elevated rates of substance use, it is not because they are an inherently “risky” population.^{11,12} Instead, the consequence of coping with various stigma related to their marginalization is the creation of psychosocial conditions leading to mental ill health and greater psychoactive substance use.^{10–14} Exclusion and trauma have been associated with excessive use of both alcohol^{15–17} and other drugs^{18–20} among transgender people.

Based on this association, one might expect that transgender people use substances more frequently or in greater quantities than cisgender counterparts who lack gender minority stress. However, the body of literature seeking to quantify substance use by transgender people has several limitations. The first relates to the studying of vulnerable subgroup populations and the associated complexity of capturing sufficiently large samples to allow generalizability of the data.

Most transgender substance use research draws on information from small convenience samples, not representative of the wider transgender community,²¹ including studies of minority ethnic transgender women^{22,23} with a history of sex work²³ or those with current gender dysphoria.²⁴ Although estimates drawn from these studies are of value to their respective subgroups, these subsamples are too heterogeneous to make wider population inferences about patterns of substance use by transgender people.²⁵

Few studies have directly compared the prevalence of substance use and/or dependence between transgender and cisgender participants. Among a representative sample of U.S.-based transgender ($n=274$) and cisgender ($n=1162$) parents, transgender participants were found to have a 2.5-fold greater mean Drug Use Disorders Identification Test score than cisgender participants.²⁶ Similarly, a study of U.S. veterans found that, compared to cisgender participants, transgender participants had greater odds of amphetamine, cannabis, cocaine, or “any drug” use disorders.²⁷ These findings

were corroborated by a recent U.S.-based study which found an excess prevalence of substance use disorders among transgender participants relative to cisgender counterparts.²⁸

Two further studies investigating alcohol outcomes reported that transgender people were more likely than cisgender people to engage in binge drinking²⁹ and three times as likely to report Alcohol Use Disorders Identification Test (AUDIT) scores indicating hazardous or harmful drinking.³⁰ However, neither study included cisgender participants and instead compared convenience and respondent-driven samples of transgender participants with nationally representative samples of cisgender people.^{29,30} These findings are corroborated by a study of 422,906 (989 transgender) U.S. college students which found that transgender students reported more days drinking, total drinks consumed, alcohol-related blackouts, and negative reasons for drinking.³¹

Moreover, a recent Global Drug Survey (GDS) study found that transgender people were more likely than cisgender people to require help to reduce their use of alcohol, cannabis, and other substances, suggesting that problematic substance use may be more common among transgender people.³² This study seeks to build on previous GDS work to address some of the aforementioned limitations by directly comparing transgender and cisgender respondents from GDS 2018. Specifically, five gender groups (cisgender women, cisgender men, transgender women, transgender men, people with nonbinary/other identities) will be compared on the prevalence of 12-month use of and dependence on a range of psychoactive substances.

Methods

Study design

The GDS is an independent research organization that develops cross-sectional surveys on an annual basis to monitor international patterns of drug use and associated behavior.³³ Global harm reduction and media partners direct participants to an encrypted online platform that can be used anonymously by GDS participants to provide consent and participate in the survey.³³ Although GDS does not claim to be a representative sample, prior work has demonstrated that cannabis and alcohol users recruited by GDS are similar to those recruited from population-based surveys in the United States, Switzerland, and Australia, in terms of sex and age.³³ A full account of GDS methodology is available elsewhere.³³

Data from GDS 2018, which recruited between November 8, 2017 and December 30, 2017, were used in this study. GDS 2018 was available in 19 languages and recruited 130,761 participants from >40 countries. Ethical approval for GDS 2018 was received from The University of New South Wales (HREC HC17769), University College London 11671/001 and University of Queensland (No: 2017001452) Research Ethics Committees.

Variables

GDS adopts a two-stage approach to assess gender.^{34,35} The first question asks participants to disclose their lived gender identity with the following response options: “female,” “male,” “nonbinary,” “different identity.” Participants are then asked to report their birth-assigned gender and could choose “female” or “male.”

Available evidence suggests a greater prevalence of non-binary than binary trans identities (66.1% vs. 33.8%),³⁶ particularly in young samples such as GDS 2018.³⁷ Moreover, greater heterogeneity in self-descriptors is reported by people who exist outside the gender binary.^{36,38,39} This suggests that binary trans participants are fewer and less likely to use terms other than “man” or “woman” to define themselves. On this basis, it was agreed that the genders of participants reporting “different identity” are more likely to be congruent with definitions of “nonbinary” genders and these groups were combined to increase power of subsequent analyses. Participants were assigned to one of the five aforementioned groups, based on criteria described in Supplementary Table S1. Transgender groups are marked with an asterisk.

This study used data pertaining to the use of and dependence on seven substances: alcohol, cannabis, ecstasy/3,4-methylenedioxymethamphetamine (MDMA), cocaine, amphetamine powder, amphetamine paste, and methamphetamine. Participants were considered nonusers if they indicated that they had never used or had not used in the last 12 months. Participants who reported alcohol use in the last 12 months were asked to complete the AUDIT, which assesses alcohol consumption, harms, and dependency.^{40–42} The AUDIT is a 10-item questionnaire with a maximum score of 40, where scores ≥ 20 indicate probable dependence.⁴¹

When participants endorsed use of any drug (other than alcohol), they were invited to complete the Severity of Dependence Scale (SDS), reflecting specifically on their use of that drug in the preceding 12 months.⁴³ This five-item tool assesses the psychological aspects of drug dependence and has a maximum score of 15.^{43–45} Scores of ≥ 4 on the SDS were deemed a conservative estimate of dependence for each substance, based on previous literature.^{46–51}

Several drugs had low or zero counts for 12-month use and/or dependence. Consequently, several drugs were combined to increase the statistical power of subsequent analyses. Amphetamine powder, amphetamine paste, and methamphetamine were combined to create an “amphetamine” group. Participants had to report 12-month use of or dependence on at least one amphetamine drug to posi-

tively endorse the category. GDS 2018 also recorded participants’ demographics and lifetime history of a mental health diagnosis (yes/no). Please see Supplementary Table S2 for the items used to assess each of the demographic variables.

Statistical analyses

The sample characteristics were described using counts and percentages. Percentages describe the proportion of respondents of each gender who endorsed 12-month use of and dependence on each drug (or drug group). For each drug (or drug group), likelihood ratio χ^2 analyses were used as an omnibus measure of differences between genders on each of 12-month use and dependence.

Multivariable logistic regression was used to calculate odds ratios (ORs) for 12-month use and dependence. In each initial regression model, the association between gender and substance use or dependence was adjusted only for age. Gender was a five-level categorical variable, where cisgender women were chosen as the reference category because of their established lower risk for problematic substance use, relative to cisgender men.^{52–54} Age was a three-level categorical variable, and the lowest risk group (≥ 35 years) was the reference category.

Sensitivity analyses demonstrating the validity of combining “nonbinary” and “different identity” groups comprised three parts. Counts and percentages followed by one-way analysis of variance or likelihood ratio χ^2 analyses described and compared the demographic then substance use and dependence characteristics of both groups. Following this, the “different identity” group was omitted from repeated regression analyses. All analyses were conducted using IBM SPSS Statistics software, v25 and v27.^{55,56}

Results

Sample characteristics and sensitivity analyses

Of 130,761 survey respondents, 126,648 responded to both questions relating to gender and so could be classified to one of five gender groups and included in the subsequent analyses. Of these, there were 81,607 (64.4%) cisgender

TABLE 1. TWELVE-MONTH SUBSTANCE USE AND DEPENDENCE, BY GENDER GROUP

Outcome		Cisgender men (n = 81,607)	Cisgender women (n = 43,331)	Transgender men (n = 254)	Transgender women (n = 215)	Nonbinary/ other identity (n = 1241)	
Substance	Measure	%	%	%	%	%	χ^2 (df = 4)
Cannabis	Last 12-month use	50.6	37.0	47.2	50.7	55.1	2182.8**
	SDS ≥ 4	9.4	5.7	7.9	9.3	12.7	594.7**
Cocaine	Last 12-month use	19.2	14.1	14.6	17.2	21.4	544.0**
	SDS ≥ 4	1.7	1.4	1.6	0.5	1.7	18.8*
MDMA	Last 12-month use	23.6	18.7	18.5	20.0	31.0	471.4**
	SDS ≥ 4	1.1	1.4	0.8	1.9	2.4	32.2**
Amphetamines	Last 12-month use	16.2	11.9	14.6	16.7	23.8	503.5**
	SDS ≥ 4	1.5	1.6	1.6	3.3	2.3	8.9 ^{ns}
Alcohol	Last 12-month use	94.9	94.4	89.0	93.0	87.9	112.32**
	AUDIT ≥ 20	5.5	3.7	7.1	8.4	11.4	292.1**

* $p < 0.001$; ** $p < 0.0001$.

AUDIT, Alcohol Use Disorders Identification Test; df, degrees of freedom; MDMA, 3,4-methylenedioxymethamphetamine; ns, not significant; SDS, Severity of Dependence Scale.

men, 43,331 (34.2%) cisgender women, 254 (0.2%) transgender men, 215 (0.2%) transgender women, and 1241 (1.0%) people with nonbinary/other identities. Sample characteristics are presented in Supplementary Table S2.

Demographic data were missing for >40% of participants on each variable (other than age). However, among those who did respond, most participants were White, highly educated, and had never been diagnosed with a mental illness. More than half the sample was 18–25 years old. GDS also asks participants' country of origin. The largest number of respondents were from Germany (38.4%; $n=48,616$), Denmark (11.9%; $n=15,074$), Poland (5.8%; $n=7355$), United States (4.6%; 5859) and Switzerland (4.5%; 5677). A full breakdown of participants' country of origin is found in Supplementary Table S3.

Sensitivity analyses confirming the validity of combining “nonbinary” and “different identity” groups are presented in Supplementary Tables S4 and S5. Other than 12-month cannabis use, there were no significant between-group differences on measures of substance use and dependence. Similarly, there were no significant changes to regression model effect sizes (other than for MDMA dependence) when participants reporting a “different identity” were removed from the sample.

Substance use and dependence

Table 1 summarizes data relating to 12-month use and dependence. Likelihood ratio χ^2 values are reported for each measure. Table 2 reports the adjusted OR (AOR) for each gender endorsing each of 12-month use and dependence, for each drug (or drug group), controlling only for age. Cisgender women were the reference group. Age was significantly associated with most substance use measures, with younger respondents more likely to use and become dependent on substances.

Cannabis

Cannabis use, while common across all gender groups, was least likely to be reported by cisgender women (37.0%). People with nonbinary/other identities had twofold greater odds of reporting use of (55.1%, AOR: 2.06, 95% confidence interval [CI]: 1.84–2.31, $p<0.0001$) and dependence on (12.7%, AOR: 2.39, 95% CI: 2.02–2.84, $p<0.0001$) cannabis, relative to cisgender women. Cisgender men were more likely to use and become dependent on cannabis than cisgender women. Although transgender men had greater odds of 12-month use than cisgender women, they were not significantly more likely to report dependence.

Other drugs

Twelve-month use of cocaine was reported by 14.1% of cisgender women. People with nonbinary/other identities were more likely than cisgender women to report cocaine use (21.4%, AOR: 1.66, 95% CI: 1.44–1.91, $p<0.0001$). Cisgender men were the only group significantly more likely to report cocaine dependence than cisgender women (1.7%, AOR: 1.23, 95% CI: 1.12–1.36, $p<0.0001$).

People with nonbinary/other identities were more likely to report 12-month use (31.0%, AOR 1.94, 95% CI: 1.72–2.20, $p<0.0001$) and dependence on MDMA (2.4%, AOR: 1.64,

TABLE 2. MULTIVARIABLE LOGISTIC ANALYSIS OF THE ASSOCIATION BETWEEN GENDER GROUP, AGE, AND 12-MONTH SUBSTANCE USE AND DEPENDENCE

Outcome	Substance	Measure	Gender (reference category: cisgender women)		
			Transgender men	Cisgender men	Transgender women
			AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
					Nonbinary/other identity
					AOR (95% CI)
	Cannabis	Last 12-month use	1.37 (1.07–1.76)*	1.72 (1.68–1.76)****	1.60 (1.22–2.10)***
		SDS ≥ 4	1.34 (0.85–2.12) ^{ns}	1.71 (1.63–1.79)****	1.61 (1.02–2.56)*
	Cocaine	Last 12-month use	1.01 (0.71–1.44) ^{ns}	1.46 (1.41–1.50)****	1.22 (0.86–1.74) ^{ns}
		SDS ≥ 4	1.16 (0.43–3.12) ^{ns}	1.23 (1.12–1.36)****	0.33 (0.05–2.38) ^{ns}
	MDMA	Last 12-month use	0.91 (0.66–1.25) ^{ns}	1.33 (1.29–1.37)****	1.00 (0.71–1.40) ^{ns}
		SDS ≥ 4	0.47 (0.12–1.90) ^{ns}	0.75 (0.68–0.83)****	1.14 (0.42–3.09) ^{ns}
	Amphetamines	Last 12-month use	1.19 (0.84–1.69) ^{ns}	1.42 (1.37–1.47)****	1.40 (0.98–2.01) ^{ns}
		SDS ≥ 4	0.93 (0.35–2.51) ^{ns}	0.93 (0.85–1.02) ^{ns}	1.95 (0.91–4.15) ^{ns}
	Alcohol	Last 12-month use	0.43 (0.29–0.63)****	1.08 (1.02–1.14)**	0.71 (0.42–1.20) ^{ns}
		AUDIT ≥ 20	1.86 (1.15–3.01)*	1.48 (1.39–1.56)****	2.24 (1.38–3.65)**

* $p<0.05$; ** $p<0.01$; *** $p<0.001$; **** $p<0.0001$.
AOR, adjusted odds ratio; CI, confidence intervals.

95% CI: 1.13–2.38, $p < 0.01$) than cisgender women. Use of amphetamines was more commonly reported by people with nonbinary/other identities (23.8%, AOR: 2.30, 95% CI: 2.01–2.63, $p < 0.0001$) than cisgender women (11.9%, reference group). There were no significant differences in the rates of dependence between cisgender women and any other gender group.

Alcohol

Twelve-month alcohol use was reported by the majority of the whole sample (94.5%) and was more commonly reported by cisgender men (94.9%, AOR: 1.08, 95% CI: 1.02–1.14, $p < 0.01$) and cisgender women (94.4%, reference group) than transgender participants (87.9%–93.0%). People with nonbinary/other identities (11.4%, AOR: 3.28, 95% CI: 2.73–3.94, $p < 0.0001$), transgender women (8.4%, AOR: 2.24, 95% CI: 1.38–3.65, $p < 0.01$), and transgender men (7.1%, AOR: 1.86, 95% CI: 1.15–3.01, $p < 0.05$) all had greater odds of reporting alcohol dependence than cisgender women. Dependence was also more likely among cisgender men (5.5%, AOR: 1.48, 95% CI: 1.39–1.56, $p < 0.0001$), relative to cisgender women.

Discussion

Key findings

The most consistent finding of this study was that participants with nonbinary/other identities reported greater odds of 12-month use of all drugs (except alcohol) than cisgender women. In addition, participants with nonbinary/other identities had greater odds of reporting dependence on alcohol, cannabis, and MDMA than cisgender women. Although transgender women and transgender men also had significantly higher odds of alcohol dependence relative to cisgender women, there were fewer observed significant differences between binary transgender participants and cisgender women, on measures of use of other substances. However, there did appear to be a trend of increased likelihood of use among transgender people across most measures, despite many analyses lacking power.

Findings in context

The results of this study are supported by a systematic review which reported a high and excess prevalence of (problematic) substance use among transgender people, relative to cisgender people.²¹ More specifically, our finding that transgender groups each had higher odds of alcohol dependence than cisgender women is supported by the substantial body of alcohol literature which suggests that transgender people have a high prevalence of hazardous or harmful drinking.⁵⁷

A large study with a clinical sample corroborated our results for both alcohol and cocaine where disordered use of the former was almost three times as common and the latter half as common among transgender participants, relative to cisgender counterparts.²⁸ The more frequent reporting of amphetamine dependence by transgender women in this study is corroborated by recent work which found 2.2-fold greater odds of amphetamine use disorder among transgender compared with cisgender veterans.²⁷

Nonbinary people have largely been excluded from substance use research to date.²¹ However, an extension of

minority stress theory, which asserts that individuals with nonbinary (or genderqueer) identities experience greater gender minority stress than do cisgender or other transgender counterparts, provides one possible explanation for the findings in this study.⁵⁸ This assertion is supported by both the results presented here and studies which found that gender presentations incongruent with societal expectation are associated with increased substance use to cope with greater exposure to gender minority stress.^{12,30,59}

Strengths and limitations

A limitation of the existing transgender substance use literature is that most studies focus on trans feminine people living in North America,⁵⁷ whereas those with nonbinary/other identities, living elsewhere, remain understudied.^{57,60} This study is unique in that GDS offers an international sample with (1) 1710 transgender participants; (2) >1000 participants with nonbinary/other identities; and (3) cisgender comparators. Given the increased substance use and dependence reported by nonbinary people, this disaggregated analysis was an important step forward in understanding substance use in the transgender community.

GDS has previously been criticized for its use of a nonprobability-based sampling frame.³³ This approach means that the GDS sample is influenced by both nonresponse bias and volunteer bias.^{61,62} In addition, the retrospective nature of GDS data means that it is subject to recall bias.

As it has been argued that a representative sample is only needed when estimating population prevalence, a purposive sample was adequate for this present study.^{33,63–68} Indeed, the recruitment of such a large sample of transgender participants can be attributed to the sampling techniques used by GDS.^{33,69} Had a probability-based approach been used, one could expect a maximum of between 380 and 1520 transgender participants.^{7,9,70}

Although GDS 2018 asked about a wide range of drugs, several drug groups (opioids) and behaviors (nonmedical use of prescription drugs), where one would expect similar differences, were not included in the survey. GDS 2018 is a largely Western European sample, which limits generalizability. GDS is designed with demographic data collection at both the start and end of the survey. Therefore, one possible explanation for low response rate on important demographic variables such as ethnicity, sexual orientation, and education level is that these items are asked when many participants have ended participation, before reaching the end of the survey.

This present analysis required the collation of “nonbinary” and “different identity” respondents before statistical analysis. The rationale for this decision is described above. However, there remains a risk that participants have been miscategorized.

We were interested in current users, and 12-month use was chosen to ensure an adequate sample size. It also corresponded with the time frame used by the AUDIT and SDS. Consequently, a limitation of this study was that those who had never used and those who had used more than a year preceding the survey were collectively classified as “nonusers.” Finally, although it is possible that between-country differences exist, subsamples of transgender participants from individual countries were too small to allow for meaningful comparison.

Clinical, policy, and research recommendations

The most novel finding of this study was the increased risk of substance dependence faced by people with nonbinary/other identities. Given the excess substance use-related harm reported in this and other studies,²⁸ there is a need for estimates of prevalence to inform the scale of clinical service provision. Estimates from studies such as *TransPop*^{26,71} can begin to address such questions in the United States. However, patterns of drug use are influenced by cultural, political, and legal factors, which vary by both nation and region. Therefore, a representative U.S.-based sample is not generalizable to other nations, and representative samples outside of North America are needed.

Moreover, despite this being the largest international sample reported, the numbers of transgender men and transgender women were very small. Future GDS samples will aim to broaden participation in these, as well as minority ethnic groups and low- and middle-income countries. Moving forward, research should explore the motivations and culture surrounding substance use and the experiences of harm among nonbinary and other transgender people.

Currently in the United Kingdom, the National Drug Treatment Monitoring System only records each client's birth-registered sex, and Adult Psychiatric Morbidity Survey reports make no comment on transgender people.^{72,73} This and a previous GDS study indicate that there is a need for tailored substance use disorder treatment for transgender people.³² To facilitate the abovementioned estimates, the two-stage approach to assessing gender, used by the GDS,³⁵ should be incorporated into all general population surveys. Although there is evidence that this approach to measuring gender, which has high sensitivity and specificity, is generally acceptable to the community, further research is needed to understand the feasibility of offering an open-ended response option in large samples to maximize inclusivity.⁶⁸

Further work is then needed to determine what types of support are most acceptable to transgender people and the barriers that might prevent engagement. In the interim, it is recommended that the two-stage approach to assessing gender should also be incorporated into substance use disorder services, so that clients can identify themselves as transgender if they wish.³⁵ There is an urgent need for treatment providers to be educated about gender and the needs of the transgender client, to overcome the stigma and discrimination that currently prevents engagement with these services.^{74–80}

Specialist services for transgender people who use drugs and/or specialist interventions in nonspecialist settings may be indicated. However, a recent systematic review highlighted that these appear to be lacking.⁸¹ The development of such interventions should be a priority for researchers and policymakers.

Conclusion

People with nonbinary/other gender identities, transgender women, and transgender men appear to be more likely to use and become dependent on psychoactive substances, relative to cisgender women. Researchers and clinicians must take these findings into account, and a nuanced approach to gender reporting in surveys and by treatment centers is required to understand the needs of transgender people who use substances.

Authors' Contributions

D.J.C.: Conceptualization, formal analysis, writing—original draft, writing—review and editing, project administration. E.D.: Conceptualization, methodology, writing—review and editing. M.L.: Conceptualization, formal analysis, writing—review and editing, supervision. L.J.M.: Conceptualization, methodology, writing—review and editing. J.A.F.: Conceptualization, methodology, writing—review and editing. M.J.B.: Conceptualization, methodology, writing—review and editing. A.R.W.: Conceptualization, methodology, writing—review and editing. G.G.: Conceptualization, formal analysis, writing—review and editing, supervision.

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Supplementary Material

Supplementary Table S1
Supplementary Table S2
Supplementary Table S3
Supplementary Table S4
Supplementary Table S5

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Address correspondence to:
 Dean J. Connolly, MA (Cantab), MSc
 National Addiction Centre
 Institute of Psychiatry, Psychology and Neuroscience
 King's College London
 4 Windsor Walk
 London SE5 8AF
 United Kingdom

E-mail: dean.l.connolly@kcl.ac.uk