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Substance Use and Treatment of Substance Use Disorders in a Community Sample of Transgender Adults

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Abstract

Background—Transgender people have elevated substance use prevalence compared with the U.S. general population, however no studies have comprehensively examined the relationship of psychosocial risk factors to substance use and substance use disorder (SUD) treatment among both male-to-female (MTF) and female-to-male (FTM) transgender adults.

Methods—Secondary data analysis of a 2013 community-based survey of transgender adults in Massachusetts (N=452) was conducted. Adjusted multivariable logistic regression models were fit to examine the relationship of four risk factor domains with SUD treatment history and recent substance use: (1) demographics; (2) gender-related characteristics; (3) mental health; (4) socio-structural factors. Adjusted Odds Ratios (aOR) and 95% Confidence Intervals (95% CI) were estimated.

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All authors contributed to the interpretation of the data and revising the manuscript for important intellectual content. ASK led the drafting of the manuscript and oversaw subsequent revisions. SLR and ASK conceived the data analysis plan. SLR undertook the statistical analyses. SLR and JMW were principal investigators for Project VOICE, which they helped conceive and design. RDW provided clinical guidance for the article and edited the manuscript.

Conflict of Interest:
No conflict declared.

Results—Ten percent of the sample reported lifetime SUD treatment. Factors associated with significant increase in odds of lifetime SUD treatment alongside recent substance use (all $p<0.05$) were: (1) older age (aOR=1.02; 95% CI=1.01–1.04), higher educational attainment (aOR=3.59; 95% CI=2.35–5.50), low income (aOR=0.58; 95% CI=0.39–0.86); (2) MTF identity (aOR=3.03; 95% CI=1.95–4.67), gender-affirming medical care (aOR=1.99; 95% CI=1.32–3.00); (3) intimate partner violence (aOR=1.68; 95% CI=1.13–2.49), posttraumatic stress disorder (aOR = 2.56; 95% CI=1.69–3.88), depression (aOR=2.30; 95% CI=1.58–3.35), mental health treatment (aOR=1.65; 95% CI=1.11–2.45); (4) discrimination (aOR=1.90; 95% CI=1.22–2.95), unstable housing (aOR=1.80; 95% CI=1.21–2.67), and sex work (aOR=2.48; 95% CI=1.24–4.95).

Conclusions—Substance use and SUD treatment among transgender adults are associated with demographic, gender-related, mental health, and socio-structural risk factors. Studies are warranted that identify SUD treatment barriers, and integrate SUD treatment with psychosocial and structural interventions for a diverse spectrum of transgender adults.

Keywords

substance use; alcohol; drugs; transgender; posttraumatic stress disorder; unstable housing

1. INTRODUCTION

The term *transgender* describes people whose gender expression or identity differs from that traditionally attributed to their assigned natal sex (Mayer et al., 2008). Nearly 1 million American adults currently identify as transgender (Stroumsa, 2014). Studies examining substance use disorders (SUDs) among transgender people are rare, and reporting of gender identity data (e.g., transgender status) in SUD-related research is limited (Flentje et al., 2015). In the few studies that exist, transgender people have significantly elevated prevalence of alcohol and illicit drug use compared with the general population (Benotsch et al., 2013; Clements-Nolle et al., 2001; Herbst et al., 2008; Kecojevic et al., 2012; Reback and Fletcher, 2014; Santos et al., 2014).

A biopsychosocial model of illness (Engel, 1980) is often applied to understand SUDs, including consideration of the relationship of demographic, gender-related, mental health, and socio-structural risk factors to substance use and SUD treatment (Cheatle and Gallagher, 2006; Chermack and Giancola, 1997; Comfort and Kaltenbach, 1999; Griffiths, 2005; Marlatt, 1992). To our knowledge, however, no reports have comprehensively examined these factors in substance use and SUD treatment utilization among transgender adults. Indeed, the association between demographic characteristics and substance use among transgender people has not yet been well characterized. Studies have often focused on youth rather than the entire adult lifespan (Garofalo et al., 2006; Kecojevic et al., 2012; Rowe et al., 2015). In addition, gender differences in SUD treatment utilization between transgender people on the male-to-female spectrum (MTF/transgender women) versus female-to-male spectrum (FTM/transgender men) have not been described, as existing reports have focused primarily on substance use among transgender women in the context of HIV risk (Nemoto et al., 2004; Nuttbrock et al., 2014b; Reback and Fletcher, 2014; Rowe et al., 2015; Santos et al., 2014). Moreover, reporting of non-binary gender identity (i.e., gender identity which is not defined as either male or female, and may be defined as “genderqueer” or “gender

variant") in published substance use research is minimal (Flentje et al., 2015), and differences in substance use and SUD treatment between transgender people with binary versus non-binary gender identity have not been investigated.

Based on sexual minority (Meyer, 2003) and gender minority (Hendricks and Testa, 2012; Reisner et al., 2014a, 2014d) stress theories, SUDs among transgender people are increasingly viewed as downstream consequences of internalized and enacted transphobia (Nuttbrock et al., 2014b). Transgender people are at high risk for verbal, physical and sexual victimization (Garofalo et al., 2006; Operario and Nemoto, 2010; Stieglitz, 2010; Stotzer, 2009). A national study of more than 6,000 transgender people found that 63% had experienced a serious act of discrimination (e.g., medical service denial, eviction, bullying, or physical/sexual assault; Grant et al., 2011). Transgender people who, due to physical attributes that reveal their transgender status, are unable to "pass" (i.e., to be societally affirmed in the gender with which they identify) may be particularly vulnerable to victimization (Grant et al., 2011; Nemoto et al., 2004; Operario and Nemoto, 2010). Experiencing psychological or physical abuse as a result of one's nonconforming gender expression or identity is associated with a three- to four-fold higher odds of alcohol, marijuana, or cocaine use, as well as an 8-times higher odds of any drug use, among transgender women (Nuttbrock et al., 2014b). Among MTF transgender youth, gender-related discrimination is associated with increased odds of alcohol and drug use (Rowe et al., 2015). Research suggests that substance use may be a means of coping with discrimination, as a national study found that 35% of transgender people who experienced school-related verbal harassment, physical assault, sexual assault, or expulsion reported using substances to cope with transgender- or gender nonconformity-related mistreatment (Grant et al., 2011).

In the context of such common interpersonal trauma, a recent report showed that posttraumatic stress disorder (PTSD) symptoms are associated with increased odds of drug use among MTF youth (Rowe et al., 2015). Previous research also indicates that transgender people have high prevalence of depression (Clements-Nolle et al., 2001; Reisner et al., 2015) and, among transgender women, gender nonconformity-related abuse has been associated with higher likelihood of major depression (Nuttbrock et al., 2014a). Moreover, depression has been shown to mediate the relationship of gender-related abuse to substance use (Nuttbrock et al., 2014b). Though the associations of violent victimization, PTSD, and depression to substance use and SUD treatment utilization are well characterized in non-transgender populations (Davis et al., 2008; Jacobsen et al., 2001), these relationships remain largely unstudied among both MTF and FTM transgender adults.

Transgender people are twice as likely to be unemployed as non-transgender people (Grant et al., 2011), as stigma and discrimination restrict access to employment and income (Grant et al., 2011). Some transgender people, particularly transgender women, engage in sex work (Garofalo et al., 2006; Nemoto et al., 2006; Operario et al., 2008; Sausa et al., 2007; Sevelius et al., 2009). Sex work has been linked to increased prevalence and frequency of substance use among transgender women (Nuttbrock et al., 2014b). Little is known, however, about the associations of poverty, homelessness, and sex work to substance use and SUD treatment utilization among both MTF and FTM transgender adults, though these

relationships have been studied extensively in non-transgender populations (Bassuk et al., 1998; Fischer and Breakey, 1991; Nuttbrock et al., 2004; Robertson et al., 1997; Shannon et al., 2008).

Many transgender people seek out medical gender affirmation technologies, such as cross-sex hormone therapy or surgeries, to align their physical selves with their internal sense of gender identity or expression. The American Medical Association has deemed cross-sex hormone therapy and gender-affirming surgery necessary medical treatments for gender dysphoria, defined as extreme and persistent distress related to incongruence of gender identity and natal sex (American Medical Association, 2008). Nevertheless, transgender individuals face numerous barriers to receiving appropriate gender-affirming health care (Operario and Nemoto, 2010), including a lack of both competent providers and insurance coverage (Operario and Nemoto, 2010; Sanchez et al., 2009; Spicer, 2010; Stroumsa, 2014). The psychological stress of health care access disparities faced by transgender people is believed to contribute to worse mental health (Poteat et al., 2013), including disproportionate substance use as a coping strategy (Wilson et al., 2015). A recent study examined the relationship of gender-affirming medical services to recent alcohol and drug use among transgender women (Wilson et al., 2015), however, the sample did not include transgender men, and SUD treatment utilization was not assessed. Thus research exploring the specific relationship of cross-sex hormone therapy and/or gender-affirming surgery to substance use and SUD treatment utilization among diverse groups of transgender people is warranted.

Significant gaps exist in the literature regarding the association of demographic, gender-related, mental health, and socio-structural risk factors to substance use and SUD treatment among transgender adults. To address these gaps, the present study aimed to: (1) assess the prevalence and distribution of SUD treatment history and recent substance use in a community sample of transgender adults; and (2) examine the relationship of substance use and SUD treatment utilization to demographic, gender-related, mental health, and socio-structural risk factors in this understudied and highly vulnerable population.

2. MATERIALS AND METHODS

2.1. Participants and Sampling

Data were gathered through Project VOICE, a community-based sample of 452 self-identified transgender and gender-nonconforming Massachusetts residents, ages 18 to 75 years. Participants were purposively recruited using bimodal methods (online and in-person) from August to December, 2013 and asked to complete a one-time survey assessing demographics, experiences of discrimination and victimization, and health indicators. Participants provided informed consent before beginning the survey. The study was designed to examine the association between social stress (e.g., public accommodations discrimination) and stress-responsive physical and mental health indicators (e.g., asthma and depression). The study was not specifically designed to study SUDs or their treatment. Eligible respondents were age 18 years or older, self-identified as transgender or gender-nonconforming, lived in Massachusetts for at least 3 months in the past year, and had the ability to read/write at the 5th grade level or higher in either English or Spanish. Project

VOICE was a local collaboration between The Fenway Institute (TFI) at Fenway Health and the Massachusetts Transgender Political Coalition (MTPC). Compensation for participating was entry into a raffle in which participants could win one of two iPads. Given the time required to complete the survey and the lack of incentive for every participant, it is unlikely that individuals who were not transgender would take the time to complete this relatively lengthy survey. Additionally, the survey was circulated through social networks of transgender people and organizations surveying transgender people. In-person surveys recruited transgender people at events for the transgender community. Participants were required to provide a unique code based on letters in their name and year of birth. Surveys with the same code were reviewed for similarity and duplicates were removed. There was also a question that asked whether participants had completed the survey before (yes/no). Those who selected "yes" were not permitted to take the survey again. Further details on survey methodology can be found elsewhere (Reisner et al., 2014e). All study activities were reviewed by the IRB at Fenway Health.

2.2. Measures

2.2.1. Outcomes: Substance use and SUD treatment—Lifetime SUD treatment history was assessed with the following single-item question: "Have you ever been in treatment for alcohol and/or drug abuse?" Response options were either 1=Yes or 0=No. We assumed that treatment occurred for actual SUDs rather than subclinical substance use. This item has been used in prior SUD research (Reisner et al., 2013). Past 3-month binge drinking was assessed by asking participants whether they reported drinking five or more drinks on at least one occasion in the past three months, with response options 1=Yes and 0=No. Participants were asked whether they had smoked marijuana ("pot") in the past 12 months (1=Yes, 0=No). Past 12-month non-marijuana illicit drug use was assessed by asking participants if they had used the following 10 substances (1=Yes, 0=No): cocaine, crack, club drugs, heroin, methamphetamine, poppers, hallucinogens, downers (sedatives/hypnotics/anxiolytics), painkillers, or another drug. Any past-12 month non-marijuana illicit drug use was operationalized as self-reported use of any of these non-marijuana illicit drugs versus not.

Using these variables, two binary substance use outcomes were operationalized as follows: (1) SUD treatment history; (2) SUD treatment history and recent substance use (i.e. SUD treatment history and any report of: a) binge drinking in the past 3 months; b) past-year marijuana use, or c) any past-year non-marijuana illicit drug use). We did not use recent substance use alone as an outcome because we were assessing overall patterns of use among transgender adults: recent substance use is a snapshot that is not necessarily indicative of overall patterns of use and could overrepresent or underrepresent use.

2.2.2. Independent variables: Four risk factor domains—Independent variables were grouped into four domains based on the biopsychosocial model of illness (Engel, 1980) as well as based on major clinical risk categories for SUDs that remain understudied among transgender people, as outlined above.

2.2.2.1 Domain 1: Demographics: Age in years was assessed continuously. Participants were categorized as having either low educational attainment (high school/GED or below) or higher educational attainment (some college, college degree, or above) and either low income (< $35,000 annually, which is 300% of the federal poverty level in 2013Office of the Assistance Secretary for Planning and Evaluation, 2013) or higher income (> $35,000 annually). Race/ethnicity captured whether participants were people of color (POC) or white (non-Hispanic).

2.2.2.2 Domain 2: Gender-related characteristics: Gender was assessed using a two-step method asking two items: (1) assigned sex at birth (female, male) and (2) current gender identity (man, woman, female-to-male (FTM)/trans man, male-to-female (MTF)/trans woman, genderqueer, gender variant, gender-nonconforming, other; Reisner et al., 2014b, 2014c). The two items were cross-tabulated to categorize participants as female-to-male (FTM) spectrum or male-to-female (MTF) spectrum according to their natal sex and current gender identity. An indicator of non-binary gender identity was also created to compare individuals with a non-binary identity and those with a binary identity (man, woman). Medical gender affirmation was operationalized as being on cross-sex hormone therapy and/or having had any type of gender-affirming surgery (yes/no).

2.2.2.3 Domain 3: Mental health factors: Lifetime intimate partner violence was assessed by asking participants (yes/no): “Have you ever been slapped, punched, kicked, beaten up, or otherwise physically or sexually hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner?” Lifetime PTSD diagnosis was assessed using a single-item measure from the BRFSS (Centers for Disease Control and Prevention, 2011). Participants were asked a series of questions about health conditions, including PTSD, with the following response options: 1=No, I don’t have this; 2=Not sure if I have this; 3=Yes, a health professional diagnosed me with this; 4=Yes, I think I have this. Participants reporting having been diagnosed by a healthcare provider with PTSD were considered to have a lifetime PTSD diagnosis and compared to all others (yes/no), to be consistent with prior research (Sareen et al., 2007). Past 7-day depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale-10 (CESD-10), a 10-item validated screener for depression (Andresen et al., 1994). Respondents meeting the validated cutoff score for clinically significant depression (10 or higher) were compared to those who did not meet the threshold. Current mental health treatment was queried using a single-item measure: “Are you now taking medicine or receiving treatment from a doctor or other health professional for any type of mental health condition or emotional problem?” (1=Yes, 0=No).

2.2.2.4 Domain 4: Socio-structural factors: Participants were asked whether they had sought and been unable to access gender-affirming medical care (hormones or surgery) in the past 12 months (yes/no). Discrimination in public accommodations settings in the past 12 months was assessed by asking participants if they experienced discrimination (verbal or physical mistreatment of some kind) in a public accommodations venue in the past 12 months (Yes=1, No=0). Past 12-month unstable housing was operationalized as “rarely,” “sometimes,” or “often” having difficulty “finding a safe place to hang out or sleep (housing)” in the past 12 months. This was compared to stable housing, operationalized as

"never" having difficulty "finding a safe place to hang out or sleep (housing)" in the past 12 months. Past 12-month sex work (transactional sex) was assessed by asking participants: "Have you traded sexual activity or favors for food, money, a place to sleep, drugs, or other material goods in the last 12 months?" (1=Yes, 0=No).

2.3. Data analysis

Statistical analyses were performed in SAS v9.4.1 with statistical significance set at the level of alpha=0.05. First, univariable, descriptive statistics were used to summarize the overall distribution of variables with regard to mean, standard deviation (SD), frequency, and proportion. Analyses then sought to examine recent substance use by SUD treatment history. Overall 12.2% of the study sample was recruited in-person. A significantly higher proportion of participants reporting SUD treatment history were recruited in-person versus online (22.2% vs 11.1%; OR=2.30; 95% CI=1.63, 3.24; $p<0.0001$). Survey mode (in-person vs. online) was therefore treated as a study design covariate and adjusted for in all statistical comparisons.

Two substance use outcomes were modeled: (1) lifetime SUD treatment history; (2) combined lifetime SUD treatment history and recent substance use. Lifetime SUD treatment and recent substance use were combined for the second outcome, in an effort to use the variables available to us through Project VOICE to identify groups with higher SUD treatment prevalence despite not also having more substance use, for example if one group has greater access to SUD treatment than its comparison group as a result of encountering fewer service barriers.

A single multivariable logistic regression model regressed each of these two substance use-related outcomes on the four risk factor domains (demographic, gender-related, mental health, and socio-structural risk factors) to identify those groups with significantly higher probability of adverse substance use outcomes. All models were adjusted for survey mode and included the following variables, which were selected based on prior research indicating that comparable factors are predictive of substance use in other samples, excepting non-binary gender identity, which was included as a variable of interest due to the absence of prior research assessing its relationship to substance use: age (continuous; Kessler et al., 2005), higher educational attainment (yes/no; Gfroerer et al., 1997), higher income (yes/no; Bassuk et al., 1998), people of color (yes/no; Wallace and Muroff, 2002), MTF spectrum (yes/no; Herbst et al., 2008), non-binary gender (yes/no; Flentje et al., 2015), medical gender affirmation (yes/no; Wilson et al., 2015), lifetime intimate partner violence (yes/no; Reisner et al., 2013), lifetime PTSD diagnosis (yes/no; Jacobsen et al., 2001; Rowe et al., 2015), past 7-day clinically significant depression (yes/no; Davis et al., 2008), current mental health treatment (yes/no; Kessler et al., 1996), inability to access gender-transition care in past 12 months (yes/no; Wilson et al., 2015), public accommodations discrimination in past 12 months (yes/no; Nuttbrock et al., 2014b), past 12-month unstable housing (yes/no; Bassuk et al., 1998), and past 12-month sex work (yes/no; Rekart, 2005). Models were adjusted for recent substance use, as appropriate. Adjusted Odds Ratios (aOR) and 95% Confidence Intervals (95% CI) were estimated.

3. RESULTS

3.1. Sample characteristics

Characteristics of the study sample are presented in Table 1. The mean age was 33.6 (SD=12.8) years, with 20.6% of the sample identifying as people of color and 36.9% self-identifying as MTF. Overall, 10% reported a lifetime SUD treatment history, whereas 7.3% reported both lifetime SUD treatment and recent substance use. Binge drinking in the past 3 months (47.0%) was reported more frequently than marijuana use (39.6%) or non-marijuana illicit drug use (19.0%) in the past 12 months. Recent substance use by SUD treatment history is shown descriptively in Table 2.

3.2. Multivariable analysis

Table 3 presents two multivariable logistic regression models adjusted for survey mode: the first model has any lifetime SUD treatment history as its outcome, and the outcome in the second model is any lifetime SUD treatment history plus recent substance use. In the first model (first column), factors associated with a statistically significant increase in the odds of lifetime SUD treatment (at $p<0.05$) were: (1) recent substance use: binge drinking in the past 3 months, non-marijuana illicit drug use in the past 12 months; (2) demographics: older age, low educational attainment; (3) gender characteristics: non-binary gender identity, being on cross-sex hormones or having gender-affirming surgery; (4) mental health factors: lifetime intimate partner violence, lifetime PTSD, current mental health treatment; and (5) socio-structural risk: unstable housing.

In the second model (second column), factors associated with a statistically significant increase in the odds of lifetime SUD treatment plus recent substance use (at $p<0.05$) were: (1) demographics: older age, higher educational attainment, low income, (2) gender characteristics: MTF gender identity, being on cross-sex hormones or having gender-affirming surgery; (3) mental health factors: lifetime intimate partner violence, lifetime PTSD, current depression, current mental health treatment; (4) socio-structural risk: discrimination in public accommodations, unstable housing, and sex work.

4. DISCUSSION

In this community sample of transgender adults, the prevalence of alcohol and drug use was found to be consistent with previous studies assessing substance use in transgender people (Benotsch et al., 2013; Clements-Nolle et al., 2001; Herbst et al., 2008; Kecojevic et al., 2012; Reback and Fletcher, 2014; Santos et al., 2014). The higher prevalence of lifetime SUD treatment mainly among participants with recent illicit use of prescription medications such as stimulants, downers, and painkillers may be related to greater overall health care access among these participants. As might be expected, binge drinking in the last 3 months and non-marijuana illicit drug use in the last 12 months were each associated with a significant increase in the odds of lifetime SUD treatment.

Applying a biopsychosocial model (Engel, 1980), with regard to demographic and gender-related factors, this study found that transgender adults with lifetime SUD treatment plus recent substance use are more likely to: 1) be older; 2) be on the MTF spectrum; 3) access

gender-affirming medical care, and 4) have lower income levels despite higher educational attainment. Older transgender adults may use alcohol and drugs to cope with stress from stigma and discrimination throughout the life course (Auldridge et al., 2012; Fredriksen-Goldsen et al., 2014; Grant et al., 2011). The finding regarding older adults emphasizes the importance of expanding the current substance use research agenda beyond a primary focus on transgender youth in order to be more inclusive of older transgender adults, who may have unique vulnerabilities to substance use and SUDs. The association of cross-sex hormone and/or surgery utilization with higher odds of both lifetime SUD treatment and lifetime SUD treatment plus recent substance use may indicate that people with more access to gender-affirming health care also had more access to SUD treatment services. With regard to educational attainment and income, additional longitudinal research is needed given the cross-sectional nature of this study and non-inclusion of temporal data regarding whether substance use or SUD treatment preceded either completion of education or changes in income. Higher educational attainment was associated with greater odds of lifetime SUD treatment both alone and when combined with recent substance use, which may be occurring in the context of this group's higher health literacy and treatment access, as well as possibly higher substance use related to stress from low income despite higher educational attainment. The higher prevalence of lifetime SUD treatment plus recent substance use, but not of SUD treatment alone, among MTF participants compared with FTM participants may be related to higher prevalence of substance use among MTF individuals, perhaps in the context of greater life stress from more prevalent discrimination as well as MTF individuals' possibly lower access and linkage to health services (Grant et al., 2011). Future research should explore the motivators and barriers to SUD treatment interventions among MTF and FTM individuals together and separately so that tailored interventions can be developed to meet the unique needs of these population subgroups.

Continuing within a biopsychosocial framework, this study assessed mental health factors and found that transgender adults with a history of SUD treatment alongside recent substance use disproportionately experience: 1) intimate partner violence; 2) lifetime PTSD; 3) current clinically significant depression, and 4) current mental health treatment. Transgender people who experience violent victimization and/or who develop PTSD may be coping with the stress of gender abuse through substance use (Nuttbrock et al., 2014b). These findings are consistent with results from a recent study that examined PTSD and substance use among transgender female youth (Rowe et al., 2015). Alternatively, transgender adults with substance use may be more likely to have intimate partners with SUDs and may experience more intimate partner violence in this context (Coker et al., 2000; Jewkes, 2002). Clinically significant depression in the past seven days was not associated with lifetime SUD treatment history alone; however, it was associated with the combined outcome of lifetime SUD treatment plus recent substance use. Depression may have contributed to substance use as a coping strategy, or it may have itself resulted from chronic SUDs (Grant et al., 2004). Mental health treatment was associated with higher odds of lifetime SUD treatment as well as higher odds of lifetime SUD treatment plus recent substance use, consistent with the notion that transgender people with access to general mental health treatment may also be more likely to have access to treatment specifically targeting SUDs.

Through an examination of socio-structural factors, this study found that transgender adults with lifetime SUD treatment plus recent substance use have disproportionate past-year: 1) unstable housing; 2) public accommodations discrimination, and 3) engagement in sex work. Transgender-specific housing interventions should be prioritized, including services built upon the Housing First model (Tsemberis and Eisenberg, 2000; Tsemberis et al., 2004, 2012), an evidence-based best practice for homelessness and SUDs that centers on immediate, low-barrier, permanent supportive housing without preconditions of sobriety or treatment acceptance/adherence (Collins et al., 2012a, 2012b; Larimer et al., 2009; Padgett et al., 2011). The current study's finding regarding public accommodations discrimination extends previous research showing that gender nonconformity-related psychological abuse and discrimination among transgender women is associated with higher odds of substance use (Nuttbrock et al., 2014b; Rowe et al., 2015). The present finding pertaining to sex work, in this community sample comprised of majority FTM-spectrum participants, extends previous research that identified sex work as a syndemic risk factor primarily among transgender women only (Brennan et al., 2012; Melendez and Pinto, 2007; Nemoto et al., 2006; Operario et al., 2008; Sausa et al., 2007; Sevelius et al., 2009).

The association of current low income, past 7-day depression, past 12-month discrimination, and past 12-month sex work with higher odds of lifetime SUD treatment plus recent substance use, but not of lifetime SUD treatment alone, may be related to the greater synchronicity of these four variables with recent substance use than with lifetime SUD treatment.

Limitations of this study include its cross-sectional design, which does not allow causal inferences regarding the associations with substance use and SUD treatment in this sample of transgender adults. Additionally, Project VOICE was not primarily designed to assess SUDs or SUD treatment. Data were not collected on the frequency of substance use, and substance use variables presented here did not correspond to diagnostic criteria for SUDs: this imprecision prevented this study from drawing conclusions about how problematic substance use was, or whether current treatment for SUDs was indicated or sufficient. We have also assumed that treatment only occurred for SUD diagnoses, however some participants may have experienced treatment for subclinical substance use. The combination of lifetime SUD treatment prevalence with recent substance use to generate our second outcome, and our analyses of recent substance use by lifetime SUD treatment history, are limited by our use of available variables with heterogeneous time frames that were collected in Project VOICE using pre-existing survey instruments. The difference between time frames for assessment of binge drinking (three months) versus other drug use (12 months) also resulted from use of pre-existing survey items in Project VOICE. Future studies are needed that utilize diagnostic screeners and instruments with transgender respondents to be comparable to other SUD research studies. Another limitation is that not all substance use assessed was equally adverse: for example, past-year use of poppers is more benign than past-year heroin use, yet the current analyses did not account for such differences in severity. Moreover, this community sample was drawn from Massachusetts, therefore findings may not be generalizable to transgender people in other geographic areas. Finally, study data were derived from participants' self-report and were therefore susceptible to recall and social desirability biases.

Despite its limitations, this study expands understanding of the prevalence of substance use and SUD treatment, and for the first time comprehensively assesses the association of these to demographic, gender-related, mental health, and socio-structural factors among transgender adults, an understudied and highly vulnerable population. The study extends findings from previous research by focusing not just on substance use but also SUD treatment, and by inclusively reporting on both transgender men and women, non-binary gender-identified transgender people, and people across the full adult lifespan. It will be important for future studies to continue to report on the full spectrum of demographic and gender-related diversity within the transgender community in order to develop more effective treatment interventions. Future research should aim to identify barriers to SUD treatment among transgender adults. Policy and research initiatives ought to focus on developing multicomponent interventions to reduce SUDs and provide much-need services for transgender adults, by integrating clinical treatments with structural risk interventions, such as housing and employment assistance, to reduce serious health disparities faced by this population.

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Highlights

- This is the first study of risk factors for substance use/substance use disorder (SUD) treatment in transgender men and women.
- We assessed psychosocial risk factors for substance use and SUD treatment in transgender adults.
- Substance use and SUD treatment are linked to age, education, poverty and male-to-female identity.
- Substance use and SUD treatment are linked to violence/PTSD, discrimination, housing and sex work.
- SUD treatment should incorporate psychosocial/structural approaches for transgender adults.

Table 1

Characteristics of 452 Transgender Adults Sampled in Massachusetts.[+]

	Total Sample (n=452)
	%
Substance Use	
SUD Treatment History	10.0
SUD Treatment History and Recent Substance Use (Recent Substance Use = Recent Binge Drinking, Marijuana Use, and/or Any Non-Marijuana Illicit Drug Use)	7.3
Binge Drinking, Past 3 Months	47.0
Marijuana Use, Past 12 Months	39.6
Non-Marijuana Illicit Drug Use, Past 12 Months	19.0
Polysubstance Use (Binge Drinking, Marijuana Use, and Any Non- Marijuana Illicit Drug Use – All 3 Concurrently)	10.8
	Mean (SD)
Demographics	
Age in Years (range 18–75 years)	33.6 (12.8)
	%
Low Education (High School Diploma/GED or Below)	14.4
Low Income (< $35,000 annually)	45.6
People of Color (POC)	20.6
Gender Characteristics	
MTF Spectrum Gender Identity	36.9
Non-Binary Gender Identity	40.9
Cross-Sex Hormones and/or Surgery	54.9
Mental Health	
Intimate Partner Violence Ever	33.1
PTSD Diagnosis Ever	21.8
Depressed (CESD Score 10^{+}), Past 7 Days	23.7
Current Mental Health Treatment Utilization	45.4
Socio-Structural Factors	
Unable to Access Gender Transition-Related Care, Past 12 Months	19.7
Public Accommodations Discrimination, Past 12 Months	65.0
Unstable Housing, Past 12 Months	23.5
Sex Work, Past 12 Months	3.1

[+] All Models adjusted for survey mode (in-person vs online).

Table 2

Distribution of Recent Substance Use By SUD Treatment History in a Community Sample of Massachusetts Transgender Adults (n=452).

	Total Sample (n=452)		SUD Treatment (n=45)		No SUD Treatment (n=407)	
	n	%	n	%	n	%
Binge Drinking, Past 3 Months	212	47.0	24	53.3	188	46.2
Marijuana Use, Past 12 Months	179	39.6	22	48.9	157	38.6
Any Non-Marijuana Illicit Drug Use, Past 12 Months	86	19.0	18	40.0	68	16.7
Stimulants (e.g., Cocaine, Crack, Methamphetamine)	15	3.3	9	20.0	6	1.5
Club Drug (e.g., Ecstasy, GHB, Ketamine)	19	4.2	4	8.9	15	3.7
Heroin	5	1.1	3	6.7	2	0.5
Poppers	11	2.4	1	2.2	10	2.5
Hallucinogens (e.g., LSD, mushrooms)	26	5.8	3	6.7	23	5.7
Downers	29	6.4	9	20.0	20	4.9
Painkillers	39	8.6	9	20.0	30	7.4
Other Drug	13	2.9	3	6.7	10	2.5
Polydrug Use (3 or More Non-Marijuana Illicit Drugs Used), Past 12 Months	19	4.2	9	20.0	10	2.5
Polysubstance Use (Binge Drinking, Marijuana Use, and Any Non-Marijuana Drug Use – Use of All 3 Concurrent)	49	10.8	11	24.4	38	9.4

Table 3

Multivariable Logistic Regression Models Examining (1) SUD Treatment History, and (2) SUD Treatment History Plus Recent Substance Use in the Sample of Transgender Adults (n=452)[+]

	SUD Treatment History 10.0% (n=45)		SUD Treatment History Plus Recent Substance Use 7.3% (n=33)	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Substance Use				
Binge Drinking, Past 3 Months	**1.83 (1.30, 2.58)**	**0.0006**	--	--
Marijuana Use, Past 12 Months	1.01 (0.69, 1.49)	0.942	--	--
Non-Marijuana Illicit Drug Use, Past 12 Months	**2.97 (1.98, 4.45)**	**<0.0001**	--	--
Demographics				
Age in Years	**1.06 (1.05, 1.08)**	**<0.0001**	**1.02 (1.01, 1.04)**	**0.003**
Higher Educational Attainment	**3.11 (2.12, 4.56)**	**<0.0001**	**3.59 (2.35, 5.50)**	**<0.0001**
Higher Income	0.75 (0.53, 1.06)	0.099	**0.58 (0.39, 0.86)**	**0.006**
People of Color (POC)	1.00 (0.66, 1.52)	0.983	0.88 (0.56, 1.40)	0.596
Gender Characteristics				
MTF Spectrum Gender Identity	1.39 (0.95, 2.05)	0.089	**3.03 (1.95, 4.67)**	**<0.0001**
Non-Binary Gender Identity	**1.73 (1.16, 2.59)**	**0.007**	1.26 (0.80, 1.98)	0.312
Cross-Sex Hormones and/or Surgery	**1.76 (1.22, 2.54)**	**0.003**	**1.99 (1.32, 3.00)**	**0.001**
Mental Health				
Intimate Partner Violence Ever	**2.14 (1.51, 3.03)**	**<0.0001**	**1.68 (1.13, 2.49)**	**0.011**
PTSD Diagnosis Ever	**1.99 (1.38, 2.87)**	**0.0002**	**2.56 (1.69, 3.88)**	**<0.0001**
Depressed (CESD Score 10[+]), Past 7 Days	1.39 (0.99, 1.96)	0.060	**2.30 (1.58, 3.35)**	**<0.0001**
Current Mental Health Treatment	**1.73 (1.23, 2.44)**	**0.002**	**1.65 (1.11, 2.45)**	**0.014**
Socio-Structural Factors				
Unable to Access Transition- Related Care, Past 12 Months	0.79 (0.53, 1.18)	0.253	0.94 (0.61, 1.45)	0.772
Discrimination, Past 12 Months	1.12 (0.78, 1.61)	0.531	**1.90 (1.22, 2.95)**	**0.004**
Unstable Housing, Past 12 Months	**1.58 (1.17, 2.40)**	**0.005**	**1.80 (1.21, 2.67)**	**0.003**
Sex Work, Past 12 Months	1.88 (0.93, 3.80)	0.079	**2.48 (1.24, 4.95)**	**0.010**

[+] All Models adjusted for survey mode (in-person vs online).

aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval.