Title

Prevalence and correlates of methamphetamine use in transitional age youth experiencing homelessness or housing instability in San Francisco, CA

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Abstract

Introduction:

Substance use, including methamphetamine use is a contributing factor in HIV acquisition and treatment. Stimulant use is linked to mental health yet there is limited data from youth in community based settings.

Design: One hundred marginally housed or homeless transitional age youth (TAY) were recruited at Larkin Street Youth Services and completed a survey on mental health and substance use.

Methods: We conducted baseline data and built multivariable logistic regression models to identify the correlates of methamphetamine use among TAY.

Results: Participants were mean aged 22. Of those who reported methamphetamine use in the past 3 months were 64% Gay, Bisexual, or Pansexual when compared with those who reported no use (54%). Factors independently associated with methamphetamine use were; living with HIV (adjusted odds ratio [aOR]=3.18, 95% CI=1.11-9.15), depressive symptoms (aOR=6.02, 95% CI=1.46-24.78), symptoms of PTSD (aOR=13.38, 95% CI=1.59-112.73), polysubstance use in the past three months (aOR=50.02, 95% CI=9.72-257.46) and a history of injection drug use (aOR=8.38, 95% CI=1.87-37.53).

Conclusions: Results from this study suggest a need to develop, adapt, and rapidly implement comprehensive interventions that address the combined epidemics of substance use, HIV and mental health among TAY.

Key Words

HIV, Transitional Age Youth, Stimulant Use, Mental Health

Clinical Relevance

This article examines factors associated with methamphetamine use among transitional age youth (TAY) experiencing homelessness or housing instability. Several factors were associated with use, including depression, PTSD, HIV status, polysubstance use, and injection drug use. These findings highlight the need for nurses to assess for methamphetamine use among youth as well as associated mental health and physical health problems. Nurses should link TAY who are using methamphetamine to evidence-based treatment programs to address the substance use and comorbid conditions.

Introduction

The most recent data from the Centers for Disease Control and Prevention (CDC) estimate there have been more than 100,000 overdose deaths between February 2021 and February 2022, representing a nearly 12% increase in deaths compared to the preceding 12-month period (Ahmad et al., 2022). While opioid-related overdoses continue to represent the majority of cases, methamphetamine-related overdose deaths have risen dramatically over the past decade (Hedegaard et al., 2020). From 2015-2019 alone, overdose deaths involving psychostimulants other than cocaine increased 180% with the vast majority attributed to methamphetamine (Han et al., 2021). Overall use of methamphetamine is also high. An estimated 1.6 million adults over the age of 18 in the United States have used methamphetamine in the past year and 52.9% of those reporting past-year use meet criteria for methamphetamine use disorder (MUD) (Jones, Compton, et al., 2020). Globally, trends in methamphetamine use show similar increases in the past few years, particularly in Southeast Asia and the Middle East (Chomchai & Chomchai, 2015). The political and sociocultural context of methamphetamine use differs regionally. Soldiers, sex workers, and men who have sex with men (MSM) represent distinct populations of methamphetamine users geographically (Chomchai & Chomchai, 2015, Shokoohi et al., 2018). However, less is known regarding trends in use among TAY globally and the unique factors contributing to the development of MUD.

Methamphetamine is a potent central nervous system (CNS) stimulant that acts to increase levels of the monoamine neurotransmitters serotonin, dopamine, and norepinephrine in the brain resulting in increased energy, euphoria, and behavioral disinhibition (Fitzpatrick et al., 2020; Yasaei & Saadabadi, 2022). Methamphetamine can be taken orally, smoked, snorted, injected or absorbed through the rectal epithelium (“booty bump”) (Cantrell et al., 2006; Yasaei & Saadabadi, 2022). Aside from acute overdose, short-term impacts of use include tachycardia, hypertension, increased body temperature, sleep disruption, erratic behavior, hallucinations, psychosis, and seizures (Yasaei & Saadabadi, 2022). Long-term use is associated with significant medical and neuropsychiatric complications, including pulmonary hypertension, renal failure, impaired information processing speed, persistent psychosis, and increased risk of developing Parkinson’s disease ((Jayanthi et al., 2021; Yasaei & Saadabadi, 2022).

Research has consistently shown associations between methamphetamine use and HIV infection, major depressive disorder, suicidality, trauma experiences, personality disorders, and polysubstance use (Fletcher et al., 2018; Grov et al., 2020). However, this research base is largely comprised of middle- to older-aged adults and little is known about HIV, mental health burden, and other substance use behavior among transitional age youth ages 18-24 (TAY) who use methamphetamine (Freeman et al., 2011; Kuitunen-Paul et al., 2021). This is despite data showing a concerning increase in methamphetamine use and rise in hospital visits for nonfatal stimulant overdose rates among this age group ((Jones, Olsen, et al., 2020; Roehler et al., 2021). Various federal agencies have prioritized TAY in initiatives to address the HIV, substance use, and mental health epidemics in the U.S. given the disparities in outcomes for this age group as well as the potential for long-term benefits of prevention and early intervention efforts at this

developmental stage (The White House, 2021a, 2021b). These policy priorities highlight the importance of understanding this nexus of HIV, substance use, and mental health problems among individuals who are 18 – 24 years old.

Social determinants of health (SDH), such as homelessness and incarceration history, are salient drivers of methamphetamine use as well, particularly for TAY. Young people who experience homelessness are more likely to report high rates of substance use, including methamphetamine use and injection drug use (IDU), compared to their housed peers (Ararso et al., 2021; Smith-Grant et al., 2022). One study of street-involved youth reported high rates of methamphetamine initiation after onset of homelessness (Uhlmann et al., 2014). Similarly, a history of incarceration is associated with methamphetamine use and IDU among homeless TAY, particularly among those in social networks comprised of other youth who are using methamphetamines (Nyamathi et al., 2012; Zhao et al., 2018).

Applying a SDH lens to methamphetamine use among TAY can help identify modifiable risk factors for problematic use and negative health outcomes. SDHs are potent influencers of health status and are essential to address in order to eliminate persistent health disparities (Phillips et al., 2020). This study used a SDH perspective to examine correlates of methamphetamine use among a sample of homeless and marginally housed TAY in San Francisco, CA.

Design

We utilized baseline survey data from a cross-sectional sample of 100 marginally housed and homeless transitional aged youth in San Francisco. Participants were recruited in collaboration with a local community-based organization, Larkin Street Youth Services, which provides housing, education, medical care, and behavioral health services to youth aged 12-24 at risk for or currently experiencing homelessness. Eligibility criteria were 1) current client of Larkin Street Youth Services and 2) between the ages of 18 and 24. Recruitment was completed between May 2017 and April 2018 at multiple Larkin Street Youth Service sites in San Francisco. Potential participants were contacted through community meetings, responded to posted flyers, and referred by staff. Data were collected as part of a broader capacity building initiative to improve substance use and HIV prevention services for at-risk racial/ethnic minority youth and young adults.

Materials & Methods

Study Procedures

Written consent was obtained from all participants. One-on-one survey interviews were completed with participants and lasted 45-120 minutes. The research assistant read all questions aloud in a private setting and recorded responses in a computer assisted survey information collection (CASIC) system. A 30-dollar drugstore gift-card was given to participants after completion of the interview. The study and all documents received approval by the University of California, San Francisco Institutional Review Board (IRB Protocol #17-21673).

Outcome

The outcome of interest for this study was any methamphetamine use in the past three months. The National Institute on Drug Abuse (NIDA) Modified ASSIST V1.0 was utilized to measure methamphetamine use (World Health Organization (WHO) ASSIST Working Group, 2002). Participants were asked "in your lifetime, which of the following substances have you ever used." Those who response indicated previous methamphetamine use were asked "in the past three months, how often have you used methamphetamine." A dichotomous variable was created for methamphetamine use in the past three months, and those who answered the follow up question and selected a response other than "never" were coded as yes.

Sociodemographics

The survey included sociodemographic questions including age, race/ethnicity, gender identity, sexual orientation, and HIV status. Race/ethnicity categories were: White, Black or African American, Multiracial, or other. Gender identity options included: male, female, or other with an open field option. A dichotomous variable was created for sexual minority status, which combined gay, lesbian, bisexual, and pansexual responses. HIV status responses were coded as positive or negative/unknown.

Mental Health

Four instruments were included in the survey to measure the presence of symptoms associated mental health conditions. Symptoms of depression were assessed using the Center for Epidemiologic Studies Depression Scale (CES- D), which measures 20-iterms associated with depression (Cronbach's alpha = 0.87; Radloff, 2016). The total scores range from 0-60, with higher scores indicating increasing number and frequency of symptoms. A score of 16 or higher indicates risk for major depressive disorder (MDD). A dichotomous variable of participants' total CES-D scores was created using the cutoff of 16 (yes/no). The 20-item PTSD Checklist for DSM-5 (PCL-5) was utilized to assess for symptoms of post-traumatic stress disorder (PTSD; Cronbach's alpha = 0.95; Weathers et al., 1993). PCL-5 total scores range from 0-80 and a score of 33 or higher is consistent with PTSD. A dichotomous variable was created using the cutoff of 33 (yes/no). Symptoms of anxiety were measured using the Generalized Anxiety Disorder 7-item (GAD-7) scale (Cronbach's alpha = 0.89; Mossman et al., 2017). Total scores ranging from 0-21 are divided into 4 categories: minimal (0-4), mild (5-9), moderate (10-14), and severe (15+). A dichotomous variable was created for moderate to severe anxiety which included scores of 10 or greater (yes/no). The Adverse Childhood Experiences (ACEs) measures traumatic events prior to age 18 (Felitti et al., 1998). A dichotomous variable greater adverse childhood scores was created using the cutoff score of 4 or higher (yes/no).

Substance Use

In addition to methamphetamine use, the NIDA-Modified ASSIST asked about use of cannabis, cocaine, prescription stimulants, inhalants, sedatives, hallucinogens, street opioids, prescription opioids, and other drugs. We defined polysubstance use as three or more drugs

listed above except for methamphetamine over the past three months and created a dichotomous variable (yes/no), consistent with a prior study (Connor et al., 2014). Participants were asked "have you ever used any drug by injection." Lifetime history of injecting was coded as a dichotomous variable (yes/no).

Descriptive Statistics

To describe the study sample with respect to sociodemographic characteristics, social determinants of health, mental health symptoms, and substance use, we used frequencies and percentages for categorical variables, and means and standard deviations (SD) for continuous data. We also stratified by methamphetamine use and estimated the extent to which these factors vary among TAY who reported methamphetamine use and TAY who did no report methamphetamine use. To do this, we used Chi-square tests for categorical data, and T-tests for continuous variables.

Logistic Regression Analyses

First, bivariate logistic regression models were built to examine the relationship between sociodemographics, social determinants of health, mental health factors, and substance use variables and the outcome of methamphetamine use in the past three months. Then, to estimate the total effect of each primary effect measure that was significant (<0.05) at the bivariate level while controlling for age, race/ethnicity, gender identity, and sexual orientation, we built individual models estimating the impact of each exposure on methamphetamine use separately (Westreich & Greenland, 2013). To ensure the integrity of each model, we tested for multicollinearity between all exposures and confounders by estimating the correlation coefficient between each set of variables using Stata's correlate command. We identified a strong negative correlation between living with HIV and being heterosexual (-0.47) and therefore chose to remove sexual orientation as a confounder. All analyses were performed using Stata 16.1.

Results

Among a total of 100 TAY, the mean age was 21.7 (SD=1.8), participants were predominantly male (67%), most (54.2%) identified as a sexual minority and 23% were living with HIV. More than half of the sample reported symptoms of depression, anxiety, or PTSD. More than a quarter of participants (28%) reported use of methamphetamines in the prior 3 months (Table 1). An a prior power analysis was not conducted as this was a secondary data analysis and participation was capped at 100 individuals in keeping with the primary aims of this capacity building initiative.

Baseline comparisons of TAY who reported methamphetamine use and TAY who did not report methamphetamine use suggested that the two groups differed with respect to the following: living with HIV (42.7 % vs. 15.7%, p=0.004); having depressive symptoms (89.3% vs. 67.1%, p=0.03); having symptoms consistent with PTSD (96.4% vs. 72.7%, p=0.009); reporting polysubstance use (67.9% vs. 11.4%, p=<0.001); and a history of IDU (64.3% vs. 23.1%, p=0.002; Table 1).

In unadjusted logistic regression models the following factors were significantly associated with greater odds of methamphetamine use: living with HIV (odds ratio [OR]=4.02, 95% CI=1.50-10.80); having depressive symptoms (OR=4.08, 95% CI=1.11-14.92), having symptoms consistent with PTSD (OR=10.06, 95% CI=1.28-79.26), reporting polysubstance use (OR=16.36, 95% CI=5.54-48.28), and a history of IDU (OR=6, 95% CI=1.82-19.84; Table 2).

The independent effect of factors associated with methamphetamine use among TAY was examined in multivariable logistic regression (Table 3). The following factors were significantly associated with greater odds of methamphetamine use: living with HIV (adjusted odds ratio [AOR]=3.18, 95% CI=1.11-9.15); depressive symptoms (AOR=6.02, 95% CI=1.46-24.78); symptoms consistent with PTSD (AOR=13.38, 95% CI=1.59-112.73); polysubstance use (AOR=50.02, 95% CI=9.72-257.46), and a history of IDU (AOR=8.38, 95% CI=1.87-37.53).

Discussion

This sample of TAY experiencing homelessness or unstable housing reported high levels of overall substance use. Over one quarter of youth reported methamphetamine use in the past three months, which is notably higher than the 0.8% reported use among this age group in a recent national sample (Substance Abuse and Mental Health Services Administration, 2019). This is likely due, in part, to the high rate of methamphetamine use seen among people experiencing homelessness as well as geographic differences in use (Ararso et al., 2021). Western states have a significantly higher prevalence of methamphetamine use compared to other regions nationally, potentially creating permissive beliefs about methamphetamine use among drug using communities (Grov et al., 2020). Similarly, unlike in other samples nationally where rates of use are highest among middle aged adults, TAY in California had the greatest increase in reported methamphetamine use of any age group in the state (*Overview of Methamphetamine Usage & Trends in SF*, 2019). This highlights unique, local differences in methamphetamine use that should be considered when planning substance use-related clinical services and public health interventions for TAY.

HIV Status

TAY living with HIV had significantly greater odds of reporting methamphetamine use compared to their HIV-negative peers. This is consistent with previous research showing strong associations between these two factors (Freeman et al., 2011; Grov et al., 2020; Hurt et al., 2010). Methamphetamine use itself introduces HIV risk. People who use methamphetamine experience a simultaneous increase in sexual libido and decrease in inhibition, resulting in greater sexual risk behaviors and HIV acquisition (Grov et al., 2020). Similarly, use of methamphetamine via IDU or “booty bumping” can result in HIV infection through direct inoculation of the blood stream from a shared needle or damage the rectal mucosa, which increases biological susceptibility to HIV infection if exposed during condomless receptive anal sex (Cantrell et al., 2006). Methamphetamine also directly alters cellular processes, resulting in decreased intracellular immunity to HIV and greater HIV replication in human monocyte cells (Liu et al., 2021).

The negative behavioral, cognitive, psychiatric, and physical impacts of methamphetamine use also thwart HIV prevention efforts. HIV Pre-Exposure Prophylaxis (PrEP) and Treatment as Prevention (TasP) are two cornerstones of biomedical approaches to preventing new HIV infections. Biomedical prevention strategies, if scaled up, could prevent an estimated 70% of new HIV infections in the US (CDC, 2016). However, people who use stimulants are five times more likely to have sub-optimal PrEP adherence, limiting the preventive benefit of this otherwise potent intervention (Hojilla et al., 2018). This is salient given that 16% of this sample reported a negative HIV status but had used methamphetamine in the past 3 months. Previous research shows these individuals are at particularly high risk of HIV seroconversion and could benefit from PrEP uptake and adherence support (Grov et al., 2020). Moreover, methamphetamine use decreases engagement in HIV care and negatively impacts adherence to antiretroviral treatment (ART) and attaining viral suppression, thus contributing to forward transmission of HIV (Jin et al., 2018).

Biomedical prevention strategies comprise two of the four central strategies to the federal government's coordinated plan to end HIV epidemic by 2030. *Ending the HIV Epidemic* (EHE) proposes four main strategies: diagnosing HIV through scale up of testing and case finding; initiating all individuals living with HIV on ART as soon as possible; prevent new HIV transmissions using evidence-based interventions including pre-exposure prophylaxis (PrEP) and syringe access services; and responding to protentional HIV outbreaks in the hardest hit geographical areas of the epidemic (CDC, 2022). In line with these efforts, HIV testing, linkage and retention support for PrEP and HIV treatment, needle exchange, and HIV harm reduction education should be incorporated into substance use programs serving TAY.

Mental Health

TAY using methamphetamine had notably higher odds of meeting diagnostic criteria for MDD and PTSD in this sample compared to those without methamphetamine use, consistent with previous findings (Kuitunen-Paul et al., 2021; Marshall & Werb, 2010; Thoradeniya et al., 2021). There are likely multiple pathways to explain these associations. Psychopathology and substance use share common risk factors that may predispose an individual to comorbidity, such as: genetic vulnerabilities, environmental factors, stress, and trauma (*Common Comorbidities with Substance Use Disorders Research Report*, 2020). Methamphetamine use may represent an attempt to ameliorate one's mental health symptoms. Individuals with MDD may rely on the activating effects of stimulants to counter the negative symptoms of MDD, like lethargy, anhedonia, decreased libido, and lack of motivation. Similarly, methamphetamine may be used to overcome PTSD-related avoidance symptoms negative affectivity (Smith et al., 2010). Alternatively, stimulant use may lead to MDD and PTSD directly. Methamphetamine disrupts serotonergic and dopaminergic pathways in the brain, which may result in MDD (Jayanthi et al., 2021). Methamphetamine use may also put individuals in dangerous environments, resulting in traumatic experiences and subsequent development of PTSD.

The US Preventative Services Taskforce (USPSTF) recommends routine depression screening of all adolescents and adults in health care settings (Siu et al., 2016; Siu & on behalf of the US Preventive Services Task Force, 2016). Similar guidelines exist for targeted screening for PTSD and ACEs in the healthcare setting (Loveday et al., 2022; Sonis, 2013). Nurses can employ validated tools to assess for comorbid MDD and PTSD among populations using methamphetamine. Comprehensive care for dually diagnosed TAY should include evidence-based behavioral and pharmacologic treatments for mood and trauma-related disorders.

Substance Use Behaviors

Methamphetamine using TAY in this sample reported significantly higher prevalence of risky substance use. More than two-thirds of youth who use methamphetamine endorsed polysubstance use in the past three months. The health and psychiatric consequences of polysubstance use are beginning to explored in more detail, yet little research has evaluated this phenomenon among TAY (Connor et al., 2014). TAY may use multiple substances concurrently or sequentially either to extend or enhance the euphoric effects of a substances or as a means to treat withdrawal symptoms from another substance (Boileau-Falardeau et al., 2022; Valente et al., 2020). This pattern of use amplifies risk for mental health problems, negatively impacts substance use treatment, and is significantly associated with fatal overdoses among youth (Connor et al., 2014; O'Donnell et al., 2020; Schneider et al., 2019). Screening for substance use should be a priority in HIV care settings given the high rates of substance use among people living with HIV and negative impacts on HIV-related outcomes (Dawson-Rose et al., 2017). IDU was common in this sample, which is consistent with previous research of youth experiencing homelessness (Feng et al., 2013). IDU with shared needles increases risk of HIV and viral hepatitis infection as well as skin infections, sepsis, and infective endocarditis.

Our results highlight the importance of considering patterns of substance use as means to identify risks for overdose as well as to promote identification of otherwise unassessed methamphetamine use in TAY using other substances. Harm reduction education focusing on safer injection practices, avoiding dangerous drug-drug combinations, and overdose prevention should be incorporated into substance use services for TAY. Naloxone distribution is essential as well given the high rates of overdose seen with combined methamphetamine and opioid use and unintended fentanyl ingestion in laced substances (O'Donnell et al., 2020).

Limitations

The present study has important limitations. This is a cross-sectional study; hence, we do not know the temporal sequence between our predictors and our outcome, and therefore cannot make any causal inferences. Additionally, our study used self-reported measures which may be susceptible to recall and social desirability bias. However, our use of standardized questionnaires and cut-offs, as well as the use of CASIC enhance the rigor of these our self-reported measures. In addition, our sample size was modest, as a result, some point estimates for our predictors have wide confidence intervals. The low precision on those estimates should therefore be interpreted with caution. As previously mentioned, an a prior power analysis was not done as part of the

primary project from which these data come. A study with a small sample size and limited power is at risk of committing type II error, meaning it may fail to detect an association between variables where one truly does exist. Despite our small sample, our study did detect an association between the variables in question. Finally, because this study was conducted among TAY in San Francisco, our findings may not necessarily be generalizable to other TAY in other geographic regions.

Implications and Future Directions

Despite study limitations, the findings have important implications for nursing scholarship, policy development and practice. All nurses regardless of practice setting have an opportunity to screen and identify substance use. There is a large body of research on the prevalence of substance use as well as evidence-based responses that can be translated into practice, yet there is limited uptake of these interventions. The range of evidence-based interventions to identify and treat substance use are numerous, e.g., screening, brief interventions, linking to services or treatment including harm reduction and syringe availability, motivational interviewing, contingency management, overdose training for clinicians, and medication assisted treatment (MAT). While there is no currently identified MAT for methamphetamine use – MAT for those who use nicotine, alcohol, or opiates is readily available. Providing MAT for people who use methamphetamines and are polysubstance users represents a harm reduction approach.

There are numerous federal policy priorities in place to respond to the dual epidemics of substance use and HIV. It is critical that nurse leaders in policy implementation at all levels of government are aware of these initiatives. Advocating for incorporation of substance use identification and treatment services into biomedical HIV prevention efforts is an opportunity for nurses to be leaders in the federal EHE initiative.

Additional research on methamphetamine use among TAY is needed, especially studies with large, nationally representative samples and longitudinal follow up, to identify risk and protective factors on which promising interventions can be based. Research is also needed to identify effective medication treatments for MUD. There currently no FDA-approved MAT options for MUD and many behavioral interventions are ineffective (Ronsley et al., 2020). One behavioral strategy, contingency management, has shown promise for reducing methamphetamine use (Ronsley et al., 2020). Despite strong evidence for its effectiveness, there is limited uptake of contingency management in clinical settings (Rash et al., 2017). Moreover, multisite international studies are needed to examine the differing contexts in which TAY use methamphetamine, examining the varying influencers and consequences of this behavior. In particular, this research should examine the role of MUD in regional HIV and HCV epidemics and evaluate tailored interventions to reduce MUD and HIV/HCV infection that are specific to the local environment.

Nursing scholars and policy advocates must address homelessness as a potent SDH that propels increasing rates of methamphetamine use, poor mental health, and HIV disparities

among TAY. Systems to prevent homelessness in this age group must be invested in and expanded upon, including support for families experiencing parent-child conflict, enhanced school connectedness for youth, alternatives to the carceral state, and facilitated transition to independence out of the child welfare system. For youth who do experience homelessness, systems must be in place to provide coordinated entry into services with individualized needs assessments as well as a prioritization on rapid rehousing. Robust policy supports and structural reform are required to support system changes and the primary prevention of homelessness. Poverty reduction policies, increased affordable housing availability, and eviction prevention legislation are just a few of the necessary structural interventions needed to prevent youth homelessness and its negative sequela.

Conclusion

Methamphetamine use is increasing in the U.S. and was common in this sample of TAY. These findings represent a significant clinical and public health problem. Several factors were associated with methamphetamine use and present opportunities for nurse scholars and practitioners to address substance use. These factors include HIV status, depression and PTSD symptoms, polysubstance use, and IDU. Opportunities or policies that integrate screening and treatment for HIV, substance use disorders and mental health are needed.

Clinical Resources

Methamphetamine DrugFacts

https://nida.nih.gov/publications/drugfacts/methamphetamine

Methamphetamine Research Report

https://nida.nih.gov/publications/research-reports/methamphetamine/what-scope-methamphetamine-misuse-in-united-states

Ending the HIV Epidemic in the U.S.

https://www.cdc.gov/endhiv/index.html

Screening to Brief Intervention (S2BI)

https://nida.nih.gov/s2bi/

A Blueprint Guide To Supporting Black And Latino MSM Who Use Crystal Meth

https://harmreduction.org/issues/safer-drug-use/supporting-black-latino-msm-who-use-crystal-meth-report/overview/

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Tables

Table 1. Sociodemographic, Substance Use, and Mental Health Characteristics among Marginally Housed Transitional Aged Youth in San Francisco, CA (N=100)

Variable	Total n (%)	Meth Use n=28 (%)	No Meth Use n=70 (%)	P value
Mean age (SD)	21.7 (1.8)	22.3 (1.6)	21.5 (1.83	0.07
Race/ethnicity				0.23
Multiracial	38 (38.0)	10 (35.7)	28 (40)	
Black	28 (28.0)	5 (17.7)	21 (30)	
White	22 (22.0)	10 (35.7)	12 (17.1)	
Other/decline to state	12 (12.0)	3 (10.7)	9 (12.9)	
Gender				0.52
Male	67 (67.0)	21 (75)	44 (62.9)	
Female	28 (28.0)	6 (21.4)	22 (31.4)	
Other	5 (5.0)	1 (3.6)	4 (5.71)	
Sexual orientation				0.26
Gay, Bisexual, or Pansexual	52 (54.2)	18 (64.3)	34 (51.5)	
Heterosexual	44 (45.8)	10 (35.7)	32 (48.5)	
Social Determinants of Health				
Homeless/in a shelter	63 (63.0)	20 (71.4)	42 (60.0)	0.29
Group Home	10 (10.5)	3 (10.71)	6 (9.23)	0.82
Lifetime History of Incarceration	39 (39.8)	15 (53.6)	22 (32.4)	0.05
Living with HIV	23 (23.0)	12 (42.7)	11 (15.7)	0.004
Mental Health				
CESD Score ≥ 16	73 (73.7)	25 (89.3)	47 (67.1)	0.03
ACEs Score ≥ 4	76 (76.8)	22 (78.6)	53 (75.7)	0.76
GAD-7 Score ≥ 10	50 (50.1)	16 (57.1)	33 (47.1)	0.371
PCL-5 Score ≥ 33	79 (79.8)	27 (96.4)	51 (72.7)	0.009
Substance Use Past 3 Months				
Cannabis	46 (46.9)	23 (82.1)	23 (32.9)	<0.001
Cocaine	32 (32.7)	18 (64.3)	14 (20.0)	<0.001
Prescription stimulants	10 (10.2)	9 (32.1)	1 (1.43)	<0.001
Inhalants	7 (7.1)	6 (21.4)	1 (1.43)	0.001
Sedatives	19 (19.4)	14 (50.0)	5 (7.14)	<0.001
Hallucinogens	25 (25.5)	16 (57.1)	9 (12.7)	<0.001
Street opioids	12 (12.2)	12 (42.9)	0 (0.0)	<0.001
Prescription opioids	13 (13.3)	11 (39.3)	2 (2.87)	<0.001
Other	3 (3.1)	2 (7.14)	1 (1.43)	0.14

Polysubstance Use Past 3 Months (three or more of the aforementioned substances)	27 (27.6)	19 (67.9)	8 (11.43)	<0.001
Lifetime History of Injection Drug Use	24 (43.6)	18 (64.3)	6 (23.1)	0.002
Alcohol Use				
Binge drinking past year	69 (69.7)	23 (82.1)	45 (64.3)	0.08

Table 2. Bivariate Logistic Regression Models Examining Factors Associated with Meth Use in the Last 3 Months among Transitional Aged Youth in San Francisco, CA (N=100)

Variable	**Odds Ratio**	**95 % Confidence Interval**	***P***
Age in years	1.27	(0.98-1.65)	0.07
Race/ethnicity			
White	Ref	Ref	Ref
Black	0.29	(0.08-1.03)	0.06
Multiracia1	0.43	(0.14-1.30)	0.13
Other/decline to state	0.4	(0.08-1.89)	0.25
Gender			
Male	Ref	Ref	Ref
Female	0.57	(0.20-1.62)	0.29
Other	0.52	(0.06-4.98)	0.57
Heterosexual	0.59	(0.24-1.47)	0.26
Social Determinants of Health			
Homeless/in a shelter	1.67	(0.65-4.31)	0.29
Group Home	1.18	(0.27-5.09)	0.82
Lifetime History of Incarceration	2.14	(0.98-5.93)	0.06
Living with HIV	4.02	(1.50-10.80)	0.006
Mental Health			
Depressive symptoms (CESD score of 16 or greater)	4.08	(1.11-14.92)	0.03
Exposure to traumatic events (ACEs score of 4 or greater	1.18	(0.41-3.38)	0.76
Anxiety Symptoms, GAD Moderate (score 10-14) or Severe (score 15+)	1.49	(0.62-3.61)	0.37

PTSD, PCL-5 Score ≥ 33	10.06	(1.28-79.26)	0.03
Substance Use Past 3 Months			
Polysubstance use (three or more drugs excluding meth)	16.36	(5.54-48.28)	<0.001
Lifetime History of Injection Drug Use	6	(1.82-19.84)	0.003

Table 3. Multivariable Logistic Regression Models Examining Factors Associated with Meth Use Among Transitional Aged Youth in San Francisco, CA (N=100)

Variable	**Adjusted Odds Ratio Models 1-5**	**95 % Confidence Interval**	***P***
Living with HIV	3.18	(1.11-9.15)	0.03
Mental Health			
Depressive symptoms (CESD score of 16 or greater)	6.02	(1.46-24.78)	0.013
PTSD, PCL-5 Score ≥ 33	13.38	(1.59-112.73)	0.017
Substance Use			
Polysubstance use (three or more drugs excluding meth)	50.02	(9.72-257.46)	<0.001
Lifetime History of Injection Drug Use	8.38	(1.87-37.53)	0.005

Adjusted models (1-5) controlled for: age in years, race/ethnicity, and gender identity.
Model 1 represents the total effect of living with HIV on meth use.
Model 2 represents the total effect of the symptoms of depression on meth use.
Model 3 represents the total effect of the symptoms of PTSD on meth use.
Model 4 represents the total effect of polysubstance use on meth use.
Model 5 represents the total effect of lifetime history of injection drug use on meth use.