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Early initiation of substance use as an indicator of problematic substance use among young men who have sex with men (YMSM)

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Abstract

Background and Objectives: Much research has documented that young men who have sex with men (YMSM) are at higher risk for substance use related problems. This study examined the age of substance use initiation and its relationship to current substance use related problems among substance-using YMSM.

Design and Methods: A cross-sectional survey of 191 YMSM (aged 18 to 29) with recent histories of prescription drug misuse was conducted in Philadelphia in 2012–13. Participants were surveyed about age of initiation of cigarette smoking, alcohol use to the point of intoxication, marijuana, prescription, and illicit drugs, and about alternate modes of prescription drug administration. The severity of participants' current substance use related problems was measured using the Drug Abuse Screening Test (DAST-10).

Results: Mean age of initiation was 14.6 years for cigarette smoking, 15.3 years for alcohol use to the point of intoxication, 15.2 years for marijuana, 16.8 years for prescription drugs, and 17.9 years for illicit drugs. Use of 2 or more substances by the age of 15 was reported by 56% of the participants. Odds of substance-related problems were significantly greater among those who reported earlier initiation of alcohol, prescription drugs, or polysubstance use. Odds of prescription drug misuse via altered routes of administration were significantly greater among participants with earlier onset of alcohol, marijuana, prescription, illicit drugs, or polysubstance use.

Discussion and Conclusions: This study demonstrates that earlier initiation of substance use is associated with higher risk of substance-related problems among substance-using YMSM. Early interventions addressing substance use initiation could benefit this population.

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Conflict of interest:

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

Keywords

substance use; initiation; YMSM

1. Introduction

An early onset of substance use is associated with a range of adverse health outcomes, including an increased risk of dependence and substance use disorder by young adulthood (Buchmann et al., 2013; Kendler, Myers, Damaj, & Chen, 2013; Yamaguchi & Kandel, 1984), poor academic performance (Ellickson, Tucker, Klein, & Saner, 2004; Wu, Schlenger, & Galvin, 2003), and HIV risk behavior (Baldwin, Shrestha, Potrepka, & Copenhaver, 2013; Celentano et al., 2006; Rosario, Schrimshaw, & Hunter, 2006). Initiation of substance use is most often associated with adolescence and reaches its peak during emerging adulthood (Chen & Jacobson, 2012). The Youth Risk Behavior Survey (Kann, McManus, Harris, Shanklin, Flint, 2016; Lee & Abdel-Ghany, 2004) found that the most prevalent age for the onset of alcohol, cigarettes, or marijuana use is between 13 and 15 years old. In terms of sequencing, substance use is associated with a much greater risk of substance use disorder if initiation occurs in late childhood or early adolescence rather than in adulthood (Chen, Storr, & Anthony, 2009; Trenz et al., 2012). In addition, some studies indicated that younger drug abusers are more likely to use alternate routes of administration and to display greater drug problem severity later in adulthood (Budman, Grimes Serrano, & Butler, 2009; Surratt, Kurtz, & Cicero, 2011).

Although considerable research has focused on understanding the process of drug initiation, limited data is available regarding the patterns of substance use initiation, including age of initiation, among sexual minorities. Select literature suggests that sexual minorities begin smoking (Corliss et al., 2013; Garofalo, Wolf, Kessel, Palfrey, & DuRant, 1998), initiate alcohol use (Corliss, Rosario, Wypij, Fisher, & Austin, 2008), and misuse prescription opioids and tranquilizers (Kecojevic et al., 2012) at younger ages than their heterosexual peers. However, a study in San Francisco comparing substance use between lesbian, gay and bisexual (LGB) and heterosexual clients entering substance abuse treatment centers found that gay men began using their primary substance at older ages than their heterosexual counterparts (Flentje, Heck, & Sorensen, 2015). Nonetheless, sexual minority identification, attractions, and behaviors predicted greater initial and sustained use of cigarettes and marijuana among these individuals, compared to their sexual majority counterparts (Talley, Sher, & Littlefield, 2010).

Although the previous research has documented high rates of substance use among young men who have sex with men (YMSM) (Marshall, Friedman, Stall, & Thompson, 2009; Newcomb, Ryan, Greene, Garofalo, & Mustanski, 2014; Storholm, Halkitis, Siconolfi, & Moeller, 2011), the age of initiation of substance use behaviors among YMSM remains poorly understood, with only a handful studies exploring substance use initiation patterns in this population. In a sample of 450 YMSM in Chicago, a quarter to a third reported initiating cigarettes, alcohol and marijuana in early adolescence (before age 15), whereas the vast majority initiated stimulant and club drug use in later adolescence (Newcomb et al., 2014).

In a study of YMSM recruited from gay-identified venues in Los Angeles (Kipke et al., 2007), the mean age of initiation of alcohol was 16.5, marijuana use 16.8, prescription drugs misuse 17.6, and any club drug use 17.8 years. A study reporting on initiation patterns of club drugs among gay and bisexual men in New York City, found that the majority of the men start with cocaine and ecstasy followed by ketamine, methamphetamine and γ -hydroxybutyrate (GHB) (Halkitis & Palamar, 2008). An Australian national study reported that gay/bisexual men initiated tobacco and alcohol at 16, marijuana at 19, while other illicit drugs in their early to mid twenties (Roxburgh, Lea, de Wit, & Degenhardt, 2016).

While previous studies have increased our understanding of substance use among YMSM and related negative health outcomes (Substance Abuse and Mental Health Services Administration, 2014; Traube, Schrage, Holloway, Weiss, & Kipke, 2013), more research is necessary to understand the role of early onset of substance use on the extent of later substance use related problems in this population. Furthermore, YMSM who initiate substance use at early age may more readily engage in alternate routes of administration and place themselves at higher risk for developing substance use disorders in adulthood. Thus, the primary objective of this study was to examine ages of first use of variety of substances including cigarettes, alcohol to the point of intoxication, marijuana, prescription drugs (opioids, tranquilizers, stimulants) not as prescribed, and various illicit drugs (heroin, cocaine-crack, crystal-methamphetamine, ecstasy, and hallucinogens) in a sample of urban, substance-using YMSM. The secondary objective of this study was to investigate whether later substance use related problems, including alternate routes of prescription drug administration, are associated with an early initiation of substance use (before or at age of 15).

2. Methods

2.1. Sample

Participants were recruited in Philadelphia, PA, during 2012-2013. Eligible participants were: male; between the ages of 18–29 years; misused at least one of 3 major classes of prescription drugs (opioid, tranquilizer, stimulant) in the last 6 months; had sex (oral or anal) with a male partner during the past 6 months; were English speaking; and resided in Philadelphia area. Sampling was stratified by age (three age ranges: 18–21, 22–25, 26–29) in order to ensure equal representation of different age groups. Participants were compensated \$25 cash for their participation. Additional descriptions of the recruitment strategy and sampling methods are reported elsewhere (Kecojevic, Silva, Sell, & Lankenau, 2015).

A cross-sectional survey was developed using iSurvey Software (Contact Software Ltd, Wellington, New Zealand) and loaded onto iPads. The instrument was administered during face-to-face interviews conducted in a private office at Drexel University, or in natural settings (i.e. fast food restaurants, cafes, community center, parks) and lasted approximately 60 minutes. The institutional review boards at Drexel University and at William Paterson University New Jersey approved the research protocol.

2.2. Measures

2.2.1. Demographics—Demographic characteristics included age, race/ethnicity (recoded dichotomously as 0=“White/Caucasian” or 1=“non-White/racial/ethnic minorities”), sexual orientation (dichotomized into 0=“gay identified” and 1=“non-gay identified, i.e. bisexual, heterosexual, other”), and socio-economic status (SES) growing up (0=“middle/upper class”, 1=“poor/working class”).

2.2.2. Drug use and age of onset variables—Participants were asked about lifetime use of cigarettes, alcohol (to the point of intoxication), marijuana, misuse of the three most commonly misused classes of prescription drugs (opioids, tranquilizers, and stimulants) and use of illicit drugs (heroin, cocaine-crack, crystal-methamphetamine, ecstasy, and hallucinogens) with a Yes/No question. Those who answered “Yes” to use of each individual substance, were assessed age of onset with the following question: “How old were you the first time you used this substance?”, i.e. “How old were you the first time you took alcohol to the point of intoxication?” The age of onset for the earliest used prescription drug class was recorded as the age of onset of prescription drug misuse. The same procedure was implemented for illicit drugs (with exception of marijuana which was treated as a separate variable). Responses for all drugs were recorded on a continuous scale. For logistic regression analyses and following previous literature on age of onset of substance use among LGB (Corliss et al., 2013), continuous age variables were transformed into dichotomous variables where early onset substance use was categorized as ≤ 15 (coded as 1) and >15 (coded as 0). Early polysubstance initiation was defined as the use of any two or more substances before or at age 15 (0= if used less than 2 substances, 1= if used 2 or more substances).

2.2.3. Family history of substance use—Participants were asked whether their parents/guardians substance used cigarettes, alcohol, prescription, or any illicit drugs when they were growing up. Answers were dichotomized as 1=“Yes” and 0=“No” for cigarette/alcohol use and for any drug use.

2.2.4. Current substance use problems—The Drug Abuse Screening Test (DAST-10) questionnaire was used to describe the severity of participants’ substance use problems, excluding alcohol and tobacco, in the past 6 months (Skinner, 1982; Yudko, Lozhkina, & Fouts, 2007). This instrument has been used in clinical and non-clinical settings to identify individuals who need more intensive assessment for drug abuse problems (Cocco & Carey, 1998). We used a cutoff point score of 4 to identify YMSM with potential drug abuse problems. A cutoff point of 4 is a more conservative approach that can reduce false-positive results and has been used previously among young adult populations (Kaloyanides, McCabe, Cranford, & Teter, 2007). The Cronbach’s alpha for the scale was 0.81.

2.2.5. Alternate routes of administration of prescription drugs—We asked respondents to indicate the route(s) of administration used for taking prescription drugs. Respondents were asked to select all that apply from a list of four alternate routes including: snorting, smoking, injecting, and chewing. For purposes of analyses, a two-level indicator

variable was created for route of administration consisting of 0="oral only", and 1="alternate routes of administration".

2.2.5. Data Analysis—Descriptive statistics, such as frequencies, percentages, means, medians and ranges, were used to tabulate the sample demographics. Prevalence rates were derived by dividing the number of participants reporting an outcome behavior by the total number of responses to that question. Mean and standard deviation (SD) for age of initiation was calculated for each substance. Chi-squares and t-tests were used to identify significant differences between participants' characteristics (demographics and age of initiation) and outcomes of interest (DAST-10 score, alternate modes of administration). Bivariate correlates that achieved significance of less than .05 were retained for inclusion in the multivariable logistic analyses. Multiple logistic regression analyses were conducted to examine the associations between independent (age of onset of substance use before or at age 15) variables and dependent (DAST-10 score, alternate modes of drug administration) variables after statistically controlling for other background characteristics (e.g., age, race, sexual identity, family SES, parents/guardian substance use). Age was retained in the logistic models as a control for duration of substance use. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) are provided. An alpha level of .05 was used to determine significance for all tests. All statistical analyses were performed using SPSS 23.0 statistical software.

Results

Demographic characteristics of the sample are presented in Table 1. Lifetime use and the mean age of first use were as following: cigarettes (93.2%, 14.6 years old); alcohol to the point of intoxication (99.0%, 15.3 years old); marijuana (94.8%, 15.2 years old); prescription drugs (100%, 16.8 years old); and illicit drugs (75.9%, 17.9 years old). Over half of the participants reported smoking their first cigarette and marijuana at or before age 15 (63.3% and 52.9% respectively), and slightly less than half reported getting drunk at or before age 15 (49.7%). One-third (33.0%) reported the first misuse of prescription drug at or before age 15, while 14% did so for illicit drugs. The most frequent first substance of initiation was cigarette (52.9%), followed by marijuana (41.3%), alcohol to the point of intoxication (39.8%) and prescription drugs (22.0%). Polysubstance initiation (defined as the use of any two drugs at or by the age of 15) was common. By age 15, polysubstance initiation was reported by 56% of participants. No drug was used by 24.1%, while initiation of one drug by 19.9% of participants. Two-thirds of participants identified as having a current substance use problem, while 63.9% reported ever using alternate modes of prescription drugs administration.

In the second part of our analysis, we examined the association between earlier initiation into substance use/misuse with later substance use related problems. In bivariate analysis (Table 2), participants with more problematic current substance use (i.e. DAST-10 cut-off point >4) were earlier initiators into alcohol, prescription drug misuse, and illicit drugs. Polysubstance early initiators reported more problematic current substance use. Regarding demographic variables, participants with more problematic current substance use were more likely to grew up in low/working class SES, and more likely to self-identify as bisexual/

heterosexual/other. Race and parental smoking/alcohol use or parental drug use were not associated with later problematic substance use.

The practice of administration of prescription drugs via snorting, smoking, injecting, or chewing was associated with earlier (age 15) initiation into all substances with exception of cigarettes. Early initiation into polysubstance use was also associated with alternate prescription drug administration. Among demographic variables, White and bisexual/heterosexual/other participants were more likely to report alternate modes of prescription drugs administration. SES and parental smoking/alcohol use or parental drug use were not associated with alternate modes of prescription drug administration (Table 2).

In Table 3, we present estimates for the AOR for two outcomes of interest. After controlling for age, sexual orientation and SES, participants with earlier onset of alcohol (AOR = 2.4, 95% CI: 1.2, 4.6), prescription drug misuse (AOR = 5.7, 95% CI: 2.3, 14.2), and polysubstance use (AOR = 5.7, 95% CI: 2.3, 14.2) were more likely to have drug abuse problem as indicated by DAST-10. After controlling for age, race, and sexual orientation, participants with earlier onset of alcohol (AOR = 2.2, 95% CI: 1.2, 4.3), marijuana (AOR = 2.4, 95% CI: 1.2, 4.6), prescription drug (AOR = 3.1, 95% CI: 1.4, 6.9), illicit drugs (AOR = 16.2, 95% CI: 2.1, 126.7), and polysubstance use (AOR = 1.1, 95% CI: 1.1, 3.9) were more likely to report altered routes of administration of prescription drugs.

Discussion:

This study is among the first to examine patterns of substance initiation among a sample of urban YMSM with histories of prescription drug misuse. In addition, we examined the relationship between early onset (age 15) of cigarette, alcohol, marijuana, prescription, illicit drugs and polysubstance use and later substance use related problems among a sample of substance-using YMSM. The order of substance use initiation in our sample was similar to Gateway Drug Theory (Kandel & Faust, 1975; Yamaguchi & Kandel, 1984), which suggests that more socially accepted and legalized drugs (i.e. cigarettes, and alcohol) precede the use of other drugs (i.e. prescription and illicit). Interestingly, for many YMSM in our sample, marijuana was the first drug at initiation. Given a greater social acceptance and lesser stigma associated with marijuana use, particularly in urban environments, this is not surprising. Additionally, most participants in this sample of YMSM started misusing prescription drugs prior to abusing illicit drugs. This is consistent with previous findings which showed that prior misuse of prescription drugs, i.e. prescription opioids, precedes illicit drug use, i.e. heroin (Cerdá, Santaella, Marshall, Kim, & Martins, 2015; Lankenau et al., 2012). Polysubstance initiation, defined as initiation of 2 or more drugs by age 15, was reported by more than half of participants. Possible explanation for high prevalence of early polysubstance initiation is that substance use expectancies might be influenced by family and friends' attitudes towards use of multiple drugs (Martino, Collins, Ellickson, Schell, & McCaffrey, 2006). Particularly concerning is finding that the majority of substances are initiated in a short window between the ages of 14 and 18 years. This finding warrants additional attention due to its potential negative long-term outcomes.

A few notable differences exist between our targeted sample of substance using YMSM and two community-based samples of YMSM, i.e. Healthy Young Men's Study (HYM) in Los Angeles (LA) (Kipke et al., 2007), and Crew 450 in Chicago (Newcomb et al., 2014). Our participants reported initiation into alcohol, marijuana and prescription drugs, on average, 12–18 months earlier than HYM participants. Interestingly, illicit drug use initiation in both samples was closer to age 18. In Chicago, a quarter to a third reported initiating cigarettes, alcohol and marijuana before age 15, whereas half or more of our participants reported use of these substances by age 15. While all three studies included racially diverse samples of YMSM, Philadelphia sample also included higher percent of non-gay identified YMSM.

Contrary to previous findings among young adults (Ohannessian, Finan, Schulz, & Hesselbrock, 2015), onset of substance use and later substance abuse problems was not substance specific. Early onset of alcohol, prescription drugs, and polysubstance use were risk factors for current substance use-related problems based on the DAST-10, while early onset of alcohol, marijuana, prescription drugs, illicit drugs and polysubstance use were risk factors for alternative routes of administration of prescription drugs. Our finding in regard to early onset of alcohol use is consistent with previous research suggesting that early initiation into alcohol use may significantly heightened risk for later progression to substance use disorder (Hingson, Heeren, & Winter, 2006; Moss, Chen, & Yi, 2014). The odds of substance-related problems and riskier administration practices were significantly greater among those who initiated earlier prescription drug misuse relative to later initiation. Early onset polysubstance use in adolescence has been shown to be predictive of increased problems with drugs in young adulthood (Trenz et al., 2012). Given the present findings, a specific focus on the role of early polysubstance use initiation may be warranted for this population. Differing from previous findings that earlier initiators of marijuana were more likely to have drug abuse/dependence (Ellickson et al., 2004), we did not observe such association. In addition, early illicit drug use onset did not predict later substance use problems in our sample. Furthermore, we are cautious in interpreting the effect of early onset of illicit drug use on alternate modes of prescription drug misuse due to wide confidence intervals. We were unable to appropriately address these differences due to the relatively small number of participants who initiated illicit drug use at early age. Consistent with previous studies among urban drug users (Young, Havens, & Leukefeld, 2010), non-oral routes of prescription drug ingestion was common in our study. YMSM substance users may be less aware of the risks associated with tampering of prescription drugs (Katz et al., 2011), placing them at higher risk to adverse health consequences. From a public health perspective, it is critical that YMSM substance users be targeted for appropriate harm reduction initiatives.

Regarding demographic variables, certain subgroups of YMSM are likely at even higher risk for substance-use related problems than others. Consistent with previous studies, our findings indicate that bisexual/heterosexual/other identified YMSM are at higher risk for substance use-related problems (Newcomb et al., 2014). Our findings also suggest that racial minority YMSM report lower prevalence of substance use-related problems compared to White YMSM (Kipke et al., 2007; Wong, Kipke, & Weiss, 2008). Previous studies have examined various factors contributing to lowered risk for substance use-related problems among racial minority YMSM, including feelings of attachment to racial minority peers and

communities (McKay, McDavitt, George, & Mutchler, 2012). Racial minority YMSM may also perceive that their communities strongly discourage the alternate use of prescription drugs.

While these findings provide new information about onset of substance use among YMSM, and additional evidence that those who are early initiators are at higher risk for problematic drug use, we acknowledge a number of limitations. Our findings rely on self-reported behaviors, which cannot be independently verified. Use of computer assisted interview technology may have minimized the bias of socially desirable responding. The data are cross-sectional and therefore no statements can be made about the causal relationship between these variables. This sample is not representative of the larger YMSM population, in particular those who do not engage in substance use behaviors.

Despite these limitations, this study provides further evidence that drug problems in young adulthood are greater when drug use starts during adolescence, even when duration of substance use is taken into account. Findings suggest that current substance using YMSM may have specific patterns of substance use initiation that differ from other groups. Earlier initiation of some drugs may be related to subsequent substance use risk behaviors, e.g., snorting, injecting, in this population. The findings from this study will help to fill the gap in the literature that exists regarding YMSM and onset of substance use. However, more research is needed to further characterize trajectories of substance use in this population. From a prevention point of view, early initiation of substance use occurring among YMSM highlights the importance of engaging YMSM during adolescence about issues of substance use to inhibit patterns of problematic use in later years.

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Table 1.

Participants' demographics, lifetime substance use, age of initiation, and current substance use problems (N=191)

Demographics	N (%)		
Age, years (median, IQR)	23 (21, 27)		
Race			
Non-Hispanic White	64 (33.5)		
Racial/ethnic minorities	127 (66.5)		
Sexual Identity			
Gay/Homosexual	109 (57.1)		
Bisexual/Heterosexual/Other	82 (42.9)		
Socioeconomic status (SES) growing up	61 (32.1)		
Lower/Working class	126 (66.0)		
Middle/Upper class	65 (34.0)		
Parents/guardians' smoking or drinking	144 (75.4)		
Parents/guardians drugs use	104 (54.5)		

Substance use	Lifetime use N (%)	Age of initiation (Mean, SD)	Drugs used during the 1 st year of substance use N (%) [*]
Cigarette smoking	178 (93.2)	14.6 (3.5)	101 (52.9)
Alcohol to the point of intoxication	189 (99.0)	15.3 (3.3)	76 (39.8)
Marijuana use	181 (94.8)	15.2 (3.2)	79 (41.3)
Misuse of prescription drugs	191 (100)	16.8 (3.4)	42 (22.0)
Illicit drugs use	145 (75.9)	17.9 (3.1)	3 (1.5)
	N (%)	(Mean, SD)	
DAST-10 score (4)	126 (66.0)	5.1 (2.7)	
Alternate prescription drug using practices	122 (63.9)		

^{*}-adds to above 191 (100%) as many participants used multiple drugs within the same year of initiation.

Table 2.

Bivariate associations of between earlier initiation into substance use with current substance use related problems.

		DAST-10 ⁺ >4		Alternate modes of prescription drugs administration	
		%	Test	%	Test
Demographics					
Race	White	70.3	$\chi^2=0.8$	76.6	$\chi^2=6.7^{**}$
	Non-White	63.8		57.5	
Sexual Identity	Gay	56.9	$\chi^2=9.3^{**}$	54.1	$\chi^2=10.5^{***}$
	Non-gay	78.0		76.8	
Socio-economic status (SES)	Upper/middle	55.4	$\chi^2=4.9^*$	60.0	$\chi^2=0.6$
	Lower/working	71.4		65.9	
Parental smoking and/or drinking	No	59.6	$\chi^2=1.1$	68.1	$\chi^2=0.5$
	Yes	68.1		62.5	
Parental drug use	No	63.2	$\chi^2=0.5$	66.3	$\chi^2=0.6$
	Yes	68.3		60.9	
Early initiation (age 15 vs. > age 15)					
Cigarettes		70.6	$\chi^2=3.0$	66.4	$\chi^2=0.9$
		58.3		59.7	
Alcohol to the point of intoxication		75.8	$\chi^2=8.1^{**}$	75.8	$\chi^2=11.6^{***}$
		56.3		52.1	
Marijuana		69.3	$\chi^2=1.1$	72.3	$\chi^2=6.6^{**}$
		62.2		54.4	
Rx drugs		88.9	$\chi^2=22.0^{***}$	82.5	$\chi^2=14.2^{***}$
		54.7		54.7	
Illicit drugs ^a		88.9	$\chi^2=7.4^{**}$	96.3	$\chi^2=14.3^{***}$
		62.2		58.5	
Polysubstance use		74.8	$\chi^2=8.4^{**}$	72.9	$\chi^2=8.6^{**}$
		54.8		52.4	

⁺ - DAST-10 – Drug Abuse Screening Test

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

^a Fischer test performed for illicit drugs comparisons.

Table 3.

Adjusted odds ratios (AOR) ^{*} for logistic regression analyses using early initiation of substance use as a predictor of substance use problems and risky substance use practices (N=191)

Early initiation predictors (age 15)	DAST-10 ⁺ >4	Alternate mode of administration of Rx drugs
	AOR (95% CI)	AOR (95% CI)
Cigarettes	-	-
Alcohol to the point of intoxication	2.4 (1.2, 4.6) ^{**}	2.2 (1.2, 4.3) [*]
Marijuana	-	2.4 (1.2, 4.6) ^{**}
Rx drugs	5.7 (2.3,14.2) ^{***}	3.1 (1.4, 6.9) ^{**}
Illicit drugs	3.3 (0.9, 12.0)	16.2 (2.1,126.7) ^{**}
Polysubstance	2.2 (1.1, 4.2) [*]	2.1 (1.1, 3.9) [*]

^{*} - AOR are adjusted for age, SES, and sexual identity for DAST-10 as the outcome, and for age, race, and sexual identity for an alternate mode of administration.

⁺ - DAST-10 – Drug Abuse Screening Test

^{*}
 $p < 0.05$

^{**}
 $p < 0.01$

^{***}
 $p < 0.001$.