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Patterns Of Drug Use And Correlates Of Active Amphetamine-Type Substance Use Among Sex Workers In Kuala Lumpur, Malaysia

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Abstract
Objective: To describe the female and transgender sex worker population in Kuala Lumpur, Malaysia, understand their patterns of substance use, and examine the correlates of active amphetamine-type substance (ATS) use.
Methods: We administered a cross-sectional survey and performed biological testing on 492 sex workers to assess lifetime and active substance use history and frequency, criminal justice involvement, alcohol and substance abuse disorders, sexual risk behaviors, experience of childhood and adulthood physical and sexual abuse, depression, and prevalence of HIV, syphilis, chlamydia, and gonorrhea. We performed descriptive statistics to describe demographics and lifetime and active drug use patterns and employed bivariate and multivariate logistic regression to examine correlates of active ATS use.
Results: Of 492 participants 299 (60.8%) were female and 193 (39.2%) were transgender. Prevalence of substance abuse disorders (29.7%) were high. ATS (32.3%) was the substance with highest reported use in the 30 days prior; smoking was the main route of administration. Of the sample, 11.7% was HIV-infected and 11.9% tested positive for syphilis. The majority of participants were unaware of their infections. History of childhood and adulthood physical and sexual abuse, depression (57.1%), and previous incarceration was also high (57.5%). Location, history of incarceration, history of self-harm, polysubstance use, and testing positive for syphilis were significantly associated with active ATS use even after controlling for all other variables.
Conclusion: Our findings suggest there is a high need for evidence-based interventions for HIV prevention tailored specifically towards female and transgender women who dually engage in drug use and sex work.

Introduction

With 2 millions new infections in 2014[1], the HIV epidemic remains a significant global health problem. The burden disproportionally falls on women and gender minorities and is often exacerbated by substance abuse and occupational risk factors. Stigma, gender-based sexual violence, and social and economic marginalization including exclusion from education and employment opportunities contribute to this HIV vulnerability for transgender women (TGW)[2] and females. TGW, specifically, are 49 times more likely to be HIV-infected than adults in the general population[3] with a global estimated HIV prevalence of 14.7%.[4]. For TGW who engage in sex work, however, the prevalence is almost two-fold higher (27.3%).[4] These prevalence estimates are significantly higher than those for female and male sex workers.[3]

In Malaysia, the situation is no different. As the focus on harm reduction programs and policies has succeeded in curtailing the HIV burden among people who inject drugs (PWID), the epidemic has transitioned from being concentrated among PWID to being driven by sexual transmission.[5] In 2015, nearly 80% of all new infections were attributed to sexual transmission, compared to just 5.3% in 1990.[6] With this shift, women are carrying more of the burden as sexual transmission is higher among females than among males (87% vs. 47%).[5] Female and transgender sex workers (F/TGSW) have the highest HIV prevalence among Malaysian women at 12%[5] which is 30 times greater than the general population (0.4%) and 75 times greater than among all women (0.15%).[7] Although the estimated 45,000 F/TGSW in Malaysia[6] are at a much greater risk of acquiring HIV, the number of HIV cases reported among F/TGSW compared to PWID is "grossly underreported"[6] and disaggregated data for TGSW does not exist.

While it is widely recognized that injection drug use is a risk factor for HIV transmission, substances other than opioids can increase sexual risk taking behavior, are associated with physical and sexual violence, and may be an important link in transmission. As an example, binge alcohol use was associated with HIV infection, increases in sexual violence, and unprotected sex in both Kenyan[8] and Russian[9] FSW. Aside from injection drug and binge alcohol use, use of other substances has received little attention in HIV prevention research. The UNODC reports that, globally, the use of amphetamine-group substances is more prevalent than that of either opioids or cocaine.[10] Similarly in Malaysia, recent research found that amphetamine-type substances (ATS) are the preferred drug among women who use drugs.[11] This trend could be linked to the increased manufacturing and trafficking levels in southeast Asia.[10]

This is concerning as previous research has shown links between sex work, HIV infection, and ATS use. In Mexican border cities, researchers documented that FSWs use methamphetamine alone or in combination with other drugs to help them cope, stay awake, and enhance sexual performance for their clients.[12] Methamphetamine use is associated with increased sexual risk behaviors, including greater number of sexual partners, decreased condom use, and even after adjusting for injection drug use, with HIV infection in FSW, pregnant women, and heterosexual men who inject drugs.[13-16] Biomedically, its use is also associated with higher viral loads and lower CD4+ counts in HIV-infected individuals, making it an important factor in both primary and secondary prevention.[17] Aside from HIV, use of methamphetamine is also associated with active syphilis in FSW.[12]

ATS use among sex workers is particularly concerning because there exists no medication-assisted treatments. Evidence-based behavioral interventions for treatment of ATS dependence have shown limited efficacy, with high rates of relapse.[18] Although extensive research has been performed on substance abuse and HIV among men in Malaysia, there remains little published data on how this syndemic has impacted females and transgender women who engage in sex work. In Malaysia, the mixture of gender power dynamics, stigma, discrimination, and harsh criminalization of sex work and drug use complicates data collection and prevention efforts, yet tailoring HIV prevention strategies requires a nuanced understanding of these populations and the specific risks they face.

With this study, we aimed to characterize lifetime and active drug use activity among female and transgender sex workers in Malaysia. Additionally, given the high use of ATS by both populations, we examined factors associated specifically with active ATS use with the hopes of informing future HIV prevention efforts among this population.

Methods

Setting, sample, and recruitment

We conducted a cross-sectional descriptive study in the Kuala Lumpur metropolitan area known as the Klang Valley between February 2014 to December 2014. Our study focused on three hubs within the Klang Valley: (a) Kuala Lumpur, (b) Petaling Jaya and (c) Klang. These captured different sex work communities – an urban, suburban, and port town, respectively. Recruitment of participants was conducted through Respondent Driven Sampling (RDS).[19] An initial group of 28 "seeds" were selected from six of the major venues in which SWs operate in the Klang Valley: (a) street-based, (b) brothels, (c) hotels/motels, (d) massage parlors, (e) karaoke bars, and

(f) night clubs. All participants provided informed consent prior to initiating study activities. After completing the biological testing and questionnaire, each seed was given three coupons to use to recruit their peers. Peers who elected to pursue the research study and completed the biological testing and questionnaire were also given three coupons each for the recruitment of their peers. Participants were eligible if they: (a) were 18 years of age or older, (b) identify as biologically female or transgender woman, (c) had been compensated for sexual activity at least once in the past six months, (d) were willing to undergo HIV and STI testing, (e) were literate in either Malay, Chinese, Tamil, or English, and (f) were able to provide informed consent. All participants were provided modest monetary compensation for their time.

Survey Administration

Trained research assistants administered participants a questionnaire that took approximately 60 minutes to complete. Questionnaire content focused on: demographic information, criminal justice involvement, substance use history, alcohol and substance abuse disorders, sexual risk behaviors, experience of childhood and adulthood physical and sexual violence, depression, and quality of life.

Survey Measures

Validated measures were used to assess severe depression, history of physical and sexual violence, quality of life, and alcohol and substance abuse disorders. Screening for depression was conducted using the 10-item Center for Epidemiologic Studies Depression (CES-D) scale, using previously validated cut-offs (≥10) for severe depression [20, 21] Experience of childhood and adulthood physical and sexual violence was measured using the U.S. Centers for Diseases Control and Prevention's Behavioral Risk Factor Surveillance System questionnaire for Violence and Victimization.[22] Participants were screened for alcohol use disorders using the Alcohol Use Disorder Identification Test (AUDIT)[23] that was recently validated in the Malaysian context (AUDIT-M).[24] Hazardous drinking was categorized as females having a score of ≥7 and TG having a score of ≥8. Degree of problems related to drug abuse were scaled using the 10-item Drug Abuse Screening Test (DAST-10)[25], with cut-offs for low (1-2), moderate (3-5), substantial (6-8) and severe (9-10) level drug abuse problems.

Biological Testing

A two-step rapid HIV test protocol was employed following the WHO guidelines for low- and middle-income countries. Participants were tested for HIV using a rapid HIV ½ antibody + p24 antigen test that is able to identify chronic (Ab+/Ag-) and acute Ab-/Ag+) HIV infection [Alere Determine HIV-1/2 Ag/Ab Combo (Waltham, MA, USA)]. If the first test was positive, a confirmatory rapid test was conducted using a second HIV ½ antibody test from a different manufacturer (ACON HIV-1/2 Antibody Kit [San Dieog, CA, USA)]. Each participants was tested for syphilis using a rapid test [RPR BD Macro-Vue Antigen Suspension (Sparks, MD, USA)] and, if positive, a confirmatory TP-PA. [Serodia (Fujirebio, Tokyo, Japan)] Self-administered rectal and vaginal swabs or in the case of TG participants, self-collected urine samples, were obtained to test for Chlamydia and Gonorrhea using the Roche Cobas ® 4800 CT/NG test (Roche Molecular, Pleasanton, CA, USA).

Analytic Approach

Analyses were performed in SAS 9.3 (SAS Institute, Cary NC). Descriptive analyses were used to characterize the population by age, nationality, ethnicity, religion, and other demographic factors. Comparisons between female and TG participants were performed using t-tests for continuous variables and chi-squared test or, when necessary, Fisher's exact tests for categorical variables at the level of $p \leq 0.05$ for significance. The same analysis was used for lifetime and active substance use activity and results were compared between female and TG participants. Bivariate and multivariate logistic regression was performed to identify covariates associated with ATS use in the 30 days prior. All variables with a $p \leq 0.05$ in the bivariate analysis were considered in the multivariate analysis. Testing for multicollinearity resulted in the elimination of the following variables prior to building the multivariate model: religion, Malaysian born, ever in jail or compulsory drug detection center (CDDC), drug abuse severity level, and active opioid use. A stepwise backwards elimination process was used for the model and resulted in the elimination of all history of violence and abuse, injection drug use, HIV, housing, depression, and ethnicity variables. Covariates with a $p \leq 0.05$ were considered significant.

Ethics and Human Subjects Approval

The Institutional Review Board (IRB) at Yale University and the Ethics Committee at the University of Malaya Medical Center approved the study.

Results

Sample characteristics

Characteristics of the sample are provided in Table 1. A total of 492 participants provided informed consent and enrolled, of whom 299 (60.8%) were female and 193 (39.2%) were TGW. Mean age was 37.4 years, with an average of 12 years of sex work experience. Most were born in Malaysia (78.1%) and Indonesia (19.3%) and were Muslim (74.6%) or Hindu (20.1%). Both females and TGW were mostly single (56.7%) although the females were more likely to be single due to being widowed, divorced, or separated. The majority lived with others in a house or apartment (80.5%), engaged in sex work full-time (61.2%), and had reached the secondary education level or above (36.2%). Mean monthly income overall and from sex work was significantly higher among TGW than among females.

Criminal justice and history of abuse

Most participants (57.5%) reported having been involved with the criminal justice system (CJS) in their lifetime, including prison (32.7%), detention centers (49.2%), and CDDC (10.6%). The most common reason for imprisonment was sex work (66.8%) and drug use (40.3%). Drug use as a reason for incarceration was more common among females (48.2%) than TGW (29.8%). For those ever having been in prison, recidivism was high at 3.5 imprisonments on average.

Both populations experienced high levels of physical and sexual abuse in childhood and adulthood. Before the age of 18 years, they experienced similar levels of physical abuse (36.8%) but compared to females, TGW experienced higher levels of sexual abuse (23.9% vs. 45.6%) and forced sex (13.4% vs. 28.5%). After the age of 18, experiences of physical abuse were high (33.8%) with 76.9% of females and 61.3% of TGW receiving this abuse from an intimate partner. Adult sexual abuse (12.8% vs. 24.5%) was also higher among TGW.

Over half of the participants met the screening criteria for severe depression with higher rates among female participants compared to the TGW participants (62.4% vs. 48.7%).

Infectious disease prevalence and sexual risk behavior
Biological testing revealed that 11.7% were HIV infected. Of concern, 51.5% of female and 70.8% TG cases were newly diagnosed. Rates of syphilis among females and TGW were similar (9.8% vs. 15.0%) but significantly higher among females for gonorrhea (8.87% vs. 1.08%), and chlamydia (22.5% and 2.69%). Rates of self-reported condom use varied by sex act. Female participants were less likely to report using a condom 90% or more of the time for oral (49.2% vs. 66.5%), anal (46.2% vs. 83.2%), and vaginal sex (60.1% vs. 92.3%) as compared to TGW participants.

Substance use
Table 2 describes the lifetime and active history of substance use for the population. Nearly one-third (29.7%) of participants screened positively for moderate to severe drug abuse disorders. More females (34.4%) than TGW (22.3%) screened positively. Alternatively, less than one-tenth of participants screened positive for hazardous or harmful alcohol use (9.35%). As shown in Chart 1, lifetime and active substance use can vary significantly depending on the substance. The most commonly reported substances ever used were alcohol (61.4%), ATS (44.9%), heroin (17.7%), and cannabis (15.5%) while those used in the 30 days prior (active use) were ATS (32.3%), alcohol (21.2%) and heroin (12.4%). Importantly, the nearly universal mode of use for both heroin and ATS was smoking, not injection. Notably, of this population, 11.4% of females and 2.1% of TGW had ever injected drugs and only 4 (1.34%) of the females and no TGW reporting injecting drugs in the 30 days prior. Active polysubstance use, defined as using any two substances on the same day in the 30 days prior, was 15%. This decreased to 10.8% when alcohol was excluded. Females (13.0%) were more likely to report polysubstance use (excluding alcohol) than TGW (7.25%).

Correlates of Active Amphetamine Use.
Table 3 shows all unadjusted and adjusted odd ratios resulting from a logistic regression with active ATS used as the dependent variable. All variables factors attaining p-values ≤ 0.05 in bivariate regressions were considered in the multivariate model. Five factors remained significant in the multivariate model. These variables included environmental, structural, and individual factors. At the environmental level, those recruited, and presumptively working, in urban and suburban settings were more than 3 and 2 times more likely report active ATS use. At the structural level, those ever having been incarcerated were greater than 4 times more likely (AOR = 4.30) to be active ATS users compared to those never incarcerated. At the individual level, participants with syphilis (AOR = 2.39) and who ever engaged in self-harm (AOR = 2.47) were more likely to have used ATS in the 30 days prior. Finally, the odds of active ATS use were 10 times higher for those who reported polysubstance use.

Discussion
Our research sought to describe and analyze the risk profile of the female and transgender populations that engage in sex work in Kuala Lumpur, Malaysia. Through this work, we found high rates of drug use and specifically, use of ATS. These results are consistent with previous findings that ATS use is high among women who use drugs in Malaysia[26] and among sex

workers elsewhere.[27] Similarly, nearly one-third of surveyed sex workers screened positive for a moderate to severe drug abuse disorder. Variables that remained significant were structural, individual, and environmental risk factors.

Of particular concern at the structural level is the tremendous increase in odds of ATS use among those who have been incarcerated. In our sample, those ever incarcerated have been in prison an average of 3.5 times. Moreover, those who use ATS were significantly more likely to have drug abuse disorders. This suggests that sex workers who use ATS are cycling through the criminal justice system without being connected to care during incarceration or upon release despite high need. There is a great opportunity for future evidence-based interventions to reduce substance abuse disorders as well recidivism for this population.

Also of concern were individual factors including high rates of undiagnosed HIV and other sexually transmitted infections. The prevalence of HIV was more than two times that reported for TGW and 60% higher than that reported for female sex workers in Malaysia in the 2015 UNAIDS country progress report.[6] While high rates of infectious disease were expected given the low levels of reported condom use, those going undiagnosed especially for HIV could be a manifestation of the challenges this population faces in seeking basic testing and treatment services and highlights the challenge practitioners face in engaging this population in treatment and care.

Another important individual level variable were the high rates of physical and sexual abuse both in childhood and adulthood. These high rates could be associated with the elevated prevalence of depression, self-harm, and suicidal ideation within the population. For these females, substance use could be a way to "self-medicate", serving as a replacement for mental health therapy that is likely unavailable to them.

The environmental aspect of ATS use should be considered in the creation of interventions. Our results suggest that urban and suburban environments facilitate ATS use more so than the port town we surveyed. A potential reason for this includes increased availability of substances in urban and suburban settings. Else or in addition, social networks within these settings could support high use of ATS. This information should be applied in the design and implementation of future interventions including the location of voluntary drug rehabilitation programs.

Limitations

Given the cross-sectional design of our study, we could not determine the temporality or causality of any of the variables that were independently associated with active ATS. Additionally, while the RDS sampling was beneficial in obtaining a strong sample size from a hard to reach population, it is possible that, due to social networks, bias was introduced. We attempted to prevent this as much as possible by sampling from three different sites and having multiple seeds at the beginning of the study.

Conclusions

Taken together, our results show an increased level of substance abuse in a population that already faces substantial occupational risk. As previous research has shown, drug use compounds HIV risk factors including both physical and sexual violence, loss of authority, and

criminalization. Due to harsh criminalization and stigmatization of gender minorities, sex workers, and people who use drugs, this population experiences a lack of engagement of treatment and care. Despite efforts to address the HIV epidemic, researchers have so far failed to consider some of the most hidden at-risk populations. As one of the most marginalized and, thus overlooked populations in HIV research, females and transgender women who dually engage in sex work and drug use could benefit from targeted HIV prevention interventions. We hope our results help inform such future interventions and help reduce the risk of acquiring and transmitting HIV for this population.

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Table 1. Sample Characteristics (N = 492)

Variable	% (n)	Female (n=299)	Transgender Woman (n=193)	p-value
Age (mean)	37.4 ± 10.8	39.4 ± 10.5	34.3 ± 10.5	<0.001
Mean age of entering sex work	25.4 ± 8.7	28.6 ± 9.1	20.4 ± 5.1	<0.001
Mean years engaged in sex work	12.0 ± 10.4	10.8 ± 10.3	13.9 ± 10.3	0.001
Recruitment Site				
Kuala Lumpur	54.9 (270)	64.9 (194)	39.4 (76)	<0.001
Klang	31.9 (157)	31.4 (94)	32.6 (63)	
Petaling Jaya	13.2 (65)	3.9 (11)	28.0 (54)	
Ethnicity				
Malay	55.5 (273)	53.2 (159)	59.1 (114)	<0.001
Chinese	1.63 (8)	2.34 (7)	0.52 (1)	
Indian	22.6 (111)	18.1 (54)	29.5 (57)	
Indonesian	18.2 (89)	25.4 (76)	6.74 (13)	
Other	2.24 (11)	1.00 (3)	4.15 (8)	
Religion				
Muslim	74.6 (367)	79.9 (239)	66.3 (128)	0.002
Hindu	20.1 (99)	15.1 (45)	28.0 (54)	
Christian	3.46 (17)	2.68 (8)	4.66 (9)	
Other	1.83 (9)	2.34 (7)	1.04 (2)	
Birth Country				
Malaysia	78.1 (384)	70.6 (211)	89.6 (173)	<0.001
Indonesia	19.3 (95)	26.1 (78)	8.81 (17)	
Other	2.64 (13)	3.34 (10)	1.55 (3)	
Relationship Status				
In a relationship	43.3 (213)	44.5 (133)	41.5 (80)	0.508
Single	56.7 (279)	55.5 (166)	58.5 (113)	
Number of children	1.4 ± 1.8	2.23 ± 1.92	0.10 ± 0.43	<0.001
Range	(0 – 10)	(0 – 10)	(0 – 3)	
Education Truncated				
Less than primary	10.4 (51)	14.1 (42)	4.66 (9)	<0.001
Primary – Form 4	53.5 (263)	61.5 (184)	40.9 (79)	
Form 5 - PhD	36.2 (178)	24.4 (73)	54.4 (105)	
Housing Status				
Stable housing	89.2 (439)	89.6 (268)	88.6 (171)	0.767
Unstable housing	10.8 (53)	10.4 (31)	11.4 (22)	
Frequency of sex work				
Full-time	61.2 (301)	55.2 (165)	70.5 (136)	0.003
Part-time	31.1 (153)	36.1 (108)	23.3 (45)	
Intermittent	7.7 (38)	8.7 (26)	6.22 (12)	
Source of clients				
Public venue	52.3 (46)	47.8 (22)	57.1 (24)	0.382
Not public venue	47.7 (42)	52.2 (24)	42.9 (18)	
Mean monthly income	2144 ± 1840	1788 ± 1551	2696 ± 2100	<0.001
Mean monthly income from sex work	1770 ± 1720	1475 ± 1470	2227 ±1966	<0.001

Table 2. History of Substance Use

Substance	% (n)	Female	Transgender Woman	p-value
Alcohol				
Ever	61.4 (302)	57.9 (173)	66.8 (129)	0.046
Past 30 days	21.1 (104)	20.4 (61)	22.3 (43)	0.618
Heroin				
Ever	17.7 (87)	23.8 (71)	8.29 (16)	<0.001
Past 30 days	12.4 (61)	16.7 (50)	5.70 (11)	<0.001
Main mode: smoke	95.1 (58)			
Any opioid except heroin				
Ever	11.0 (54)	15.4 (46)	4.15 (8)	<0.001
Past 30 days	5.49 (27)	7.36 (22)	2.59 (5)	0.023
Morphine				
Ever	3.46 (17)	4.35 (13)	2.07 (4)	0.177
Past 30 days	1.02 (5)	1.34 (4)	0.52 (1)	0.653
Main mode: smoke	100 (5)			
Buprenorphine				
Ever	2.24 (11)	3.34 (10)	0.52 (11)	0.057
Past 30 days	0.20 (1)	0.33 (1)	0.00 (0)	1.000
Main mode: orally	100 (1)			
Methadone				
Ever	9.96 (49)	14.1 (42)	3.63 (7)	<0.001
Past 30 days	5.08 (25)	7.02 (21)	2.07 (4)	0.015
Main mode: orally	100 (24)			
Benzodiazapines				
Ever	12.8 (63)	11.0 (33)	15.5 (30)	0.144
Past 30 days	2.03 (10)	2.01 (6)	2.07 (4)	1.000
Main mode: orally	90.0 (9)			
ATS				
Ever	44.9 (221)	43.5 (130)	47.15 (91)	0.424
Past 30 days	32.3 (159)	31.8 (95)	33.2 (64)	0.748
Main mode: smoke	98.7 (157)			
Amphetamine (Ecstasy)				
Ever	10.8 (53)	10.7 (32)	10.9 (21)	0.950
Past 30 days	1.02 (5)	1.67 (5)	0.00 (0)	0.162
Main mode: smoke	60.0 (3)			
Ketamine				
Ever	2.85 (14)	3.01 (9)	2.59 (5)	0.785
Past 30 days	0.00 (0)	--	--	--
Cannabis				
Ever	15.5 (76)	16.4 (49)	14.0 (27)	0.472
Past 30 days	3.86 (19)	4.68 (14)	2.59 (5)	0.240
Main mode: smoke	100 (19)			
Ketum (*Mitragyna speciosa*)				
Ever	2.64 (13)	3.68 (11)	1.04 (2)	0.074
Past 30 days	0.00 (0)	--	--	--
Glue				
Ever	2.24 (11)	2.34 (7)	2.07 (4)	0.844
Past 30 days	0.41 (2)	0.67 (2)	0.00 (0)	0.522

Main mode: sniff	100 (2)			
Injected Drugs				
Ever	7.72 (38)	11.4 (34)	2.07 (4)	<0.001
Past 30 days	0.81 (4)	11.8 (4)	0.00 (0)	1.000
Polysubstance Use				
Any two	15.5 (76)	17.1 (51)	13.0 (25)	0.219
Any two ex. alcohol	10.8 (53)	13.0 (39)	7.25 (14)	0.043

Chart 1. Lifetime and active history of substance use

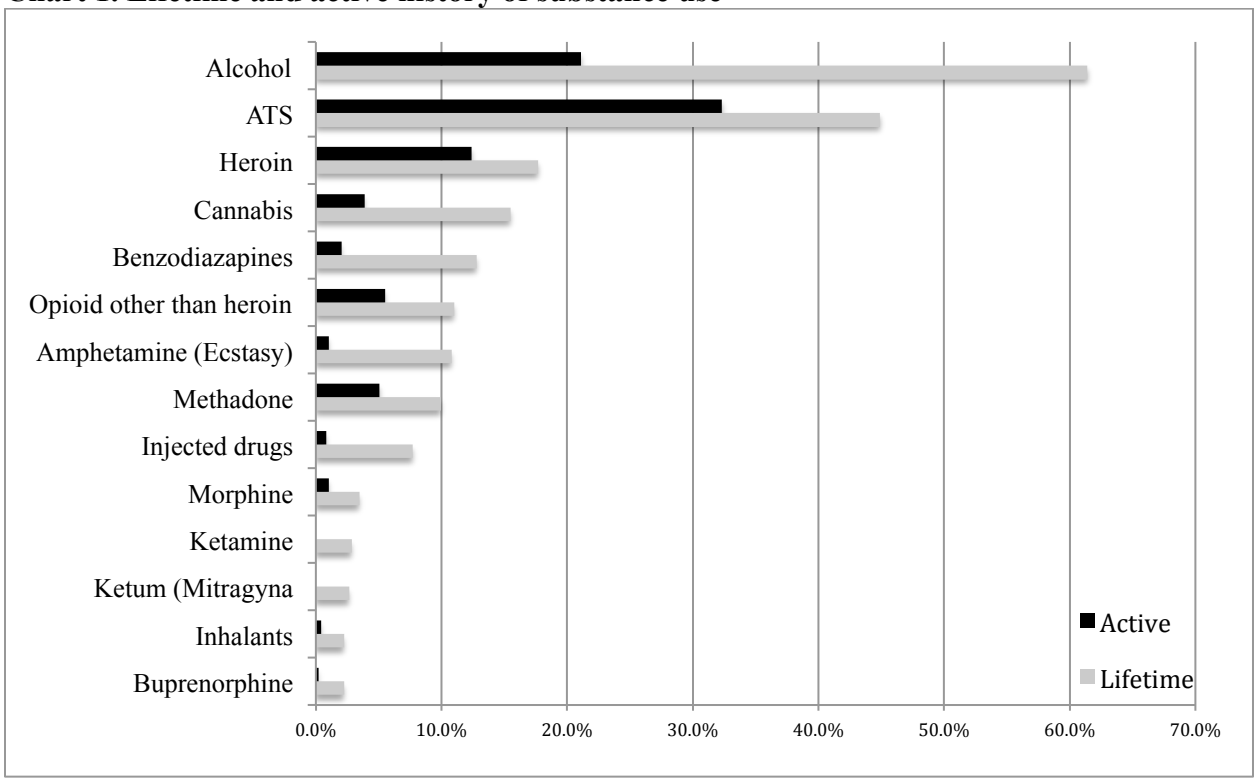

Table 3. Bivariate and multivariable associations between active amphetamine-type substance use and study variables

Variable	N*	% active users	Unadjusted OR (95% CI)	p	Adjusted OR (95% CI)	p
Location						
Klang	157	10.8	1.00		1.00	
Kuala Lumpur	270	46.7	7.21 (4.13, 12.6)	<0.001	3.22 (1.70, 6.12)	<0.001
Petaling Jaya	65	24.6	2.69 (1.26, 5.73)	0.010	2.68 (1.18, 6.10)	0.018
Ethnicity						
Malay	273	41.0	1.00			
Other	219	21.5	0.39 (0.26, 0.59)	<0.001		
Religion						
Muslim	367	32.7	1.00			
Hindu	99	22.5	0.70 (0.42, 1.15)	0.157		
Christian	17	58.8	2.94 (1.09, 7.91)	0.033		
Other	9	44.4	1.65 (0.43, 6.24)	0.463		
Born in Malaysia						
No	108	13.0	1.00			
Yes	384	37.8	4.07 (2.24, 7.40)	<0.001		
Relationship Status						
In a relationship	213	28.2	1.00			
Single	279	35.5	1.40 (0.95, 2.06)	0.086		
Education						
Less than primary	51	21.6	1.00			
Primary – Form 4	263	34.6	1.92 (0.94, 3.93)	0.073		
Form 5 - PhD	178	32.0	1.71 (0.82, 3.58)	0.153		
Housing						
Stable housing	439	29.2	1.00			
Unstable housing	53	58.5	3.42 (1.91, 6.14)	<0.001		
Frequency of sex work						
Full-time sex work	301	34.9	1.00			
Part-time	153	26.8	0.68 (0.45, 1.05)	0.082		
Periodic	38	34.2	0.97 (0.48, 1.98)	0.935		
Source of clients						
Public venue	46	47.8	2.93 (1.17, 7.33)	0.021		
Non-public venue	42	23.8	1.00			
CJS Involvement						
Ever in jail (lock-up)	242	53.7	8.85 (5.57, 14.04)	<0.001		
Ever in prison	161	64.0	8.72 (5.67, 13.42)	<0.001	4.30 (2.58, 7.17)	<0.001
Ever in CDDC	52	73.1	7.16 (3.75, 13.67)	<0.001		
HIV status						
HIV-infected; all	57	45.6	1.89 (1.08, 3.30)	0.026		
HIV-infected; new diagnosis	34	41.2	0.64 (0.22, 1.86)	0.415		
Infectious Disease						
Syphilis	58	58.6	3.47 (1.98, 6.09)	<0.001	2.39 (1.20, 4.73)	0.013
Gonorrhea	28	46.4	1.87 (0.87, 4.03)	0.112		

Chlamydia	71	25.4	0.67 (0.38, 1.18)	0.162		
Injected Drugs (lifetime)	38	71.1	5.99 (2.89, 12.42)	<0.001		
Opioid Use						
Any (lifetime)	94	69.2	7.25 (4.42, 11.89)	<0.001		
Any (active)	69	69.6	6.43 (3.68, 11.21)	<0.001		
Active Polysubstance Use	76	84.2	18.1 (9.34, 34.79)	<0.001	10.04 (3.96, 25.42)	<0.001
History of Violence						
<18 Physical abuse	181	43.1	2.15 (1.46, 3.17)	<0.001		
<18 Sexual abuse	159	40.9	1.74 (1.17, 2.59)	0.006		
>18 Physical abuse	166	42.8	2.05 (1.38, 3.03)	<0.001		
>18 Sexual abuse	85	42.4	1.70 (1.10, 2.75)	0.029		
Mental Health						
Depression	281	35.9	1.48 (1.00, 2.18)	0.048		
Ever hurt yourself	106	51.9	2.92 (1.88, 4.55)	<0.00	2.47 (1.43, 4.23)	0.001
Suicidality (lifetime)	103	41.8	1.68 (1.07, 2.63)	0.023		
Drug abuse screening						
None – low problem	319	16.0	1.00			
Moderate - Severe	135	80.0	22.0 (12.5, 35.3)	<0.001		
Alcohol abuse screening						
No – low risk	446	31.2	1.00			
Hazardous – high risk	46	43.5	1.70 (0.92, 3.15)	0.092		