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ORIGINAL ARTICLE

## Availability and Use of Substance Abuse Treatment Programs Among Substance-Using Men Who Have Sex With Men Worldwide

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### ABSTRACT

**Background:** Substance use is common among men who have sex with men (MSM) worldwide, and epidemiologic data suggest that alcohol/substance-using MSM are at greater risk for HIV. However, there are scarce data on substance abuse treatment programs (SATPs) for substance-using MSM. **Objectives:** We examined proportions of substance use as well as SATP availability and use. We used multivariable regression models, controlling for potential confounders, to examine behavioral and demographic correlates of SATP availability and use. **Methods:** This is a cross-sectional study of a multi-region, online sample of substance-using MSM. **Results:** In this sample, 75% were substance-using MSM of whom 36% reported at-least-weekly use. Substance use was most prevalent among respondents from Eastern Europe/Central Asia (86%) and Latin America (79%). Among substance-using MSM, 96% and 33% reported alcohol intoxication and other substance use, respectively; 11% reported having high SATP availability; and 5% reported using SATPs. Controlling for global region of origin and age, high SATP availability was associated with high access to HIV risk-reduction education (aOR = 3.19; CI = 1.48–6.89), mental health services (aOR = 2.53; CI = 1.32–4.83), and medical care (aOR = 2.32; CI = 1.12–4.80); less than college-level education (aOR = 0.32; CI = 0.18–0.54); and higher comfort levels with providers (aOR = 1.75; CI = 1.30–2.37). Controlling for substance use frequency and personal income additionally, using SATPs was associated with higher levels of connection to the gay community (aOR = 2.76; CI = 1.22–6.22). **Conclusion:** In this global sample of MSM, we found high alcohol intoxication and other substance use proportions. Few substance-using MSM report SATP availability, highlighting the need to develop novel substance use programs outside traditional treatment settings.

### KEYWORDS

MSM; substance use; HIV

Worldwide, men who have sex with men (MSM) carry a disproportionate burden of the HIV/AIDS epidemic. For example, prevalence among MSM reaches as high as 25% in the Caribbean and 18% in Sub-Saharan Africa, compared to 1% and 5% in the general population, respectively (Beyrer et al. 2012). There are several factors that contribute to HIV infections in MSM populations worldwide, including substance use.

Substance use—namely, alcohol intoxication, injected drug use, and noninjected drug use—is commonly cited as a predictor of condomless anal sex (Julio et al. 2015; Kahler, et al. 2015; Li & McDaid 2014) and thus a driver of HIV infections. For example, a stimulant-like methamphetamine may increase sexual desire and impair judgment. In turn, this may lead to engaging in condomless anal sex, thereby elevating the risk of becoming infected with HIV (Drumright et al., 2006). Research on the role of substance use in HIV transmission has refocused attention on the potential that substance abuse

treatment programs (SATPs) carry in curbing the HIV epidemic.

SATPs may well operate in out-patient settings (Santos et al., 2011) and hold promise for patient retention among substance-using MSM (Mansergh et al., 2010). In terms of the type of treatment, it is worth noting the benefits of psychotherapy, especially as there are no efficacious pharmacologic treatments that are FDA-approved for methamphetamine and cocaine dependence. For example, case management has demonstrated potential in patient linkage and retention in treatment (Rapp et al., 2014). In turn, the Matrix Model of cognitive behavior therapy, which incorporates motivational interviewing, has documented reductions in methamphetamine use among MSM (Rawson, 2013). Lastly, personal cognitive counseling (PCC) has been adapted for reducing HIV-related risk behaviors among MSM (Knight et al., 2014), already demonstrating a 76% reduction in condomless anal sex and 42% in frequency of alcohol intoxication in one trial (Santos et al.,

2014). Given the potential that SATPs have to address the HIV epidemic among substance-using MSM, it is also worth noting other health issues related substance use that may also be addressed by SATPs.

According to the WHO, 3.3 million deaths each year in the general global population are caused by alcohol use. In addition, 5.1% of the global burden of disease has been attributed to alcohol consumption: this includes injuries, liver cirrhosis, cancer, and alcohol dependence (WHO, 2014). As far as other substances, commonly cited concerns are drug dependence and fatal overdose among people who inject stimulants and to a greater degree opioids (Mathers et al., 2013). In all, four out of 100,000 deaths are attributable to drug use (WHO, 2010).

Taken together, effective SATPs carry potential in mitigating the negative consequences of substance use, including HIV transmission. Nevertheless, while data for general populations in multiple regions of the world exist (WHO, 2010), there remains a paucity of research on the geographical distribution of substance use among MSM across multiple regions of the world, much less data illustrating the need for improving availability and utilization of SATPs for this population, including identifying potential barriers. Such data are key for decision-making around SATPs that target substance-using MSM.

## Objectives

The first objective of this study was to provide the proportion of substance use among our global sample of MSM and describe their characteristics. Consistent with previously defined measures for substance use frequency (Colfax et al. 2004; Santos et al. 2014), here we define “high-frequency substance use” as at least weekly (“about once a week” to “daily”) alcohol intoxication (i.e., getting drunk), at least weekly injected drug use, or at least weekly non-injected drug use. We define “low-frequency substance use” as less than weekly (“less than once a month” to “more than once a month”) alcohol intoxication or less than weekly injected or non-injected drug use. After describing the proportion of MSM who use substances, the second objective of the study was to describe the level of self-reported SATP availability and SATP use among substance-using MSM across multiple regions of the world. Existing data show that coverage of treatment services for alcohol and drug use disorders in the general population across the world may be as low as 53.4% and 44.6% (respectively), with the lowest coverage levels being in low-income regions (WHO, 2010). We thus hypothesized similarly low proportions of SATP availability and use among our sample of MSM.

As the third objective, we sought to identify factors that were significantly correlated with availability and use

of these programs, as there is no multi-region research on this, to our knowledge. A prior analysis of this study sample identified various individual- and structural-level barriers to HIV/AIDS services for MSM across multiple regions of the world (Arreola et al., 2015). As such, we sought to capitalize on the robust information gathered about the various characteristics of this sample to examine whether similar factors explained availability and utilization of SATPs among substance-using MSM.

## Methods

### Procedures and participants

This is a secondary data analysis of a cross-sectional study conducted from April 23 to August 20 of 2012 through an online survey that was designed by The Global Forum on MSM & HIV/AIDS (MSMGF) and subsequently administered in five languages (Chinese, English, French, Russian, and Spanish) to a global sample of MSM. Participants were recruited *via* a network of MSM community-based organizations, listserve vs. email blasts, and internet-based recruitment. The study received IRB approval, and full descriptions of its methodology are described in previous publications (Arreola et al., 2012; Ayala et al., 2013).

Similar to the original study (Ayala et al., 2013), inclusion criteria for the present study were identifying as male, being eighteen years or older, and having had sex with a man in the past 12 months. To conduct a subgroup analysis among MSM who reported using a substance, we included only those who reported using any frequency (“less than once a month” to “daily”) of alcohol to intoxication (*During the last 12 months, how often have you used alcohol [for example: beer, wine, liquor] to get drunk?*); injected drugs (*During the last 12 months, how often have you injected recreational drugs [for example: heroin, injected crystal meth]?*); and non-injected drugs (*During the last 12 months, how often have you used recreational drugs that you did not inject [for example: marijuana, non-injected crystal meth]?*). Overall, there were 4,662 participants (MSM who met inclusion criteria), of whom 3,478 (just substance-using MSM) were included in bivariable and multivariable analyses.

### Outcome variables

In the survey, respondents were asked the following question with regard to SATP availability: *In your community, how available are free or low cost: substance abuse treatment programs?* (1 = Completely unavailable, 2 = Somewhat unavailable, 3 = Neither, 4 = Somewhat available, or 5 = Completely available). They were also asked the following with regard to SATP use: *In the last 12 months,*

how frequently have you participated in substance abuse treatment programs? (1 = Never, 2 = Once or twice, 3 = About 6 times, 4 = About 12 times, or 5 = More than 12 times). For SATP availability, participants who responded with “Neither” were excluded from the analysis ( $N = 2,067$ ). For the analysis, SATP availability and SATP use were both dichotomized. “High SATP availability” was defined as reporting complete availability of SATPs whereas “low availability” was defined as reporting complete, some unavailability, or some availability. “Any SATP use” was defined as reporting having used SATPs at least once in the past twelve months while “no SATP use” was defined as reporting never having used them in the past twelve months.

### Independent variables

The independent variables examined included sociodemographic factors (e.g., age and education), psychosocial factors (e.g., homophobia and community engagement), and clinical factors (e.g., HIV status and depression symptoms). A full description of these variables can be found in a previous publication (Arreola et al., 2012). For psychosocial variables, scales ranged from 1 to 5, with the exception of that of *service provider stigma*, which was dichotomous. The Cronbach alphas for these scales were calculated for the study from which the present analysis stems, and they met acceptable reliability standards, with alpha levels ranging from 0.71 to 0.85 (Ayala et al., 2013). Most variables were dichotomized in the same fashion as described *vis-à-vis* the outcome variables; however, some variables were left as either continuous or categorical.

### Analytic tools

To assess the difference in characteristics between the two groups, Wilcoxon rank sum and Fisher exact tests were used for the bivariable analyses, as appropriate. Independent variables with a  $p$ -value  $\leq 0.15$  at the bivariable level were included in stepwise backward elimination to generate a parsimonious model. In multivariable analyses, logistic regression and the likelihood ratio test were utilized to confirm that the independent variables identified after stepwise backward elimination made a significant contribution to the multivariable model. These analyses were all done using Stata 12 software (StataCorp).

## Results

### Respondent characteristics

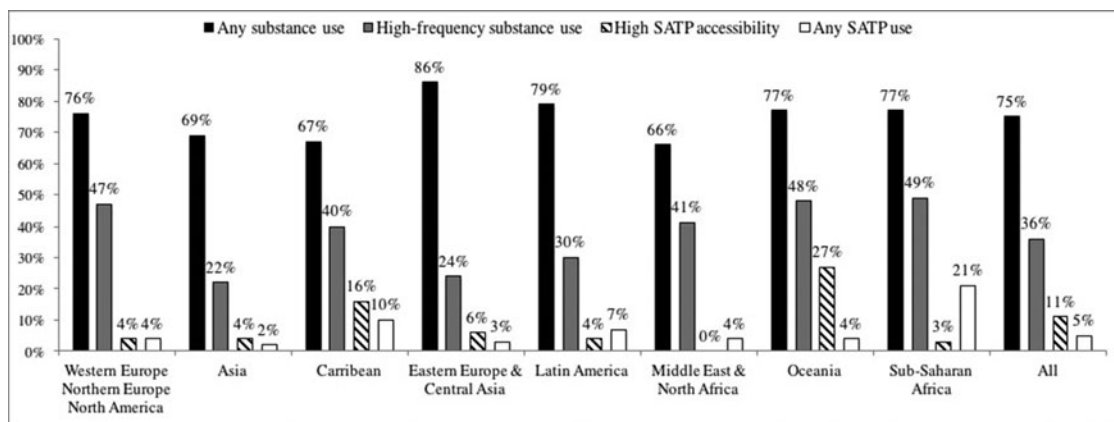
The proportion of substance use in our sample was 75%. In this sample of 3,478 respondents who were

**Table 1.** Sociodemographic and clinical characteristics of substance-using MSM in GMHR study, 2012.

	<i>n</i>	%
Total	3,478	
Region		
Asia	902	26%
Caribbean	73	2%
Eastern Europe & Central Asia	624	18%
Latin America	571	16%
Middle East & North Africa	64	2%
Oceania	190	5%
Sub-Saharan Africa	206	6%
Western and Northern Europe & North America	848	24%
Age (mean & SD)	34.66	11.30
Ethnic/racial minority status		
Minority	891	25%
Not minority	2,640	75%
Educational level		
No postsecondary	656	19%
Postsecondary	2,875	81%
Housing status		
Unstable or no place to live	829	23%
Stable place to live	2,702	77%
Personal income		
None or very low	567	16%
Low middle	1,144	32%
Middle	1,616	46%
High	204	6%
HIV status		
HIV negative/unknown	2,197	82%
HIV positive	487	18%
Alcohol intoxication		
Never	148	4%
Less to more than once a month	2,212	64%
Once a week to daily	1,118	32%
Non-injected drug use		
Never	2,404	69%
Less to more than once a month	829	24%
Once a week to daily	245	7%
Injected drug use		
Never	3,417	98%
Less to more than once a month	50	1%
Once a week to daily	11	<1%
Any alcohol-drug combination use		
Never	0	0%
Less to more than once a month	2,217	64%
Once a week to daily	1,261	36%

substance-using MSM (Table 1), 36% reported high-frequency substance, 96% reported using alcohol to get drunk, 31% any noninjected drug use, and 2% any injected drug use. The mean age was 35 and multiple regions of the world were represented: half were from Asia (26%) and Western or Northern Europe and North America (25%). A quarter of respondents self-identified as an ethnic or racial minority in their country as well as having an unstable place to live. The majority (81%) reported having a college or post-graduate education as well as a low-middle or middle income (78%). Lastly, 18% of respondents reported living with HIV.

Next, 11% of substance-using MSM reported SATP availability, and just 5% reported actually using them (Figure 1). The most highly available SATPs were in Oceania (27%) while the least highly available SATPs were in the Middle East & North Africa (0%). SATPs are most



**Figure 1.** Any substance use among MSM and at least weekly use among substance-using MSM. High availability and any use of substance abuse treatment programs among SUMSM by region.

used in Sub-Saharan Africa (21%) and the least used in Asia (2%).

### Bivariable analyses

As shown in Table 2, participants reporting high SATP availability differed significantly from participants who reported low SATP availability in all but two characteristics: having contemplated suicide and frequency of any substance use. Similarly, participants reporting any SATP use differed significantly from those who reported no SATP use in all but four characteristics: “out-ness,” access to lube, and access to HIV or STI testing (Table 3).

### Multivariable analyses

Results from multivariable analyses (Table 4) show that after controlling for global region of origin and age, compared to reporting low SATP availability, reporting high SATP availability was significantly associated with more than three times odds of having high access to HIV risk-reduction programs ( $p = .003$ ); more than twice the odds of having high access to mental health services ( $P = 0.005$ ) and medical care ( $p = .023$ ); and 75% higher odds of increased levels of feeling comfortable discussing sexual health with a provider ( $p < .001$ ). In converse, reporting high SATP availability was significantly associated with 68% fewer odds of having college or post graduate education ( $p < .001$ ), compared to reporting low SATP availability.

Next, multivariable results show that after controlling for global region of origin, age, personal income, and substance use frequency, reporting any SATP use was significantly associated with more than twice the odds of reporting higher levels of feeling connected to the gay community ( $p = .015$ ), as compared to reporting no SATP use.

### Discussion

In line with our study objectives, we identified two levels of substance use proportions among MSM and proportions on the availability of SATPs, as well as whether substance-using MSM reported using these programs. Through these analyses, we were also able to identify the characteristics of substance-using MSM that were significantly associated with availability and use of SATPs, independent of the frequency of substance use.

Our data showed that substance use is common in 75% of our global sample of MSM, and of these substance-using MSM, 36% used substances at least once a week. In support of our hypothesis, only 11% of substance-using MSM reported having high SATP availability, and still more, only 5% of substance-using MSM actually used these programs. When disaggregated by region (Figure 1), these discrepancies persist, suggesting that barriers to SATPs for substance-using MSM exist.

Our multivariable results show that high access to HIV risk-reduction programs, high access to mental health services, high access to medical care, and high levels of comfort with provider were significantly associated with high SATP availability. Although one may not infer causality between these correlates and the outcome due to the study design, some findings in the literature corroborate these relationships. First, the connection between having high access to HIV risk-reduction programs and high SATP availability reflects current literature evincing the effectiveness of SATPs as part of the greater combination prevention strategy for HIV/AIDS risk-reduction (CDC, 2011; Firestone et al., 2014; Santos et al., 2014). Second, the association between high SATP availability and high access to mental health services is reinforced by data from a WHO report showing that approximately 40% of countries around the world provide mental health services to the general population for alcohol use disorders. Similarly,

**Table 2.** Bivariable associations between independent variables and availability of substance abuse treatment programs.

Correlates	High availability (n = 228) Mean (SD)	Low availability (n = 1,839) Mean (SD)	P value
Age	41.8 (14.4)	35.7 (11.28)	<0.001
Homophobia	3.08 (0.74)	2.4 (0.74)	<.001
Provider stigma	0.21 (0.36)	0.11 (0.26)	<.001
Outness	4.06 (1.14)	3.55 (1.32)	<.001
Connection to gay community	3.68 (0.79)	3.45 (0.87)	<.001
Community engagement	1.78 (0.62)	1.64 (0.58)	<.001
Comfort with provider	4.04 (0.89)	3.03 (0.99)	<.001
	n (%)	n (%)	
Education			.019
Less than college	51 (22.37)	295 (16.04)	
College and post-graduate	177 (77.63)	1,544 (83.96)	
Personal income			.114
None or very low	31 (13.60)	267 (14.52)	
Low to middle	66 (28.95)	618 (33.61)	
Middle income	108 (47.37)	840 (45.68)	
High income	23 (10.09)	114 (6.20)	
Country income			<.001
Low income	0 (0.00)	66 (3.59)	
Lower-middle income	8 (3.51)	355 (19.31)	
Upper-middle income	45 (19.74)	768 (41.78)	
High income	175 (76.75)	649 (35.31)	
Number of partners			.020
One	62 (27.19)	373 (20.28)	
More than one	166 (72.81)	1,466 (79.72)	
HIV status			.012
HIV negative/unknown	162 (75.00)	1,439 (82.32)	
HIV positive	54 (25.00)	309 (17.68)	
Housing status			<.001
Stable home	201 (88.16)	1,431 (77.81)	
Unstable or no home	27 (11.84)	408 (22.19)	
Global North vs. South			<.001
Global North	162 (71.05)	533 (28.98)	
Global South	66 (28.95)	1,306 (71.02)	
Criminalization-MSM			.018
Never convicted	214 (95.96)	1,637 (91.50)	
Ever convicted	9 (4.04)	152 (8.50)	
Depression symptoms			<.001
No	115 (52.27)	624 (35.52)	
Yes	105 (47.73)	1,133 (64.48)	
Anxiety symptoms			<.001
No	102 (46.36)	510 (29.03)	
Yes	118 (53.64)	1,247 (70.97)	
Suicide contemplation			.277
No	173 (79.00)	1,322 (75.37)	
Yes	46 (21.00)	432 (24.63)	
Access to mental health services			<.001
High access	194 (90.65)	633 (39.49)	
Low access	20 (9.35)	970 (60.51)	
Access to medical care			<.001
High access	200 (91.74)	926 (56.53)	
Low access	18 (8.26)	712 (43.47)	
Access to condoms			<.001
High access	216 (95.58)	1,251 (73.81)	
Low access	10 (4.42)	444 (26.19)	
Access to lube			<.001
High access	198 (92.09)	898 (54.72)	
Low access	17 (7.91)	743 (45.28)	
Access to STI testing			<.001
High access	209 (93.72)	1,200 (70.42)	
Low access	14 (6.28)	504 (29.58)	
Access to HIV testing			0.001
High access	217 (97.31)	1,293 (75.44)	
Low access	6 (2.69)	421 (24.56)	
Access to HIV risk-reduction programs			<.001
High access	193 (91.47)	669 (41.48)	
Low access	18 (8.53)	944 (58.52)	
Frequency of any substance use			.246
Less to more than once a month	134 (58.77)	1,156 (62.86)	
Once a week to daily	94 (41.23)	683 (37.14)	

**Table 3.** Bivariable associations between independent variables and substance abuse treatment programs use.

Correlates	Any use (n = 140) Mean (SD)	No use (n = 2,678) Mean (SD)	p-value
Age	32.94 (10.39)	35.6 (11.58)	.009
Homophobia	3.23 (0.73)	3.01 (0.75)	.004
Provider stigma	0.29 (0.40)	0.19 (0.35)	.008
Outness	3.69 (1.17)	3.58 (1.32)	.511
Connection to gay community	3.68 (0.87)	3.43 (0.84)	.001
Community engagement	2.01 (0.55)	1.61(0.80)	<.001
Comfort with provider	3.30 (0.98)	3.11 (0.99)	.029
	n (%)	n (%)	
Education			.001
Less than college	40 (28.57)	462 (17.25)	
College and post-graduate	100 (71.43)	2,216 (82.75)	
Personal income			.007
None or very low	34 (24.29)	385 (14.37)	
Low middle	50 (35.71)	875 (32.67)	
Middle	49 (35.00)	1,256 (46.90)	
High	7 (5.00)	162 (6.05)	
Country income			<.001
Low income	18 (12.86)	65 (2.43)	
Lower-middle income	34 (24.29)	469 (17.53)	
Upper-middle income	51 (36.43)	1,117 (41.74)	
High income	37 (26.43)	1,025 (38.30)	
Number of partners			.057
One	21 (15.00)	589 (21.99)	
More than one	119 (85.00)	2,089 (78.01)	
HIV status			.032
HIV negative/unknown	93 (74.40)	2,104 (82.22)	
HIV positive	32 (25.60)	455 (17.78)	
Housing status			.002
Stable home	46 (32.86)	573 (92.57)	
Unstable or no home	94 (67.14)	2,105 (95.73)	
Global North vs. South			.025
Global North	32 (22.86)	853 (31.85)	
Global South	108 (77.14)	1,825 (68.15)	
Criminalization-MSM			0.004
Never convicted	112 (83.58)	2,386 (91.49)	
Ever convicted	22 (16.42)	222 (8.51)	
Depression symptoms			.024
No	35 (27.56)	969 (37.65)	
Yes	92 (72.44)	1,605 (62.35)	
Anxiety symptoms			.142
No	32 (25.20)	813 (31.59)	
Yes	95 (74.80)	1,761 (68.41)	
Suicide contemplation			.006
No	81 (64.80)	1,955 (76.04)	
Yes	44 (35.20)	616 (23.96)	
Access to mental health services			<.001
High access	72 (63.16)	993 (46.27)	
Low access	42 (36.84)	1,153 (53.73)	
Access to medical care			.016
High access	88 (72.73)	1,427 (61.59)	
Low access	33 (27.27)	890 (38.41)	
Access to condoms			.022
High access	111 (86.05)	1,898 (77.37)	
Low access	18 (13.95)	555 (22.63)	
Access to lube			.556
High access	73 (64.04)	1,428 (60.87)	
Low access	41 (35.96)	918 (39.13)	
Access to STI testing			.299
High access	104 (79.39)	1,829 (75.05)	
Low access	27 (20.61)	608 (24.95)	
Access to HIV testing			.366
High access	113 (84.33)	1,962 (80.67)	
Low access	21 (15.67)	470 (19.33)	
Access to HIV risk-reduction education			<.001
Highest access	75 (66.37)	1,057 (48.11)	
Lower	38 (33.63)	1,140 (51.89)	
Frequency of any substance use			.002
Less to more than once a month	70 (50.00)	1,707 (63.74)	
Once a week to daily	70 (50.00)	971 (36.26)	

**Table 4.** Multivariable model of correlates associated with availability and use of substance abuse treatment programs among substance-using MSM.

	OR	CI
High SATP access*		
Education	0.32	0.18–0.54
High access to HIV risk-reduction education	3.19	1.48–6.89
High access to medical care	2.32	1.12–4.80
High access to mental health services	2.53	1.32–4.83
Comfort with provider	1.75	1.30–2.37
Any SATP use <sup>†</sup>		
Connection to gay community	2.76	1.22–6.22

\* Controlling for world region of origin and age.

<sup>†</sup> Controlling for world region of origin, age, personal income, and substance use frequency.

the connection between medical care and SATP availability is supported by the fact that close to 52% of countries provide treatment for drug use disorders through specialized treatment services and 35% for alcohol use disorders (WHO, 2010). Next, a previous study using data from this online survey found a statistically significant association between high levels of comfort with a provider and high access to HIV/AIDS services (Ayala et al., 2013), which supports the association between such comfort levels and high SATP availability in the present study. Taken together, our findings suggest the role that a functioning health system may play in making SATPs available. Regarding education, it is unclear as to why high availability of SATPs is associated with reporting a lower level of educational attainment in this sample. This warrants research on potential explanations behind this.

Regarding SATP use, this study demonstrated a connection between a sense of belonging to a gay community and using SATPs. To our knowledge, there is no recent literature explaining the mechanisms by which belonging to a gay community leads to seeking substance abuse treatment; however, it is plausible that belonging to a gay community may provide greater access to information about various services for the specific needs of MSM. Indeed, several studies on substance abuse treatment of substance-using MSM in the US have relied chiefly on MSM-specific organizations for successful participant outreach and recruitment (Carrico et al., 2014; Reback et al., 2012; Reback & Shoptaw, 2014). Such a community-based treatment paradigm may have implications for improving SATP availability and use by substance-using MSM who need and seek such programs.

The strengths of this study include the large sample size and the survey's focus on numerous aspects of gay men's health. Still, there were limitations to our study. For one, the study was cross-sectional in design, which limits the ability to make a causal inference. In addition, the survey did not ask participants about substance use during

sexual intercourse specifically. It also only focused on free or low-cost SATPs and did not ask about specific types of SATPs, which would have been insightful. Next, the study is comprised of a convenience sample, which may have been subject to selection bias. For example, our participants accessed the online survey necessarily in a setting where there is access to a computer, Internet, and email. In addition, participation in this survey may have been limited to those already well integrated into MSM-affirming networks while those with more concealed profiles were missed by the survey. Lastly, although this study recruited participants from multiple parts of the world, the sample is nonetheless skewed toward Asia, North America, and high-income parts of Europe. As such, one must approach the generalizability of these findings to other regions of the world with caution.

Taken together, we suspect that some of the more marginalized MSM are underrepresented in our sample, which may have overestimated the observed proportion of SATP availability and use and the levels of the factors explored, including comfort levels with provider, access to other health services, and connection to the gay community.

## Conclusion

It is increasingly known that SATPs carry potential in addressing the health needs of substance-using MSM around the world. The lack of treatment for substance abuse is indeed neglect on the part of stakeholders invested in the HIV/AIDS epidemic as well as other issues directly related to substance use. Therefore, it is important to view HIV prevention and substance abuse treatment from a unified perspective. This would appeal to key stakeholders who would now view their support and funding for SATPs as doubly beneficial. More importantly, increasing the availability of substance abuse treatment for substance-using MSM would doubly benefit this population's health, especially in light of the potential for community-based venues to act as service delivery points. As our findings suggest, an environment with a functioning health system that provides comprehensive and perhaps integrated health services to MSM and where MSM feel connected to their community may be key for successful substance abuse treatment program implementation. As a next step, qualitative interviews at the country level within regions may help identify potential individual- and structural-level barriers that may be hindering SATP availability and use among substance-using MSM. These insights may help guide stakeholders to enable an environment where substance-using MSM are better linked to substance abuse treatment when needed. For example, further research is warranted on

the attitudes of substance-using MSM toward programs related to substance abuse. As such, one would be closer to uncovering feasible interventions that are adaptable for substance-using MSM populations around the world.

### Declaration of interest

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

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### References

- Arreola, S., Hebert, P., Makofane, K., Beck, J., & Ayala, G. (2012). *Access to HIV prevention and treatment for men who have sex with men the global forum on MSM & HIV: Findings from the 2012 global men's health and rights study*. The Global Forum on MSM & HIV (MSMGF). Retrieved from [http://www.msmsgf.org/files/msmgf/documents/GMHR\\_2012.pdf](http://www.msmsgf.org/files/msmgf/documents/GMHR_2012.pdf)
- Arreola, S., Santos, G.-M., Beck, J., Sundararaj, M., Wilson, P. A., Hebert, P., ... Ayala, G. (2015). Sexual stigma, criminalization, investment, and access to HIV services among men who have sex with men worldwide. *AIDS and Behavior, 19*, 227–234. doi:10.1007/s10461-014-0869-x
- Ayala, G., Makofane, K., Santos, G., Beck, J., Do, T. D., Wilson, P. A., ... Arreola, S. (2013). Access to basic HIV-related services and PrEP acceptability among men who have sex with men worldwide: Barriers, facilitators, and implications for combination prevention. *Journal of Sexually Transmitted Diseases, 2013*, 953123. doi:10.1155/2013/953123
- Beyrer, C., Baral, S. D., van Griensven, F., Goodreau, S. M., Chariyalertsak, S., Wirtz, A. L., & Brookmeyer, R. (2012). Global epidemiology of HIV infection in men who have sex with men. *Lancet, 380*(9839), 367–377. doi:10.1016/S0140-6736(12)60821-6
- Carrico, A. W., Flentje, A., Gruber, V. A., Woods, W. J., Discepola, M. V., Dilworth, S. E., ... Siever, M. D. (2014). Community-based harm reduction substance abuse treatment with methamphetamine-using men who have sex with men. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 91*(3), 555–567. doi:10.1007/s11524-014-9870-y
- Centers for Disease Control and Prevention. (2011, October 28). HIV risk, prevention, and testing behaviors among men who have sex with men—National HIV Behavioral Surveillance System, 21 U.S. cities, United States, 2008. *Morbidity and Mortality Weekly Report: Surveillance Summaries, 60*(SS14).
- Colfax, G., Vittinghoff, E., Husnik, M. J., McKirnan, D., Buchbinder, S., Koblin, B., ... Coates, T. J. (2004). Substance use and sexual risk: A participant- and episode-level analysis among a cohort of men who have sex with men. *American Journal of Epidemiology, 159*(10), 1002–1012. doi:10.1093/aje/kwh135
- Drumright, L. N., Patterson, T. L., & Strathdee, S. A. (2006). Club drugs as causal risk factors for HIV acquisition among men who have sex with men: A review. *Substance Use & Misuse, 41*, 1551–1601. doi:10.1080/10826080600847894
- Firestone, R., Rivas, J., Lungo, S., Cabrera, A., Ruether, S., Wheeler, J., & Vu, L. (2014). Effectiveness of a combination prevention strategy for HIV risk reduction with men who have sex with men in Central America: A mid-term evaluation. *BMC Public Health, 14*, 1244. doi:10.1186/1471-2458-14-1244
- Janiec, J., Haar, K., Spiteri, G., Likatavicius, G., Van de Laar, M., & Amato-Gauci, A. J. (2013). Surveillance of human immunodeficiency virus suggests that younger men who have sex with men are at higher risk of infection, European Union, 2003 to 2012. *Euro Surveillance, 18*, 20644.
- Julio, R. S., Friedman, R. K., Cunha, C. B., De Boni, R. B., Cardoso, S. W., Torres, T., ... Grinsztejn, B. (2015). Unprotected sexual practices among men who have sex with women and men who have sex with men living with HIV/AIDS in Rio de Janeiro. *Archives of Sexual Behavior, 44*, 357–365. doi:10.1007/s10508-014-0357-4
- Kahler, C. W., Wray, T. B., Pantalone, D. W., Mastroleo, N. R., Ryan, D., Mayer, K. H., ... Kruijs, R. D. (2015). Assessing sexual motives for drinking alcohol among HIV-positive men who have sex with men. *Psychology of Addictive Behaviors, 29*, 247–253. doi:10.1037/adb0000006
- Knight, K. R., Das, M., DeMicco, E., Raiford, J. L., Matheson, T., Shook, A., ... Herbst, J. H. (2014). A roadmap for adapting an evidence-based HIV prevention intervention: Personal Cognitive Counseling (PCC) for episodic substance-using men who have sex with men. *Prevention Science, 15*, 364–375. doi:10.1007/s11121-013-0364-z
- Koblin, B. A., Husnik, M. J., Colfax, G., Huang, Y., Madison, M., Mayer, K., ... Buchbinder, S. (2006). Risk factors for HIV infection among men who have sex with men. *AIDS, 20*(5), 731–739.
- Kurtz, S. P., Stall, R. D., Buttram, M. E., Surratt, H. L., & Chen, M. (2013). A randomized trial of a behavioral intervention for high risk substance-using MSM. *AIDS and Behavior, 17*(9), 2914–2926. doi:10.1007/s10461-013-0531-z
- Li, J., & McDaid, L. M. (2014). Alcohol and drug use during unprotected anal intercourse among gay and bisexual men in Scotland: What are the implications for HIV prevention? *Sexually Transmitted Infections, 90*, 125–132. doi:10.1136/sextrans-2013-051195
- Mansergh, G., Koblin, B. A., McKirnan, D. J., Hudson, S. M., Flores, S. A., Wiegand, R. E., ... Colfax, G. N. (2010). An intervention to reduce HIV risk behavior of substance-using men who have sex with men: A two-group randomized trial with a nonrandomized third group. *PLoS Medicine, 7*(8). doi:10.1371/journal.pmed.1000329
- Mathers, B. M., Degenhardt, L., Bucello, C., Lemon, J., Wiessing, L., & Hickman, M. (2013). Mortality among people who inject drugs: a systematic review and meta-analysis.



- Bulletin of the World Health Organization*, 91, 102–123. doi:10.2471/BLT.12.108282
- Muraguri, N., Tun, W., Okal, J., Broz, D., Raymond, H. F., Kellogg, T., ... Geibel, S. (2015). HIV and STI prevalence and risk factors among male sex workers and other men who have sex with men in Nairobi, Kenya. *Journal of Acquired Immune Deficiency Syndromes*, 68(1), 91–96.
- Rapp, R. C., Van Den Noortgate, W., Broekaert, E., & Vanderplasschen, W. (2014). The efficacy of case management with persons who have substance abuse problems: A three-level meta-analysis of outcomes. *Journal of Consulting and Clinical Psychology*, 82(4), 605–618. doi:10.1037/a0036750
- Rawson, R. A. (2013). Current research on the epidemiology, medical and psychiatric effects, and treatment of methamphetamine use. *Journal of Food and Drug Analysis*, 21(4), S77–S81. doi:10.1016/j.jfda.2013.09.039
- Reback, C., Grant, D., Fletcher, J., Branson, C., Shoptaw, S., Bowers, J., ... Mansergh, G. (2012). Text messaging reduces HIV risk behaviors among methamphetamine-using men who have sex with men. *AIDS and Behavior*, 16, 1993–2002. doi:10.1007/s10461-012-0200-7
- Reback, C., & Shoptaw, S. (2014). Development of an evidence-based, gay-specific cognitive behavioral therapy intervention for methamphetamine-abusing gay and bisexual men. *Addictive Behaviors*, 39, 1286–1291. doi:10.1016/j.addbeh.2011.11.029
- Ross, M. W., Nyoni, J., Ahaneku, H. O., Mbwambo, J., McClelland, R. S., & McCurdy, S. A. (2014). High HIV seroprevalence, rectal STIs and risky sexual behaviour in men who have sex with men in Dar es Salaam and Tanga, Tanzania. *British Medical Journal*, 4(8), e006175. doi:10.1136/bmjopen-2014-006175
- Santos, G.-M., Coffin, P. O., Vittinghoff, E., DeMicco, E., Das, M., Matheson, T., ... Dilley, J. W. (2014). Substance use and drinking outcomes in personalized cognitive counseling randomized trial for episodic substance-using men who have sex with men. *Drug and Alcohol Dependence*, 138, 234–239. doi:10.1016/j.drugalcdep.2014.02.015
- Santos, G.-M., Das, M., & Colfax, G. N. (2011). Interventions for non-injection substance use among US men who have sex with men: What is needed. *AIDS and Behavior*, 15, S51–S56. doi:10.1007/s10461-011-9923-0
- Santos, G.-M., Do, T., Beck, J., Makofane, K., Arreola, S., Pyun, T., ... Ayala, G. (2014). Syndemic conditions associated with increased HIV risk in a global sample of men who have sex with men. *Sexually Transmitted Infections*, 90(3), 250–253. doi:10.1136/sextrans-2013-051318
- World Health Organization. (2010). *Atlas on substance use (2010): Resources for the prevention and treatment of substance use disorder*. Geneva, Switzerland: Author.
- World Health Organization. (2014). *Global status report on alcohol and health 2014*. Geneva, Switzerland: Author.