



The Interactions Between Vulnerabilities for HIV and Syphilis among Cisgender and Transgender People Who Use Drugs

Ariadne Ribeiro^{2,7} · Alisson Paulino Trevizol^{5,6} · Rogerio Adriano Bosso² · Maria Clara Gianna³ · Denise Leite Vieira² · Viviane Briese Bernardini² · Elisa Brietzke^{2,4} · Marcelo Ribeiro^{1,2} · Thiago M. Fidalgo²

Received: 5 June 2020 / Revised: 18 October 2022 / Accepted: 19 October 2022 / Published online: 11 November 2022
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Abstract

In Brazil, transgender people are most affected by HIV, and crack cocaine addiction may contribute to social vulnerability and exposure to sexual and violence-related risks. This cross-sectional study comprised 2393 individuals seeking addiction treatment, consisting of 43 trans women, 1995 cisgender men, and 355 cisgender women. Records of rapid test results for HIV and syphilis and screening responses of trans women were compared to both cisgender groups using a logistic regression model to identify associated risk factors. HIV prevalence was higher in the transgender group (39.5%) than in cis women and men (5.9% and 3.6%, respectively). Our study showed an eightfold higher chance of a positive HIV test among transgender individuals who used drugs (OR: 8.79, $p < .01$, 95% CI: 3.90–19.78) compared to cisgender people who used drugs. A lifetime history of syphilis infection was more common in transgender people (60.0%) and cis women (32.8%) than in cis men (9.5%). Active syphilis was also more common in the transgender population (OR: 5.46, $p < .01$, 95% CI: 2.63–11.32). In our sample, 44.2% of transgender individuals had a history of at least one suicide attempt in their lifetime. Our results showed that transgender women were at higher risk of crack cocaine use (OR: 5.51, $p < .01$, 95% CI: 2.16–14.06) than cisgender men and women. The study showed that trans women had a higher prevalence of syphilis and HIV, and a greater chance of being homeless. The synergy of these vulnerabilities may have led to our findings of high psychotic symptoms and a history of suicide attempts in transgender individuals.

Keywords Crack cocaine · HIV · STI · Transgender · Social determinants of health · Gender identity

Introduction

From the 1960s onward, the social visibility and advocacy of transgender people has increased (Stryker, 2008), although affirmative and inclusive public policies did not begin to be implemented until three decades ago (Popadiuk et al., 2017). Transgender is a term that refers to individuals whose gender identity or expression differs from the culturally bound gender associated with their birth sex (Soll et al., 2017). There are currently an estimated 25 million transgender people worldwide (Flores et al., 2016).

Although societal understanding and acceptance of transgender persons has somewhat progressed (Winter et al., 2016), many individuals have still decided to conceal themselves due to the stigma, social exclusion, and intolerance they would experience if they openly displayed their identities. Social stigma limits their access to fundamental rights, such as social and financial support, housing, and health care (Diehl et al., 2017; Lenning & Buist, 2013; Winter et al.,

✉ Ariadne Ribeiro
ariadnerf@gmail.com

¹ Reference Center for Alcohol, Tobacco and Other Drugs, Sao Paulo State Secretariat of Health, Sao Paulo, SP, Brazil

² Department of Psychiatry, Universidade Federal de Sao Paulo, Sao Paulo, Brazil

³ Reference and Training Center for STI and AIDS, Sao Paulo State Secretariat of Health, Sao Paulo, SP, Brazil

⁴ Department of Psychiatry, Queen's University School of Medicine, Kingston, ON, Canada

⁵ CAMH - Mood Disorders Psychopharmacology Unit, University Health Network, Toronto, ON, Canada

⁶ Department of Psychiatry, University of Toronto, Toronto, ON, Canada

⁷ The Joint United Nations Program on HIV/AIDS, UN HOUSE Conjunto C, Quadra 802, Lote 17, Federal District, Brasília 70800-400, Brazil

2016). They face exclusion and violence that reduces their opportunities for formal education and jobs, thus leading many trans women to be involved in sex work, which makes them more vulnerable to sexually transmitted infections (STIs) and more likely to become victims of abuse, harassment, torture and homicide (Costa et al., 2016a; Wirtz et al., 2020).

Trans women—defined here as individuals assigned male at birth but who self-identify as women (Carrara et al., 2019)—have a high risk of HIV infection and transmission, thus enduring a relatively high HIV burden worldwide (Reisner et al., 2016). A meta-analysis indicated that trans women are almost 49 times more likely to test positive for HIV than cis women of the same age worldwide (Poteat & Wirtz, 2017). Several cross-sectional studies, including those in South America and Brazil, have found HIV prevalence varying from 19 to 30% (Bastos et al., 2018; De Boni et al., 2014). In addition, trans women present a high prevalence of substance and alcohol use, possibly as a coping mechanism to experiencing violence, social exclusion, and consequent psychiatric comorbidities (Santos et al., 2014; Scheim & Travers, 2017).

Brazil is the most populous country in South America. It is still struggling with structural problems, which leads to high social inequalities due to stigma related to racism, gender-based violence, and LGBT phobia. Therefore, the rights and needs of trans people in Brazil are severely neglected (Phillips, 2017). A recent study using the household sample survey methodology in Brazil showed that 0.69% of people self-identify as transgender and approximately 1.19% of people self-identify as gender nonconforming (Spizzirri et al., 2021).

The country has the highest rate of murders of transgender people worldwide (Haas & Lane, 2015; Nemoto et al., 2011; Phillips, 2017). In addition, according to Reports on Homophobic Violence in Brazil from the Office of Human Rights of the Presidency of the Republic, there were 9982 violations related to the LGBT population in 2012, with 4851 victims—an increase of almost 200% compared with the previous year (Popadiuk et al., 2017). Jalil et al. (2017) interviewed 345 trans women in Rio de Janeiro and found that more than 70% of them were living with HIV.

Some prevention strategies are low-cost, yet they do not reach the most vulnerable social groups, making them ineffective in reducing infections among trans women (Magno et al., 2019). Additionally, Brazilian trans women are less likely to adhere to antiretroviral treatment than the country's general population, with consequently lower viral suppression rates (35.4% vs. 46%, respectively) (Jalil et al., 2017).

Many key populations, such as transgender individuals, men who have sex with men (MSM), people who use drugs, sex workers, and prisoners, present multiple risk factors for HIV and STI infection (Ribeiro et al., 2016; Wiewel et al., 2016). Regarding HIV/AIDS strategies, many testing and counseling centers have difficulties in correctly identifying data of trans women; therefore, these cases are quite commonly incorrectly reported to authorities as men who have sex with men (Scheim & Travers, 2017), which leads to underreporting of the prevalence in trans women. This also complicates the development of specific public health policies for this population. The United Nations Joint Programme on HIV/AIDS (UNAIDS) has provided guidelines for the treatment of HIV/AIDS and other STIs among people who use drugs (UNAIDS, 2020; UNODC, 2014), which were implemented in the Reference Center for Alcohol, Tobacco and Other Drugs (CRATOD) in Sao Paulo, Brazil.

Finally, the use of psychoactive substances has still been poorly investigated among transgender women in Brazil. Substance use is associated with sexually transmitted infections, HIV, and poor adherence to HIV treatment (Hotton et al., 2013), all associations which are still understudied.

Currently, Brazil has the largest cocaine market in South America and the largest population of crack cocaine users worldwide (UNODC, 2017), with approximately one million adults who reported crack cocaine use in the previous year (Abdalla et al., 2014a; Fischer et al., 2013). The National Survey on Crack Cocaine Consumption (Abdalla et al., 2014a), estimated that 300,000 regular crack cocaine users live in the 27 Brazilian state capitals, many of them living on the streets or in open-air drug use areas (Garofalo et al., 2006). “Cracolândia,” in Sao Paulo, Brazil, is one of the world's largest open-air drug areas and is run by local drug dealers, with activities linked to drug use, such as unlicensed bar sales of stolen goods and prostitution. Homeless people, ex-convicts, and individuals who use drugs feel unable to integrate into mainstream society, resulting in a high violence index (Carvalho & Seibel, 2009; Ribeiro et al., 2016). Unlike other countries, in Brazil, the use of injected drugs is rare. Additionally, methamphetamine and opioid use is not a significant public health concern (Bastos et al., 2017).

The aims of this study were (1) to estimate the prevalence of HIV and STI among trans women receiving treatment in an addiction facility and compare them with those of cisgender persons and (2) to investigate factors associated with HIV and syphilis diagnoses, as well as those associated with STI treatment adherence, according to the records of the Information System of Notifiable Diseases (SINAN) and the Brazilian Logistic Center for Medication Control (SICLOM).

Method

Participants

This was a cross-sectional study evaluating the social vulnerability and prevalence of HIV and sexually transmitted infections (STIs) among cis men, cis women and trans women receiving treatment at the CRATOD, Brazil's most prominent public drug addiction treatment unit, located in downtown Sao Paulo. We interviewed 2393 individuals receiving treatment, collected rapid tests and consulted an official treatment database from the SICLOM and SINAN.

“Cracolândia” (Crackland) is an area in which drugs, especially crack cocaine, are used and traded openly (Barrington et al., 2012). It is also characterized by the high social vulnerability of its population, with a significant number of homeless people (Ribeiro et al., 2016). Most of the residents of this area are men who are not receiving any health treatment and who are frequently involved in violent situations, either as a victim or as an aggressor (Ribeiro et al., 2016). CRATOD, the largest addiction treatment facility in Latin America, is located in this area and provides treatment for people with substance use disorders (SUD). It offers a multidisciplinary approach with both inpatient and outpatient treatment, including doctors, psychologists, nurses, and social workers (Zoldan & Ribeiro, 2017).

CRATOD is a highly dynamic center, with multiple possible patient admission pathways (). The facilities include an emergency room and an outreach team. Therefore, it is extremely difficult to estimate the exact number of patients admitted in a given period. In this study, we evaluated the records of all subjects admitted to CRATOD between January 2017 and March 2018 who (1) provided informed consent; (2) underwent rapid testing; (3) were 18 years or older, (4) had a diagnosis of SUD and (5) were evaluated by a psychiatrist for the presence of psychotic symptoms and suicidal ideation. Subjects who met the inclusion criteria during the study period were included in the final analysis, for a total of 2393 individuals. Individuals who did not fulfill these inclusion criteria were excluded from our sample. All information used in this study was collected from the included individuals, and there were no missing data for any of the variables used.

Procedure and Measures

At admission, a trained nurse interviewed the subjects and collected information on sociodemographic characteristics, substance use patterns and background, behaviors known to increase the risk for HIV infection and other STIs, and current or prior STI diagnoses. Rapid tests for HIV/AIDS, syphilis and hepatitis B and C were also carried out for those

who accepted. The nurse then explained the results to the patients and referred them for medical evaluation, counseling and treatment (Samuels et al., 2017).

The rapid test consisted of a qualitative immunochromatographic assay to detect HIV types 1 and 2 (HIV-1 and HIV-2) in human serum, plasma, or whole blood. The test detects all isotypes (IgG, IgM, IgA) specific to HIV-1 or HIV-2. The test kit contains a precoated membrane strip with recombinant HIV-1 capture antigen (gp41, p24) at test line 1 and recombinant HIV-2 capture antigen (gp36) at test line 2. The recombinant antigens are sampled along the membrane strip at each test region. The result is a visible line formed by the antigen/antibody complex. Positive results were confirmed with a second rapid test carried out by another laboratory, a CD4 count and an assessment of viral load. All HIV and syphilis tests were produced by Bio Manguinhos, Alere or Bioeasy. Molecular biology tests for chlamydia and gonorrhea were requested at the laboratory as they were unavailable through the partnership with the State Health Surveillance Office. Syphilis was tested using immunochromatography to detect *Treponema pallidum* antibodies in serum, plasma or whole blood, similar to the method used to detect HIV-1 and HIV-2. If this test was positive, a venereal disease research laboratory (VDRL) test was performed. A threshold of ≥ 0.9 was applied to diagnose syphilis, following recommendations of the manufacturer of the test. All subjects diagnosed with syphilis were referred to pharmacological treatment and counseling. Patients who were already aware of their HIV diagnosis or were registered in the SINAN but were not on antiretroviral therapy were defined as treatment non-adherent.

A mental health assessment was performed by a trained psychiatrist to evaluate aggravating factors, including suicidal ideation and psychotic symptoms, which determined the type of treatment (voluntary or involuntary), tailored for each patient's condition.

Subjects exhibiting aggressive behavior and those with acute intoxication symptoms, psychotic symptoms, or suicidal ideation were referred to the inpatient unit.

Ethical Aspects

According to the protocol, all subjects admitted provided written informed consent before they began their treatment, allowing the facility to use their data for research. The local Institutional Review Board from UNIFESP approved the study under the registration number CAAE 68,508,117.5.0000.5505. Our findings are reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement.

Statistical Analysis

All statistical analyses were conducted using Stata 13.0 (Stata Corp, College Station, TX). Descriptive statistics were calculated for sociodemographic variables, risky behaviors and STI prevalence using Fisher's exact or Kruskal–Wallis test.

Two multiple logistic regression models were performed, one using HIV infection status as the dependent variable and the other using syphilis infection. The independent variables were the same for both models. The independent variables were selected according to previous literature and included self-identity (trans or cisgender) (Hotton et al., 2013), being a man who has sex with a man (Hightow-Weidman et al., 2011), history of condom use, history of suicide attempts (McPherson et al., 2017; Ribeiro et al., 2020), crack cocaine use, and being homeless (Ribeiro et al., 2020).

Results

We analyzed data from 2393 patients admitted to the unit between January 2017 and March 2018. In general, trans women sought treatment at a younger age than cisgender persons. The prevalence of homelessness was significantly

higher in the transgender patients than that in cisgender women and men. Tobacco use was more common among trans women. More cis and trans women had a history of suicide attempts in the past month than cisgender men. The prevalence of HIV infection was eight times higher among trans women than that in cisgender women and men. There was no statistically significant difference between trans women and cisgender men and women for viral load and CD4 counts (Table 1).

Among the homeless trans women receiving treatment, the prevalence rates of HIV and syphilis were 7.24% and 19.72%, respectively. Over half of the syphilis-positive individuals had a syphilis infection, 51.33% had a latent syphilis infection, and 10.16% had not adhered to prior treatment.

More than half of the patients (53.4%) with previous HIV diagnosis presented high viral loads and CD4 counts lower than 350 ($p = 0.681$). There was no significant difference between transgender and cisgender patients.

In the logistic regression model with HIV status as the dependent variable, trans women were eight times more likely to test positive than cis men and women. Other independent factors that increased the odds of testing positive were use crack cocaine, homelessness, prior suicide attempts,

Table 1 Sociodemographic, clinical, and behavioral characteristics of 2,393 patients admitted to the Reference Center for Alcohol, Tobacco and Other Drugs (CRATOD), in the city of Sao Paulo, Brazil, between January 2017 and March 2018

	Transgender female <i>n</i> = 43	Cisgender male <i>n</i> = 1,995	Cisgender female <i>n</i> = 355	<i>p</i> -value
Mean age in years (SD)	28.8	36.4	32.5	.001
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
<i>Drug of Choice</i>				.001
Alcohol	4 (9.3%)	419 (21.0%)	53 (14.9%)	
Snorted cocaine	1 (2.33%)	381 (19.1%)	68 (19.15%)	
Crack cocaine	38 (88.3%)	1,140 (57.2%)	220 (61.9%)	
Tobacco Use	35 (81.4%)	1,508 (75.6%)	278 (78.7%)	.001
<i>Housing</i>				< .001
Institution	2 (4.76%)	126 (6.33%)	9 (2.56%)	
Homeless	31 (73.8%)	947 (47.5%)	146 (41.4%)	
Fixed address	9 (21.4%)	918 (46.1%)	197 (55.9%)	
“Cracolândia”	5 (11.9%)	45 (2.26%)	27 (7.65%)	
Psychotic Symptoms in Evaluation	18 (41.8%)	626 (31.5%)	160 (31.5%)	< .001
Past-month Suicide Attempt	19 (45.2%)	645 (32.9%)	178 (51.5%)	< .001
<i>STI^b status</i>				
HIV ^c	15 (39.4%)	69 (3.58%)	20 (5.88%)	< .001
Already diagnosed with treatment neglected	13 (30.2%)	64 (3.22%)	14 (3.94%)	< .001
<i>CD4^d/Viral load/AIDS^e</i>				
< 350/ > 100.000/ml	8 (57.1%)	23 (53.4%)	11 (57.8%)	.681
> 350/ < 10.000/ml	1 (7.14%)	5 (11.6%)	4 (21.0%)	
Syphilis infection	13 (48.1%)	113 (7.3%)	65 (25.9%)	< .001

^aSD: Standard deviation; ^bSexual transmitted infection; ^cHuman immunodeficiency virus; ^dCD4 lymphocytes; ^eAcquired immunodeficiency syndrome

psychotic symptoms, not using a condom and poor adherence to HIV treatment. Detailed information is presented in Table 2. In another regression, we found that trans women were more likely to adhere to HIV treatment programs, including antiretroviral therapy, CD4 counts and tests of viral load, than cisgender men and women (OR: 5.70, $p = 0.001$, 95% CI: 1.96–16.61).

In the logistic regression model with syphilis status as the dependent variable, trans women were five times more likely to test positive than cis persons. Other independent factors that increased the chance of testing positive for syphilis were the use of crack cocaine, homelessness, prior suicide attempts, psychotic symptoms, and not using a condom. Detailed information is presented in Table 3.

Discussion

This cross-sectional study was carried out on 2,393 patients (trans women and cisgender men and women) who sought treatment for substance use disorder. We found that (1) trans women were eight times more likely to test positive for HIV than cis men and women; (2) trans women were over five times more likely to test positive for syphilis than cis men and women; and (3) the use of crack cocaine independently influenced these results.

In Brazil, the populations at high risk of HIV infection are individuals who use drugs, MSM, trans women, and prisoners (WHO & UNAIDS, 2015). Since the 1990s, intravenous drug

use has been drastically reduced in Brazil, not by adequate policies but by the rapid spread of crack cocaine (Duailibi et al., 2008). However, stimulant drugs such as crack cocaine are associated with unprotected sex and increase the risk of HIV and STIs (de Souza et al., 2002).

A prejudice-free and inclusive environment, especially one that is open to sexual and gender diversity, can deconstruct trans people's perception of discrimination in the medical field and deliver integrative health care that provides better treatment for this highly vulnerable population (Magno et al., 2019).

Among the suggested measures are the inclusion of routine testing and treatment for HIV and other STIs in addiction treatment outpatient facilities (UNAIDS, 2020; UNODC, 2014).

Testing and treating STIs and HIV in individuals with substance use disorders and other populations with synergic vulnerabilities can help to establish contact with the most marginalized people affected by inequalities (Barrington et al., 2012; Costa et al., 2016b; Gama et al., 2018). Our study showed an eight times higher likelihood of a positive HIV test among trans women who use drugs than cisgender individuals who use drugs. Studies carried out in 10 Brazilian municipalities between 2008 and 2009 estimated HIV prevalence at 5.8% among individuals who use drugs (Baptista et al., 2017), and we found that almost forty percent (39.4%) of trans women in this study were living with HIV (Poteat & Wirtz, 2017). The profile of individuals who use crack cocaine predisposes them to exchange

Table 2 Multiple logistic regression model for risk for HIV infection among 2,393 patients admitted to the Reference Center for Alcohol, Tobacco and Other Drugs (CRATOD), in the city of Sao Paulo, Brazil, between January 2017 and March 2018

Risk for HIV	Odds Ratio	Confidence Interval	<i>p</i> -value
Crack use (ref: no use)	2.13	1.20–3.79	.01
Homeless (ref: not being homeless)	2.70	1.56–4.67	< .01
Transgender (ref: cisgender)	8.79	3.90–19.78	< .01
Suicidal attempt (ref: no)	1.25	1.12–1.40	< .01
Psychotic symptoms (ref: no)	1.82	1.16–2.85	.01
MSM (ref: heterosexual)	1.49	0.84–2.64	.17
Condom use (ref: no)	0.009	0.004–0.01	< .01

MSM: Men who have sex with men; ref: reference category

Table 3 Multiple logistic regression model for risk for syphilis infection among 2,393 patients admitted to the Reference Center for Alcohol, Tobacco and Other Drugs (CRATOD), in the city of Sao Paulo, Brazil, between January 2017 and March 2018

Risk for syphilis	Odds Ratio	Confidence Interval	<i>p</i> -value
Crack use (ref: no use)	1.25	0.92–1.72	.14
Homeless (ref: not being homeless)	2.33	1.71–3.18	< .01
Transgender (ref: cisgender)	5.46	2.63–11.32	< .01
Suicidal attempt (ref: no)	1.22	1.11–1.33	< .01
Psychotic symptoms (ref: no)	1.81	1.37–2.40	.01
MSM (ref: heterosexual)	2.60	1.84–3.68	< .01
Condom use (ref: no)	0.04	0.02–0.06	< .01

MSM: men who have sex with men; ref: reference category

sex for money or drugs. However, they do not refer to the practice as sex work (Ribeiro et al., 2016). This result highlights the importance of correctly reporting HIV infection among trans women to minimize the gap between reality and official data.

Syphilis is the most prevalent STI among people who use crack cocaine (Pinto et al., 2014). Studies have found that trans women that use drugs have fivefold higher odds of testing positive for syphilis on the treponemal test (Pinto et al., 2014). The high prevalence of syphilis among trans women underscores the urgent need to develop more effective prevention and treatment strategies specifically designed for this group. The current prevention and treatment strategies are either insufficient or poorly target this key population (Ribeiro et al., 2020). Given the social vulnerability caused by the stigma and social discrimination that transgender people experience (Magno et al., 2019), preventing STIs in this population should utilize a specialized and tailored approach to care. Policies should promote the early diagnosis and treatment of STIs among individuals who use drugs, especially among trans women (Booth et al., 2000). Early diagnosis and treatment would help reduce the spread of STIs such as HIV and syphilis in key populations with synergistic vulnerabilities (Booth et al., 2015).

Crack cocaine use was more prevalent in trans women (88.3%) than in cis men (57.2%) and cis women (61.9%), which increases trans women's vulnerability to mental illness. This study observed a higher rate of psychotic symptoms among the transgender population than among cis men and women. Previous studies have reported that the prevalence of personality disorders is 26% in transgender people, compared with 10% in the general population (Ibrahim et al., 2016). In addition, the co-occurrence of personality disorders and SUD usually makes treatment adherence more complicated and predisposes patients to self-harm and suicide, which further increases the vulnerability of this group that has no or limited social support (Liu & Mustanski, 2012; Mueller et al., 2017). Nearly half of trans women in our sample had attempted suicide at some point, a similar rate as that presented by cis women (Liu & Mustanski, 2012). The results underscore the vulnerability of trans women and cis women, who are particularly vulnerable due to a culture of sexism and gender-based violence, which is markedly increased in "Cracolândia" (Butler, 2008; Sakamoto et al., 2015).

Limitations

The study was performed at a single center on a convenience sample. Additionally, CRATOD is at the core of "Cracolândia". Thus, it is reasonable to assume that the population treated there have specific characteristics, as these subjects probably face more severe addiction and are in a

more vulnerable situation. Therefore, caution should be taken when considering the generalizability of the results. Due to the study's cross-sectional design, it was not possible to infer causality, only associations. Although there was no open questionnaire eliciting gender self-identification, we have patterned the term after their own usage. Additionally, the principal researcher (A.R.), who was also responsible for case management of the participants, identifies herself as a trans woman; thus, representativeness may influence likelihood of participant self-identity disclosure. Finally, underreporting and memory bias are possible since all the information on drug intake and risk behaviors were based on self-report.

Conclusion

The study showed that trans women had a higher prevalence of syphilis and HIV and were more likely to use crack cocaine and live on the street. Given the synergy of these vulnerabilities, a high prevalence of psychotic symptoms and a history of suicide attempts were also observed in this group. The study showed that the social exclusion of individuals who use drugs in this facility was even more severe among transgender people. Therefore, it is crucial to offer HIV and STI testing and treatment interventions concurrent with mental health care. Follow-up studies are needed to investigate medium- and long-term treatment adherence, including improvement in social conditions due to mental health care.

Acknowledgements This study was financed, in part, by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior—Brasil (CAPES)—Finance Code 001.

Declarations

Conflict of interest All authors have approved the manuscript and agreed to its submission to the Archives of Sexual Behavior. We declare that we have no conflict of interest related to this study.

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