Factors Associated with HIV Viral Suppression Among Transgender Women in Lima, Peru

Katherine M. Rich, MPH,¹ Jeffrey A. Wickersham, PhD,^{1,2} Javier Valencia Huamaní, MD,³ Sara N. Kiani, BA,⁴ Robinson Cabello, MD,⁵ Paul Elish, BA,⁴ Jorge Florez Arce, MD,⁶ Lia N. Pizzicato, MPH,⁷ Jaime Soria, MD,⁸ Jorge Sanchez, MD, MPH,^{3,9} and Frederick L. Altice, MD, MA^{1,2,7}

Abstract

Purpose: Globally, transgender women (TGW) experience a high burden of adverse health outcomes, including a high prevalence of HIV and sexually transmitted infections (STIs) as well as psychiatric disorders and substance use disorders. To address gaps in HIV research in Peru focused specifically on TGW, this study presents characteristics of a sample of HIV-positive TGW and identifies factors associated with viral suppression.

Methods: Between June 2015 and August 2016, 50 HIV-positive TGW were recruited in Lima, Peru. Multivariable logistic regression was used to identify factors associated with viral suppression (<200 copies/mL) among the TGW.

Results: Among TGW, 85% achieved viral suppression. Approximately half (54%) reported anal sex with more than five partners in the past 6 months, 38% reported sex work, 68% had not disclosed their HIV status to one or more of their partners, and 38% reported condomless sex with their last partner. The prevalence of alcohol use disorders was high (54%), and 38% reported use of drugs in the past year. Moderate-to-severe drug use significantly reduced odds of achieving viral suppression (adjusted odds ratio 0.69; 95% confidence interval: 0.48–0.98).

Conclusion: Our findings highlight the need for integrated treatment for substance disorders in HIV care to increase the viral suppression rate among TGW in Lima, Peru.

Keywords: barriers to care, HIV, Latin America, substance use disorder, transgender women

Introduction

GLOBALLY, TRANSGENDER WOMEN (TGW) experience a high burden of adverse health outcomes, including a high prevalence of HIV and sexually transmitted infections (STIs) as well as mental health disorders and substance use disorders.¹ Recognition of this burden has prompted a call for increased research to guide targeted health interventions and policy efforts.^{1–3} In particular, there is a need for better understanding of the risk factors associated with HIV and HIV treatment outcomes experienced by TGW.⁴ A recent global review of the HIV burden among TGW reported that in low- and middle-income countries TGW are 50.0-fold (95% confidence interval [CI]: 26.5–94.3) more likely

to be HIV positive than all other adults of reproductive age.³ Although gender identity and presentation differ across cultures, the term “transgender” most commonly refers to individuals whose gender identity differs from their birth sex.^{1,2} For the purpose of this study, the term “TGW” refers to individuals who reported their gender identity as a woman or transgender and were assigned male sex at birth.

In Peru, HIV is particularly concentrated among TGW.^{4–6} The prevalence is estimated to be 28.9% (95% CI: 21.1–36.7), with TGW 84.7-fold (95% CI: 69.1–103.9) more likely to be HIV positive than all other adults.³ In comparison, the national HIV prevalence is 0.4%.⁷ Interventions to reduce the HIV burden in this population, however have been limited, in part, because of lack of data specific to

¹AIDS Program, Department of Internal Medicine, Section of Infectious Diseases, Yale University School of Medicine, New Haven, Connecticut.

²Centre of Excellence for Research in AIDS (CERiA), Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

³Asociación Civil Impacta Salud y Educación, Lima, Peru.

⁴Yale College, New Haven, Connecticut.

⁵Asociación Vía Libre, Lima, Peru.

⁶Infectious Diseases Unit, Hospital Nacional Arzobispo Loayza, Lima, Peru.

⁷Department of Epidemiology of Microbial Diseases, Yale School of Public Health, New Haven, Connecticut.

⁸Infectious Diseases Unit, Hospital Nacional Dos de Mayo, Lima, Peru.

⁹Centro de Investigaciones Tecnológicas, Biomédicas y Medioambientales, Callao, Peru.

TGW. Previous HIV research in Peru, including from our group, has included TGW with cohorts of cisgender men who have sex with men (MSM) and has not assessed the unique barriers to care experienced by TGW.^{5,8–10} Analyses that combine TGW and cisgender MSM have often ignored substantial differences between the two populations, including higher rates of substance use and higher levels of social exclusion among transgender individuals, as well as the unique experiences of stigma that they face.^{3,11,12} Identifying specific barriers to viral suppression among TGW is necessary to achieve the UNAIDS goal of 90-90-90, such that 90% of individuals with HIV will know their status, 90% of all people diagnosed with HIV will receive antiretroviral therapy (ART), and 90% of people receiving ART will achieve viral suppression.¹³

To address gaps in HIV research in Peru focused specifically on TGW, we aimed to identify factors associated with viral suppression among TGW. The data come from a study which recruited cisgender men and TGW in Lima, Peru to assess viral suppression. Aggregate results have been reported elsewhere.¹⁴ The findings from this study will inform future evidence-based interventions that aim to improve HIV viral suppression among TGW, potentially contributing to reduced HIV transmission within Lima.

Methods

Study participants and procedures

As previously described, we conducted a cross-sectional study at five clinical sites in Lima, Peru of HIV-positive TGW and cisgender men who reported having sex with men.¹⁴ Three of the sites were private clinics that provide HIV and STI care services oriented to the gay and transgender communities, and the other two sites were large public hospitals in Lima. All sites provided government-subsidized ART. This study was approved by Yale University (IRB Protocol No. 1502015302) and Asociación Civil Impacta Salud y Educación, Asociación Vía Libre, Hospital Nacional Arzobispo Loayza, and Hospital Nacional Dos de Mayo (Lima, Peru).

Between June 2015 and August 2016, 50 Peruvian HIV-positive TGW and 541 Peruvian HIV-positive cisgender men were recruited to participate in the study. This article presents analysis of TGW participants only. Participants were defined as TGW if they reported their gender identity as a woman or transgender and were assigned male sex at birth. Eligibility criteria were as follows: self-reporting having sex with a man; 18 years of age or older; diagnosed with HIV; currently receiving ART at one of the five participating clinical sites; Spanish speaking; and residence in the district of Lima, Peru. Convenience sampling was used to recruit patients. Clinic staff and researchers approached all patients in waiting areas to share information about the study, including procedures for enrolling. Participants who were interested in participating met with a researcher in a private space to review the full risks and benefits of participation. Participants who were eligible and provided written informed consent completed a 30-minute self-administered survey in a private setting. Research staff were available to administer the survey at a patient's request and to answer questions. No incentives were used in this study.

Survey content and variable definitions

Dependent variable. The primary outcome of interest was viral suppression. We defined viral suppression as <200 HIV-1 RNA copies/mL.¹⁵ Viral load (HIV-1 RNA copies/mL) levels were extracted from participants' medical records at the time of the survey.

Independent variables of interest. A literature review informed the selection of variables associated with viral suppression.^{8,16–24} We collected data on demographic, psychosocial, and structural characteristics, including education, employment status, and monthly personal income. Sexual identity and sexual role were both self-reported. See Supplementary Table S1 (Supplementary Data are available online at www.liebertpub.com/lgbt) for details on how each variable was measured and the reliability of scales within this sample. Alcohol use disorder (AUD) screening was conducted using the World Health Organization's validated 10-item Alcohol Use Disorders Identification Test (AUDIT),²⁵ with scores of ≥ 8 and < 16 classified as hazardous, scores ≥ 16 and < 20 classified as harmful, and scores ≥ 20 classified as dependent drinking. Participants with a score of < 8 were considered not to have an AUD. Drug use severity was measured using the 10-item Drug Abuse Screening Test (DAST-10).²⁶ Standardized scores of ≥ 3 indicated moderate-to-severe drug use severity.

Social support was measured as a continuous metric using the Modified Social Support Survey (MSSS-5), a 5-item scale.²⁷ Depression was measured with the 10-item Center for Epidemiologic Studies Depression Scale (CES-D 10),²⁸ with scores > 7 identifying participants with moderate or severe depressive symptoms. HIV-related stigma was analyzed as four continuous metrics and measured using the brief Wright Stigma Scale,²⁹ which includes the following subscales of stigma: disclosure, personalized, negative self-image, and public attitudes. Physical and mental health-related quality of life was measured using the 12-item Short Form Health Survey (SF-12 v.1).³⁰ The 4-item HITS (Hurt, Insult, Threaten, Scream) screening tool was used to assess intimate partner violence (IPV),³¹ with scores > 10 identifying participants with experience of IPV.

Sexual risk behaviors were measured using the Alaska criteria,³² which include the items: condomless sex during the last sexual encounter, anal sex with more than five individuals during the previous 6 months, sex with an HIV-positive partner during the previous 6 months, and self-identification as a sex worker in the last 6 months. Participants' disclosure of HIV status to sexual partners was also collected as a single yes/no question. Barriers to HIV healthcare were measured using a validated 10-item scale. The total number of barriers reported was summed to create a continuous measure.¹⁶ Adherence to ART was measured using a visual analog scale.³³ We operationalized ART adherence into two overlapping categories. We defined optimal ART adherence as a patient self-reporting having taken 90% or more of their ART medications in the last 30 days and perfect ART adherence as reporting having taken all ART medication (100%) in the past 30 days.³⁴

Analytic strategy

Statistical analysis was performed with deidentified data using R version 3.3.2.³⁵ Data were missing for several

variables used in the analyses, varying from 0% to 30% among TGW participants (Supplementary Table S2). The pattern of missingness observed indicated that the data were missing at random (MAR).^{36–38} To prevent selection bias associated with using complete case data in a MAR scenario, we used Multivariate Imputation by Chained Equations (MICE) with a Random Forest algorithm to impute missing values with the R package “mice” with data from all participants ($n=591$).^{39,40} We used Rubin’s rules to combine the results across our five imputed datasets.³⁶

We described characteristics of TGW using means and standard deviations (SDs) for continuous variables and frequencies and percentages for categorical variables. Bivariable and multivariable logistic regression analyses were performed to determine the independent associations of viral suppression. Variables that were associated at the $p<0.10$ level in the bivariable models were included in a parsimonious multivariable logistic regression. Variables were considered to be significant at $p<0.05$. Supplementary analysis, presented in Supplementary Table S3, was conducted to compare characteristics of cisgender MSM and TGW participants using Student’s t -test for continuous variables and Chi-square or Fisher’s exact test for categorical variables.

Results

Sample characteristics

Table 1 presents characteristics of the TGW. Briefly, 85% of the participants had achieved viral suppression, and 82% had achieved viral levels <50 HIV-1 RNA copies/mL. On average, TGW were 31.86 years of age (SD=10.33) and reported a median of 3 (mean=2.82; SD=2.32) barriers to HIV care. Education level varied among the participants, with 38% having attended school beyond high school and 34% not having completed high school. Nearly three quarters (72%) earned at least minimum wage income; yet only 40% reported stable employment. Most of the TGW identified as gay (92%) and reported their sexual role as receptive (70%); 26% reported their role as both insertive and receptive. Approximately half (54%) reported anal sex with more than five partners in the past 6 months, 38% reported sex work, 68% had not disclosed their HIV status to one or more of their partners, and 38% reported condomless sex with their last partner. The rate of AUD was high (54%), and 38% reported use of drugs in the past year. Many (40%) TGW had symptoms characteristic of major depression, and 12% had experienced IPV. Differences in characteristics between the TGW and cisgender MSM are reported in Supplementary Table S3, but not discussed in this study.

Bivariable associations of viral suppression among TGW

In bivariate analysis (Table 2), we identified two characteristics associated with viral suppression among TGW. We found that TGW with scores indicating moderate-to-severe drug use were significantly less likely to achieve viral suppression (unadjusted odds ratio [uOR]=0.61; 95% CI: 0.44–0.83) compared with TGW reporting no or low drug use. TGW who perceived themselves to be more physically healthy were more likely to achieve viral suppression (uOR=1.03; 95% CI: 1.01–1.05).

TABLE 1. CHARACTERISTICS OF HIV-POSITIVE TRANSGENDER WOMEN ($N=50$)

Age, mean (SD)	31.86 (10.33)
Education, n (%)	
Did not complete high school	17 (34)
Completed high school	14 (28)
Beyond high school	19 (38)
Employment, n (%)	
Stable	20 (40)
Temporary	18 (36)
Unemployed	10 (20)
Student	2 (4)
At least minimum wage income	36 (72)
Sexual identity, n (%)	
Gay	46 (92)
Bisexual	0 (0)
Straight	4 (8)
Sexual role, n (%)	
Insertive	2 (4)
Receptive	35 (70)
Both	13 (26)
Alcohol use disorder, n (%)	
None	23 (46)
Hazardous	20 (40)
Harmful	1 (2)
Dependent	6 (12)
Drug use severity, n (%)	
None	31 (62)
Low	14 (28)
Moderate	2 (4)
Substantial/severe	3 (6)
Depressed, n (%)	20 (40)
Experienced intimate partner violence, n (%)	6 (12)
Health-related quality of life, mean (SD)	
Physical Health Score	40.77 (4.95)
Mental Health Score	41.93 (8.34)
Social support, mean (SD)	50.34 (28.18)
Barriers to HIV care (sum), mean (SD)	2.82 (2.32)
Stigma, mean (SD)	
Personalized	5.42 (3.06)
Self-image	4.53 (2.35)
Disclosure	5.61 (2.46)
Public attitudes	4.77 (2.27)
Sexual risk behaviors (6 months), n (%)	
Anal sex with more than five partners	27 (54)
Sex with an HIV-positive partner	11 (22)
Sex work	19 (38)
Condomless sex with last partner	19 (38)
Did not disclose HIV status	34 (68)
Self-reported adherence %, mean (SD)	89.90 (21.79)
Optimal ART adherence ($\geq 90\%$), n (%)	40 (80)
Perfect ART adherence (100%), n (%)	28 (56)
Virally suppressed (<200 VL), copies/mL, n (%)	43 (85)
Maximally virally suppressed (<50 VL), copies/mL, n (%)	41 (82)

Values are mean $\pm$ SD for continuous variables and n (column %) for categorical variables. Percentages may not sum to 100% due to rounding across imputed data

ART, antiretroviral therapy; SD, standard deviation; VL, viral load.

TABLE 2. FACTORS ASSOCIATED WITH VIRAL SUPPRESSION (<200 VL) AMONG HIV-POSITIVE TRANSGENDER WOMEN

	<i>uOR</i>	<i>95% CI</i>	<i>aOR</i>	<i>95% CI</i>
Age (>25 years)	1.05	0.80–1.37		
Education				
Did not complete high school	1.00			
Completed high school	0.86	0.66–1.11		
Beyond high school	0.89	0.69–1.14		
Employment				
Stable	1.00			
Temporary	1.15	0.78–1.70		
Unemployed	1.05	0.61–1.81		
Student	1.18	0.62–2.25		
At least minimum wage income	0.99	0.78–1.24		
Sexual identity				
Gay	1.00			
Straight	0.89	0.61–1.31		
Sexual role				
Insertive	1.00			
Receptive	1.41	0.84–2.39		
Both	1.53	0.88–2.63		
Alcohol use disorder				
None/low	1.00			
Hazardous and above	1.01	0.75–1.36		
Drug use severity				
None/low	1.00			
Moderate to severe	0.61	0.44–0.83*	0.69	0.48–0.98*
Depressed	0.97	0.77–1.22		
Experienced intimate partner violence	0.81	0.59–1.11		
Health-related quality of life				
Physical Health Score	1.03	1.01–1.05*	1.02	0.99–1.04
Mental Health Score	1.01	0.99–1.02		
Social support	1.00	1.00–1.01		
Barriers to HIV care (sum)	0.96	0.92–1.01	0.98	0.93–1.02
Stigma				
Personalized	1.01	0.98–1.04		
Self-image	0.99	0.94–1.03		
Disclosure	1.01	0.96–1.05		
Public attitudes	0.97	0.92–1.02		
Sexual risk behaviors (6 months)				
Anal sex with more than five partners	1.02	0.82–1.28		
Sex with an HIV-positive partner	1.01	0.84–1.20		
Sex work	0.98	0.79–1.23		
Condomless sex with last partner	0.95	0.76–1.19		
Did not disclose HIV status	0.94	0.73–1.22		

Probability of viral suppression modeled with logistic regression models. Multivariate models include all variables with $p < 0.10$ in bivariable model.

* $p < 0.05$.

aOR, adjusted odds ratio; CI, confidence interval; uOR, unadjusted odds ratio.

Multivariable associations of viral suppression among TGW

In the parsimonious multivariate model, which included drug use severity, physical health-related quality of life, and total number of barriers to HIV care (Table 2), the only significant factor associated with achieving viral suppression was moderate-to-severe drug use. TGW with scores indicating moderate-to-severe drug use had lower odds of achieving viral suppression (adjusted odds ratio=0.69; 95% CI: 0.48–0.98) compared with TGW reporting no or low drug use.

Discussion

HIV-positive TGW have unique psychosocial characteristics and experience specific structural factors. Accordingly, there is a need for research specific to TGW to guide programming and interventions. Past research in Peru, however, has often aggregated findings across both MSM and TGW.^{5,8–10} To our knowledge, this is the first study to identify specific factors associated with viral suppression among TGW in Peru.

The UNAIDS goal of achieving 90% viral suppression levels among individuals prescribed ART¹³ has not yet been

reached among TGW in Lima, Peru. Only 85% of TGW in our sample had achieved viral suppression (viral load <200 copies/mL) and 82% had achieved maximal viral suppression (viral load <50 copies/mL), a marker associated with more durable viral suppression. Moreover, our sample represents an optimistic scenario as participants were recruited at a clinical site and reported high levels of ART adherence. Although much progress has been made toward the 2020 goal to achieve 90% viral suppression among patients in HIV care,¹³ there remains a need for large-scale interventions for HIV-positive TGW to reduce the HIV burden, with a focus on providing integrated care for mental health and substance use disorders.

In 2004, Peru implemented a national ART program which promises free ART and HIV care to all HIV-positive citizens, overseen by the Ministry of Health (MOH) and funded by the National Treasury.^{41–44} Currently, the MOH provides ART medications to all HIV clinics and pharmacies.⁴⁵ Beyond the direct provision and financing of HIV medications, HIV and other health services are provided by public insurance programs (Comprehensive Health Insurance [SIS] and EsSalud), private programs, and nongovernmental organizations.⁴⁵

While substantial barriers to health services remain,⁴⁴ Peru has shown initial commitment to expand HIV prevention and treatment, particularly for TGW. Between 2007 and 2012 a formal collaboration between TGW community organizations, the United Nations Population Fund, UNAIDS, and academic institutions existed to build the capacity of TGW organizations, increase the agency of TGW within the public sector, and increase awareness about the health needs and experiences of TGW among Peruvian government officials.⁴² This was followed by the formation of a MOH working group to develop a “Targeted Strategy Plan of STIs/HIV/AIDS Prevention and Comprehensive Care for Transwomen,” which included the goal to establish specialized health clinics for TGW.⁴² Currently, access to gender-affirming care—an essential component of comprehensive healthcare and important to address the health needs of TGW⁴⁶—remains extremely limited. A project with a collaboration of members of the transgender community, community-based clinics, and international partners, however, is underway to expand gender-affirming care and HIV services for TGW in Lima.⁴⁷

Peru has also taken steps to bolster mental health.⁴⁸ In 2012, Peru passed Law 29889, which guarantees the right to treatment for mental health and mandates that this care be provided primarily through primary care sites.⁴⁸ As policies and programs are created to implement the Strategy Plan for Transwomen and to enact Law 29889, our results suggest that HIV care providers should aim to integrate screening for mental health and substance use disorders into routine clinical practice to identify individuals in need of care.

Our data show that TGW experience high rates of problematic alcohol and drug use (12% of TGW had scores indicating that they were dependent on alcohol and 38% reported drug use) and experience substantial psychosocial and structural HIV risks. Many (12%) in our sample reported experiences of IPV, and nearly 70% did not disclose their HIV status to their sexual partners. This finding adds to a growing body of literature that has identified high rates of HIV sexual risk behaviors among TGW.^{3,49} Our data underscore the urgent need to address HIV-related risk by increasing the rate of viral suppression, reducing HIV disclosure stigma, and improving the myr-

riad of structural and social factors that affect TGW adversely in Lima and contribute to high rates of HIV transmission.

We identified one modifiable factor associated with HIV viral suppression among TGW. TGW who reported moderate-to-severe drug use had lower odds of achieving viral suppression than those with less severe drug use. Past research has identified drug use as a risk factor for HIV infection, as well as adverse HIV treatment outcomes, including viral suppression,^{50,51} particularly among TGW.^{52,53} Within the Peruvian context, drug and alcohol use has been found to be high among both TGW and MSM.^{6,8,17} Among a sample of 302 Peruvian MSM and TGW who have sex with men, alcohol dependence was shown to be associated with poor ART adherence.⁸ Our study is the first study to show drug use as independently associated with lower odds of viral suppression among a cohort of Peruvian TGW.

Given our findings, routine brief screening for drug and alcohol disorders, depression, and IPV, using the DAST-10, 3-item AUDIT-Consumption (AUDIT-C), the 10-item CES-D, and the 4-item HITS, respectively, should be integrated into routine clinical HIV care. Integration of such screening would be one way to identify patients who would benefit from brief counseling and either referral to treatment or initiation of evidence-based treatments or interventions. This integration of behavioral health services may begin to address the adverse behavioral health outcomes experienced by many TGW in Lima. Nevertheless, the integration of screenings and treatment poses the challenge of increasing the task burden on physicians and nurses in an under-resourced healthcare system. Of note is the lack of behavioral health screening currently integrated into care and the training that would be required to augment these services robustly. Such obstacles could, in part, be addressed through the use of programs such as Project ECHO (Extension for Community Healthcare Outcomes), which provides training and support to primary clinicians through remote video conferencing to expand access to specialty care.^{54,55}

Limitations

Our findings must be considered in light of several limitations. The percentage of individuals who were approached and provided consent is not known. Accordingly, we cannot rule out selection bias as a limitation, and our sample may represent an overly optimistic assessment of viral suppression since participants were all engaged in HIV care and prescribed ART. In addition, self-reported surveys can be subject to information bias due to social desirability in responses to sensitive topics and due to simple error and misremembering. Level of medication adherence was self-reported and may be incorrect. The high self-reported levels of alcohol use across the sample and other sensitive information, such as sexual behaviors, however, suggest that information bias due to selective social desirability is not a large concern. A larger sample size in the future would help to address these limitations. Furthermore, while all scales used in this study have been used previously in Spanish-speaking populations, many of the scales have not been validated specifically for TGW in Lima or TGW in South America. The formal validation of scales is outside the scope of this study, and our sample size does not have adequate power to assess reliability robustly. It should be noted, however, that the reliability of

the physical and mental health quality of life, drug use, and public stigma scales within our sample was suboptimal.

Conclusions

Among HIV-positive TGW in Lima, efforts are needed to strengthen substance use and behavioral health services. One method to achieve more robust services is by integrating mental health and substance use screening and services into existing HIV care clinics. Decentralization of expansion of such care has the potential to significantly increase the viral suppression rate among TGW, as well as improve the health of TGW more broadly.

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Disclaimer

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Author Disclosure Statement

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Address correspondence to:

Katherine M. Rich, MPH

AIDS Program

Section of Infectious Diseases

Yale University School of Medicine

135 College Street, Suite 323

New Haven, CT 06510

E-mail: katherinemrich@gmail.com