Intergenerational sex and early sexual debut are associated with HIV infection among trans women in Paraguay

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Abstract

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Introduction: HIV prevalence among transgender women is high worldwide. The objectives of the present study are to estimate the current prevalence of HIV and identify factors associated with high HIV burden among transgender women in Paraguay.

Methods: Transgender women aged 15 years or older in four regions of Paraguay were recruited by Starfish Sampling between February and March 2021.

Results: 322 transgender women were included. Mean age was 31 years (range 15-67), with 102 tested HIV positive (31.7%, 95% confidence interval [CI] 26.6-37.1). In multivariable analysis, factors associated with HIV infection were age at first intercourse 17 years old (aOR 5.47, 95% CI 1.05-28.42), >10 years difference in age with the last sexual partner (aOR 1.60, 95% CI 1.04-2.46), substance use (mostly cocaine) (aOR 3.00, 95% CI 1.47-6.12), higher risk perception (aOR 3.08, 95% CI 1.53-6.17), not testing for HIV (aOR 1.23, 95% CI 1.09-1.39), and accessed by a peer educator (aOR 3.86, 95% CI 1.77-8.38).

Conclusions: Sexual debut as a minor and a large age difference with sexual partners are associated with high burden of HIV among transgender women in Paraguay. Our study corroborates the finding of cocaine use during sex as a risk factor for HIV. Prevention programs must address structural and social vulnerabilities to stem the tragically high burden of HIV among transgender women.

Introduction

Transgender women worldwide are severely affected by HIV and other sexually transmitted infections (STIs) (1-2). HIV prevalence among transgender women documented from multiple countries indicates that this population may be experiencing the greatest burden of HIV of any population (3-4).

According to UNAIDS, an estimated 2.2 million (1.5 million-2.8 million) people were living with HIV in Latin America by the end of 2021, including an estimated 15,700 (14,000-18,000) adults aged 15 years and over in Paraguay (5). In a survey of transgender women in Paraguay conducted in 2017 (4), the prevalence of HIV was 24.8% (95% confidence interval [CI] 18.5-31.2), similar to other countries in the Latin American and Caribbean regions, including Jamaica (25.2%) (6), Argentina (34.1%) (7), and Brazil (31.2%) (8), and above that estimated for the world as a whole (19.1%) (1). Globally, risk factors associated with HIV found in studies of transgender women include sex work, poverty, unprotected receptive anal intercourse, multiple casual partners, substance use, a history of STIs (9-11).

The objective of the present study was to estimate the current prevalence of HIV among transgender women in Paraguay to assess the trajectory of the epidemic in this severely affected population and to characterize factors associated with high HIV burden among transgender women in 2021.

Methods

Study design and setting

We conducted a cross-sectional survey to determine the prevalence of HIV in transgender women in four regions of Paraguay (Asunción, Central, Alto Paraná, and Cordillera) from February to March 2021. These regions were selected from a total of eighteen in the country because they were physically accessible and include the majority of the population of Paraguay, many of its major urban areas, and the national capital.

Study population

The study population was adult and young people who were assigned male sex at birth and who identified as female or transgender. The definition did not require modifying characteristics of their body or clothing or an assessment of their gender presentation at the time of the survey. To be eligible, participants had to be at least 15 years of age and living or working in Asunción, Central, Alto Paraná, and Cordillera.

Exclusion criteria

People who did not understand the information provided concerning the study due to intoxication or mental illness.

Sampling

Participants were recruited through Starfish Sampling, which combines the venue-based recruitment methods of time-location sampling (TLS) (12) with the peer-referral respondent-driven sampling (RDS) (13) as described in greater detail by Raymond et al (14). The methods replicated the previous survey of transgender women conducted in Paraguay in 2017 (4). A sample size calculation of 300 was determined based on estimating HIV prevalence within +/−5% over a wide range of point estimates around the prevalence found in 2017 (4). Sampling stopped after this target was exceeded.

Measurements

A face-to-face structured survey instrument was used to collect information from participants in the following domains: sociodemographic characteristics, sexual history, substance use, knowledge of HIV prevention, perception of risk, and HIV testing. Before the implementation of the survey, a pilot test of the data collection instrument was carried out with 10 people from the transgender population to improve understandability and terminology, resolve misinterpretations or apparent contradictions, and to improve the comfort of the interviewers and respondents. In particular, questions were rephrased in lay rather than medical terms, questions on behaviors with different partners were dropped to shortened the time to complete the survey, and the order of questions was re-arranged for better flow from less sensitive to more sensitive topics.

Laboratory methods

Once the survey concluded, consent was obtained for the collection of serological samples for HIV testing. For the diagnosis of HIV, an algorithm of rapid sequential tests was used. If

the first test for HIV (high sensitivity) had a reactive result, a second test (higher specificity) was done to confirm the result. Tests were approved by national protocols, namely HIV-1/2 STAT Pak Assay (Chembio Diagnostic Systems, NY, USA) and SD BIOLINE HIV-1/2 3.0 (Standard Diagnostics, Inc., Korea). The national reference laboratory performed ELISA tests for HIV on all samples with discordant sequential rapid test results to establish the diagnosis. ELISA was also performed on 20% of the samples with a non-reactive result on the rapid test and on all reactive samples for quality control. Disclosure of results of confirmatory tests and follow-up for care were carried out through the local Comprehensive Care Services in each region.

Statistical methods

Descriptive statistics are shown as point estimates with 95% confidence intervals (CIs) or as a mean and median for number of sex partners. Bivariate logistic regression analysis estimated odds ratios (OR) for associations between HIV infection and demographic and behavioral variables. Variables associated with HIV at p<0.05 in bivariable logistic regression analyses were entered into a multivariable logistic regression model. Variables with p< 0.05 were retained in the final multivariable model. Analyses were done using Stata SE 16.0.

Ethical considerations

The study protocol was approved by the Ethics Committee of the Central Laboratory of Public Health of Paraguay, according to ethical principles and guidelines for the protection of human subjects of biomedical and behavioral research (15). All participants provided verbal informed consent; minors were deemed emancipated and consented for their participation. The survey was conducted anonymously to protect participants' privacy and identity.

Results

A total of 322 transgender women were surveyed, distributed in four regions: 158 (49.0%) in Central, 130 (40.4%) in Asunción, 29 (9.0%) in Alto Paraná, and 5 (1.6%) Cordillera (Table 1). Most (96.4%) self-identified as transgender or trans women; only 1.6% identified as female. Over one-fourth (27.6%) were youth aged 15 to 24 years. Most (90.9%) were employed, and a majority (58.8%) also reported engaging in sex work in the last year. The mean age of first sexual intercourse was 13.9 years (95% CI 13.5-14.2). An age difference of ten or more years with their most recent partner was reported by 15.1%. The most commonly reported illicit substance was cocaine, used by 30.5% of respondents in the last twelve months. Over one-third (40%) of transgender women perceived their risk for HIV to be higher than that of their peers. Over half (52.5%) had been accessed by a peer educator in the last 12 months. Most (93.8%) had tested for HIV in their lifetime, half (50.0%) had tested for HIV in the last 12 months. A total of 102 transgender women tested positive for HIV in the survey yielding a prevalence of 31.7% (95% CI 26.6-37.1).

HIV prevalence and bivariate comparisons by characteristics are shown in Table 2. Transgender women in Central department had the highest prevalence of HIV (37.9%),

which was significantly higher than the capital department of Asunción (23.7%, p=0.008). HIV prevalence increased with increasing age, reaching 47.5% among transgender women aged 35 years and older. HIV prevalence was higher among transgender women with markers of higher socio-economic status, including being employed (33.7%) and owning (37.4%) or renting (38.8%) their home (vs. living with family at 20.2%, p=0.005 and 0.003, respectively). Transgender women reporting their first intercourse as a minor (17 years) had significantly higher HIV prevalence (33.4%) than those with first sex age 18 years and older (16.1%, p=0.049). Transgender women reporting that their most recent sexual partner was 10 or more years older also had significantly higher HIV prevalence than those whose last partner was within 10 years of their own age (51.0% vs. 27.5%, respectively, p=0.001). HIV prevalence was higher among trans women using alcohol (40.9%, p=0.010) and cocaine (46.9%, p<0.001) compared to non-users. Several indicators of access to prevention programs were associated with higher HIV prevalence, including higher perception of their risk for HIV (32.4%), higher knowledge of HIV transmission (36.2%), always using condoms (38.9%), not testing for HIV in the last 12 months (46.7%), receiving a condom from a prevention program (35.6%), knowing where to get a free condom (35.1%), and being accessed by a peer educator (38.9%). Of note, no associations were found between HIV prevalence and engaging in sex work or history of sexually transmitted disease (STD).

In multivariable analysis (Table 3), independent risk factors for HIV infection were age at first intercourse   17 years old (adjusted odds ratio [aOR] 5.47, 95% CI 1.05-28.42), more than ten years difference in age with the last sexual partner (aOR 1.60, 95% CI 1.04-2.46), and substance use in the last 12 months (aOR 3.00, 95% CI 1.47-6.12). Additionally, higher perception of HIV risk (aOR 3.08, 95% CI 1.53-6.17), having tested for HIV in the last 12 months (aOR 1.23, 95% CI 1.09-1.39), and being accessed by a peer educator in the last 12 months (aOR 3.86, 95% CI 1.77-8.38) were associated with higher HIV prevalence. Of note, these last three factors occurred most frequently among transgender women who already knew their HIV-positive status.

Discussion

In the present study we found an extremely high prevalence of HIV in transgender women in multiple regions of Paraguay. The prevalence of HIV among transgender women in our country notably falls well above the estimated pooled prevalence of 19.1% (95% CI 17.4-20.7) for transgender women worldwide (1).

In the prior survey of Aguilar et al (4), risk factors for HIV infection among transgender women in Paraguay were older age, the use of cocaine during sex, and residence in Asunción. We corroborate that older age and cocaine use continue to be associated with HIV among transgender women in Paraguay. While HIV prevalence is expected to accumulate with increasing age, particularly in an era of improved survival with antiretroviral therapy, it is important to note that HIV prevalence was already 12.4% by the age of 24 years. Such high prevalence among youth implies rapid HIV incidence or acquisition from an early age, as found among transgender women in neighboring Brazil (8). Cocaine and use of other substances have also been documented as risk factors for HIV among transgender women in the world literature (1,4,6,9-10,16-17). Notably different in our survey of 2021 compared to

2017 (4) is that HIV prevalence now appears to have risen in areas outside the capital and main city of Asunción, with possibly higher prevalence in the Central region surrounding the city.

Also new to the present study, we found HIV infection to be associated with early age of first sexual intercourse and intergenerational sex. The age of sexual consent in Paraguay is 14 years for heterosexual sex and 16 years for homosexual sex (18). With a mean age of first sex at below 14, many participants were having sex before the age of legal consent, and therefore likely in abusive situations. Studies have demonstrated the relationship between sexual abuse in childhood and subsequent substance abuse and sexual risk behaviors in cis male and cis female heterosexuals, and in men who have sex with men (MSM) (19-23). Independently of young age of sexual onset, having partners with 10 or more years age difference was also significantly associated with HIV. The relationship between number of male partners and age disparate relationships may increase HIV risk for young transgender women by connecting them to larger and older sexual networks with higher HIV prevalence (24-25). For example, HIV prevalence in the present study was 12.4% among transgender women aged 15 to 24 years yet increased to 47.5% for transgender women aged 35 years and above. The risk for HIV through intergenerational sex has been described in studies with MSM (26) and among adolescent girls and young women (20-21,24-25).

We also found HIV associated with markers of connection to prevention programs, including higher perception of risk and being accessed by a peer educator in the last 12 months. However, we must take into account that these factors occurred more often in people with a known diagnosis of HIV, a group we expect to be linked to programs compared to persons unaware of their HIV status. Moreover, persons already diagnosed would usually not have to retake an HIV test, accounting for the higher prevalence among those not testing in the last 12 months. Taken together, the data indicated that prevention programs need to reach transgender women living with HIV who are not diagnosed and those who are HIV-negative but at high risk.

Our survey did not corroborate risk factors for HIV found in other studies of transgender women. For example, several studies have described an association between engaging in sex work and HIV risk among transgender women in diverse locations worldwide (3,9,27-28). Our data found equally high prevalence among transgender women engaging and not engaging in sex work (29). In contrast to other studies (6,30-32), we did not find income, housing, or employment status associated with HIV in multivariate analysis, although in bivariate analysis indicators of higher socio-economic status tended towards higher HIV prevalence. We also did not find an association between HIV and history of STD, again in contrast to the global literature (1-3,16). The lack of association may also be related to transgender women with known HIV infection having greater access to sexual health services.

We recognize other limitations to our study. First, our sample does not represent transgender women in rural areas. The recruitment of sexual and gender minority persons is difficult in areas where they do not visibly congregate or have small social networks. Second, there is no census in Paraguay for transgender women against which to gauge the representativeness

of our sample. Paraguay has not yet implemented a two-step set of questions to determine sex assigned at birth and current gender identity in official documents. Third, the use of an interviewer-administered survey instrument may have heightened social desirability bias and therefore under-reporting for sensitive topics, such as age of sexual onset, sex work, and drug use.

In conclusion, current findings show a high HIV prevalence among transgender women in Paraguay with evidence of continuing high incidence as evidence by the level of infection among young participants and the increase in prevalence since 2017. We identify childhood sexual intercourse, large age differences with sexual partners, and substance use (largely cocaine) as driving factors in risk for HIV. Longitudinal data, expanding information to geographic areas outside large cities, and studies of sexual partners of transgender women are needed to better understand the factors for HIV acquisition that have led to such high prevalence in Paraguay. Effective prevention interventions, such as pre-exposure prophylaxis (PrEP) (33), are needed particularly for transgender women who are young and in partnerships with age and power imbalances.

Acknowledgments

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Table 1.

Socio-demographic characteristics, drug use, sexual behaviors, and HIV prevalence among transgender women, Paraguay, 2021 (N=322).

Characteristics	N (%)	95% confidence interval
Residence (department)		
Central	158 (49.0)	43.4-54.6
Asunción	130 (40.4)	34.9-45.9
Alto Paraná	29 (9.0)	6.1-12.6
Cordillera	5 (1.6)	0.5-3.5
Gender identity		
Transgender, trans women	3317 (98.4)	996.4-99.5
Female	5 (1.6)	0.5-3.6
Age group, years		
15 -19	23 (7.1)	4.5-10.5
20 -24	66 (20.5)	16.2-25.3
25-29	68 (21.1)	16.7-25.9
30-34	47 (14.7)	10.9-18.9
35-39	48 (14.9)	11.2-19.2
40 and above	70 (21.7)	17.3-26.6
Highest educational level completed		
Primary, incomplete	62 (19.4)	15.1-24.1
Primary, complete	44 (13.8)	10.1-18.0
Secondary, incomplete	86 (26.9)	22.1-32.1
Secondary, complete	96 (30.0)	25.0-35.3
Vocational training, incomplete	3 (0.9)	0.2-2.7
Vocational training, complete	3 (0.9)	0.2-2.7
University, incomplete	17 (5.3)	3.1-8.3
University, complete	9 (2.8)	1.3-5.2
Employment status		
Employed	291 (90.9)	87.2-93.8
Unemployed	29 (9.1)	6.1-12.7
Engaged in sex work in last year		
Yes	187 (58.8)	53.1-64.2
No	131 (41.2)	35.7-46.8
Income per month		
Poverty line and below ($326 USD)	31 (17.7)	12.3-24.2
More than $326	144 (82.3)	75.8-87.6
Living situation		
Family	118 (36.7)	31.3-42.1

Characteristics	N (%)	95% confidence interval
In couple	36 (11.2)	7.9-15.1
Alone	81 (25.2)	20.5-30.2
Penal, detention	17 (5.3)	3.1-8.3
Other	70 (21.6)	17.3-26.6
Housing situation		
Own	91 (28.3)	23.4-33.5
Rental	85 (26.4)	21.6-31.5
Family home	119 (37)	31.6-42.5
No answer	27 (8.3)	5.6-11.9
Age at first intercourse (years old)	13.9 (mean)	13.5-14.2
Age difference with the last sexual partner		
10 years apart	265 (84.9)	80.5-88.7
>10 years apart	47 (15.1)	11.3-19.5
Stable partner, last six months	93 (28.9)	24.1-34.3
Casual partner, last six months	212 (66.7)	61.2-71.8
Mean number of casual partners, last six months (of 210 respondents with casual partners)	4.9	4.2-5.6
Median number of casual partners, last six months (interquartile range)	3	2-6
Always using condoms, last six months	131 (42.8)	37.2-48.5
Substance use last twelve months		
Alcohol	115 (36.4)	31.1-41.9
Marijuana	71 (22.5)	17.9-27.5
Cocaine	96 (30.5)	25.4-35.9
Sedatives, sleeping pills	7 (2.2)	0.9-4.5
Volatile inhalants, poppers, glue	0	--
Ecstasy or other designer drugs	1 (0.3)	0.01-1.7
Hallucinogens (LSD, mescaline, mushrooms)	4 (1.3)	0.3-3.2
Crack	32 (10.2)	7.0-14.0
Amphetamines	3 (1.0)	0.2-2.7
History of sexually transmitted disease (STD), lifetime	23 (7.1)	4.6-10.5
Knows where to get a free condom	285 (90.0)	85.7-92.7
Perceived their risk for HIV higher than their peers	111 (40.0)	34.1-45.9
Accessed by a peer educator, last 12 months	167 (52.5)	46.8-58.1
Received a condom from an HIV prevention program, last 12 months	267 (85.9)	81.4-89.5
Tested for HIV ever	301 (93.8)	90.5-96.1
Tested for HIV, last 12 months	151 (50.0)	44.0-55.6
HIV-positive (current test)	102 (31.7)	26.6-37.1

*N=175 respondents. Some categories do not add up to total due to missing responses (n<5 unless indicated).

Table 2.

HIV prevalence by demographic characteristics and risk behaviors, transgender women, Paraguay 2021 (N=312).

Characteristics	HIV prevalence, n (%)	OR (95% CI)	p-value
Residence (department)			
Central	60 (37.9)	1.97 (1.17-3.31)	0.008
Asunción	32 (23.7)	Ref.	--
Alto Paraná	10 (34.5)	1.69 (0.71-4.04)	0.229
Cordillera[1]	−0 (0-0.5)	--	--
Age group, years			
15-24	11 (12.4)	Ref.	--
25-34	35 (30.4)	3.10 (1.44-6.67)	0.002
35 and more	56 (47.5)	6.40 (2.92-14.04)	<0.001
Educational level			
No school or up to high school	36 (33.9)	1.16 (0.69-1.93)	0.575
High school	56 (30.8)	Ref.	--
Vocational and university	10 (31.2)	1.02 (0.45-2.30)	0.956
Employment status			
Employed	98 (33.7)	3.17 (1.06-9.47)	0.028
Unemployed	4 (13.8)	Ref.	--
Engaged in sex work in last year			
Yes	61 (32.4)	1.07 (0.66-1.74)	0.759
No	41 (30.8)	Ref.	--
Income per month[2]			
Poverty line and below ($326)	61 (29.7)	Ref.	--
More than $326	30 (36.1)	1.33 (0.78-2.29)	0.291
Housing situation			
Own	34 (37.4)	2.36 (1.26-4.43)	0.005
Rental	33 (38.8)	2.51 (1.32-4.76)	0.003
Family home	24 (20.2)	Ref.	
Age at first intercourse			
17 years old	97 (33.4)	2.61 (0.96-7.07)	0.049
>18 years old	5 (16.1)	Ref.	--
Age difference with the last sexual partner			
10 years apart	73 (27.5)	Ref.	--
>10 years apart	24 (51.0)	2.74 (1.44-5.22)	0.001
Own perception of HIV risk			
Higher	36 (32.4)	2.60 (1.44-4.69)	0.001
Equal or less	26 (25.6)	Ref.	--

Characteristics	HIV prevalence, n (%)	OR (95% CI)	p-value
Knowledge of HIV transmission risks			
Yes	75 (36.2)	1.85 (1.09-3.12)	0.018
No	27 (23.5)	Ref.	--
Stable partner, last six months			
Yes	25 (26.9)	Ref.	--
No	77 (33.8)	1.38 (0.81-2.37)	0.229
Casual partner, last six months			
Yes	60 (28.3)	Ref.	--
No	41 (38.7)	1.59 (0.97-2.62)	0.061
Frequency of condom use			
Always	51 (38.9)	1.84 (1.12-3.02)	0.013
Not always	45 (25.7)	Ref.	--
History of STD, lifetime			
Yes	8 (34.8)	1.16 (0.47-2.84)	0.740
No	94 (31.4)	Ref.	--
Substance use in last twelve months			
Alcohol			
Yes	47 (40.9)	1.88 (1.15-3.07)	0.010
No	54 (26.9)	Ref.	--
Marijuana			
Yes	23 (32.4)	1.02 (0.58-1.81)	0.929
No	78 (31.8)	Ref.	
Cocaine			
Yes	45 (46.9)	2.63 (1.57-4.41)	<0.001
No	55 (25.1)	Ref.	--
Sedatives, sleeping pills			
Yes	3 (42.9)	1.63 (0.36-7.45)	0.523
No	97 (31.5)	Ref.	--
Crack			
Yes	14 (43.7)	1.78 (0.84-3.76)	0.124
No	86 (30.4)	Ref.	--
Tested for HIV in the last 12 months			
Yes	31 (20.5)	Ref.	--
No	71 (46.7)	3.39 (1.99-5.75)	<0.001
Received a condom from an HIV prevention program, last 12 months			
Yes	95 (35.6)	3.49 (1.41-8.69)	0.004
No	6 (13.6)	Ref.	
Knows where to get a free condom			
Yes	100 (35.1)	8.38 (1.91-36.79)	<0.001

Characteristics	HIV prevalence, n (%)	OR (95% CI)	p-value
No	2 (6.1)	Ref.	--
Accessed by a peer educator, last 12 months			
Yes	65 (38.9)	1.96 (1.20-3.21)	0.006
No	37 (24.5)	Ref.	--

1.*Not able to calculate OR due to 0 in a cell.

2.*N=175 respondents. Some categories do not add up to total due to missing responses (n<5 unless indicated).

Table 3.

Multivariable analysis: independent risk factors for HIV infection among transgender women, Paraguay, 2021 (N=322).

Variables	Adjusted OR	95% CI	p-value
Age at first intercourse 17 years old	5.47	1.05 - 28.42	0.043
Age difference with the last sexual partner >10 years	1.60	1.04 - 2.46	0.031
Substance use, last twelve months (mostly cocaine)	3.00	1.47 - 6.12	0.002
Higher perception of risk for HIV	3.08	1.53 - 6.17	0.002
Not tested for HIV, last 12 months	1.23	1.09 - 1.39	0.001
Accessed by a peer educator, last 12 months	3.86	1.77 - 8.38	0.001