HIV prevalence, sociodemographic characteristics, and sexual behaviors among transwomen in Mexico City

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Abstract

Objective. To present results from HIV testing, knowledge of HIV status and socioeconomic factors associated with the probability of having a HIV positive result among transwomen (TW) in Mexico. **Materials and methods**. In 2012, we conducted an HIV seroprevalence survey to 585 TW in Mexico City in three strata: gathering places, the Condesa HIV Clinic and in four detention centers. We estimated the prevalence of HIV in each strata and applied a probit model to the overall sample to analyze factors associated with the probability of a HIV positive result. **Results**. The prevalence of HIV was 19.8% in meeting places; 31.9% in detention centers and 64% among the participants of the clinic. Age, low education and number of sexual partners was positively associated with HIV. **Conclusions.** Results from the study provide relevant information to design HIV prevention interventions tailored to the needs of the TW population.

Key words: HIV; prevalence; transgendered persons; Mexico

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Resumen

Objetivo. Identificar la prevalencia, conocimiento de estatus de VIH y factores socioeconómicos asociados con la probabilidad de tener un resultado de VIH positivo en mujeres transgénero (MT) en México. **Material y métodos**. En 2012, se realizó una encuesta de seroprevalencia de VIH a 585 MT en sitios de encuentro, centros penitenciarios y una clínica de VIH, en la Ciudad de México. Se estimó la prevalencia de VIH en cada estrato y se aplicó un modelo probit para analizar los factores asociados con la probabilidad de un resultado positivo. **Resultados**. La prevalencia de VIH fue de 19.8% en lugares de encuentro y de 32% en centros de detención; a su vez, 64% de las participantes en la clínica eran VIH positivas. La edad, el bajo nivel de educación y el número de parejas sexuales se asoció positivamente con VIH. **Conclusiones**. Los resultados del estudio aportan información relevante para el diseño de intervenciones de prevención de VIH de acuerdo con las necesidades de esta población.

Palabras clave: VIH; prevalencia; personas transgénero; México

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Transwomen (TW) are people whose gender identity and expressions differ from their male birth sex.[1] Some studies refer that TW face early on and throughout their lives such vulnerable and marginal conditions associated with no social/family acceptance of their desire to become women, that place them in higher risk of acquiring sexually transmitted diseases, engaging in substance abuse, developing mental health disorders as well as facing barriers to access to health services.[2-4]

Few studies have been conducted worldwide to estimate the prevalence of HIV among this specific population partly because TW are classified in many surveillance systems or in surveys within the group of men who have sex with men (MSM).[1] This classification fails to recognize that TW are different from MSM because their social, gender identity and health needs differ from MSM.[1] A meta-analysis published in 2013 with information available from the USA, some countries in Asia, Latin America and Europe showed a pooled prevalence of HIV among TW of 19.1 (95% confidence interval: 17.4-20.7).[5] This study estimated that TW had 49 times more risk of HIV infection compared to the general population.

In Mexico, the prevalence of HIV in the general population is less than 1%, but it is concentrated among men who have sex with men (MSM), TW and injecting drug users.[6] A nationally representative survey conducted in 2011 showed a HIV prevalence of 17% among MSM in meeting points in 24 cities[7] in Mexico. However, although 3% of the participants in this survey were TW, the study was not designed to report results from other key populations.

In this context, in 2012, we conducted an HIV seroprevalence survey to TW in Mexico City in three different places (strata): gathering places such as bars, street venues and beauty salons; the Condesa HIV Clinic, and four detention centers. The objective of this study is to report the results from HIV testing, knowledge of HIV status and socioeconomic factors associated with HIV serostatus. To our knowledge, this is the first study documenting these key aspects of the HIV epidemic among TW in Mexico and the LAC region, which are essential for the design of prevention interventions tailored to the needs of the TW population.

Materials and methods

Survey

In November 2012, we conducted an HIV seroprevalence survey to adult TW (18 years old or greater) that had lived in the city for at least six months. The survey included a questionnaire administered by an interviewer and an HIV test. The survey included HIV testing and a comprehensive questionnaire that gathered socioeconomic information, perception of stigma and discrimination, sexual practices, mental health and substance abuse. Participants in the survey were required to complete both components in order to be included in the analysis sample. The survey was conducted in Mexico City according to the following stratification of the sample: meeting points where TW assemble, the Condesa HIV Clinic (from now on the Clinic) and four local prisons that together house more that 30 000 inmates in Mexico City (*Reclusorios Sur*, *Norte*, *Oriente* and *Santa Martha Acatitla*).[8] Participants received a prevention and hygiene kit with condoms, lubricants, toiletries and brochures from the Clinic and from the City Council to Reduce and Eliminate Stigma and Discrimination. In addition, in the Clinic and in meeting places, we provided vouchers for 300 *pesos* (around 23 USD) as a token of appreciation and to compensate them for the time spent completing the survey, which was on average 50 minutes.

To ensure confidentiality, names and addresses of the respondents were not requested and all participants in the survey signed informed consent forms. The survey was approved by the IRB (Ethics Committee) at the National Institute of Public Health in Mexico (IPF Code 3627801). There was a different informed consent in each strata to reflect the different procedures related to HIV testing as explained below in the subsections that describe recruitment and survey application in each place.

The questionnaire had the following sections: socioeconomic and demographic characteristics, social capital, health care utilization, transformations, sexual risk behaviors, HIV knowledge, stigma and discrimination, mental health, substance use and suicidal ideation and attempts. The questionnaire in prisons was slightly different as some of the questions did not apply or were adapted to their current conditions, such as household assets, housing and current occupation. The questionnaire was adapted from a survey to MSM conducted in 2011. The transformation section was developed by the endocrinologists in charge of the transgender department at the Clinic, based on the questions used in the clinical history. The suicidal ideation and attempts section comes from the suicidal module of the Spanish version of the Composite International Diagnostic Interview.[9] Mental health questions were selected from the Medical Outcomes Study Short Form 36 Health Survey adapted to different populations.[10]

We estimated a sample size of 500 participants distributed as follows: 250 in gathering places, 150 in the Clinic and 100 in detention centers. The sample size

was estimated using information from a previous survey conducted in meeting places; the number of inmates at detention centers (approximately 265) and at the Clinic (around 500), and the cost of an interview and the effect of sampling design. The sample size was estimated to detect a prevalence of HIV at least 5% higher than the estimated 17% among MSM[7] with a power of 95%.

Sampling framework and recruitment in meeting places

We adapted the methodology PLACE (Priorities for Local AIDS Control Efforts) to identify TW gathering in points more frequently referred by key informants.[11] PLACE is a tool designed to get a rapid assessment of the HIV epidemic in areas where the transmission is higher as well as to monitor prevention program coverage and performance. PLACE has a methodology to identify venues where people meet new sexual partners that requires in a first step to contact community informants to create a list of venues and in a second step to collect data to characterize the identified places and the population attending these places. This methodology had been previously adapted by our team to conduct a seroprevalence survey among men who have sex with men in Mexico.[7] To identify these meeting places, we first assembled a list of places from key community informants from different economic status, mostly TW working on NGOs and TW that we interviewed in prisons. Secondly, we visited all places in this list and applied a short questionnaire to the owner/manager (a TW passer-by or a pimp in public spaces). The information included: size (average number of TW, opening hours, days and times of high attendance and reference to four additional meeting places were clients of that specific site gather). These referred sites were also visited to conduct the same process until the reference network of places was saturated.

In meeting places, the survey was implemented in two phases. We first identified and characterized places where TW gather and meet sexual partners in the city. The list of all meeting places served as the sampling framework for the survey. In a second phase, we conducted the survey in a randomly selected number of meeting places. Field supervisors would assign each enumerator into a specific location with the instruction to invite every TW that would pass by this point to participate in the survey in order to guarantee that enumerators would not select themselves those that they will approach. TW previously trained as health promoters that participated in the first phase were also present during fieldwork to support the team during the recruitment process. Enumerators will continue to invite and interview TW until the number of interviews assigned for each place was completed.

To estimate the prevalence of HIV, an HIV rapid test was applied on site to participants (Uni-Gold™ Recombigen HIV). According to the manufacturer[12] and an internal validation at the Clinic, this test warrants 100% sensitivity and specificity.* As stated in the informed consent, results from rapid testing were not given to the participants during the survey given that the main objective of the survey was to estimate population-level prevalence of HIV and because of the inadequate conditions of most of the gathering places to provide appropriate post-counseling for those HIV positive. Moreover, privacy in gathering points such as bars and clubs could not be guaranteed. However, as explained above, all participants were provided with a flyer with information on the Clinic's HIV testing and counseling services, where they could be tested for HIV with pre and post-counseling services for free. Our fieldwork team encouraged all participants to use this information.

Recruitment in detention centers

In detention centers, first we visited the cells where all TW were located‡ to explain the purpose of our visit and to invite them to participate in the study. To reduce stigma and discrimination around HIV, different diagnostic tests were offered. As described in the informed consent, blood from vein was collected for HIV test, hepatitis B, C, syphilis, glucose and cholesterol, similar to an intervention conducted months before in the same prisons.§ In addition, given the lack of access to HIV testing and counseling in prisons, according to the informed consent results were provided to all participants individually and counseling was given by personnel from the Clinic. The results were not shared with any personnel in the detention centers.

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* Evaluation conducted by the Condesa HIV Clinic Laboratory in July 2012: 293 samples were validated using as a reference the chemiluminiscence immunoassay Abbott Architect HIV ½ AG/AB Compo and the confirmatory antibody HIV test ½ Immunocomp Conbfirm II Orgenics (Juárez L, personal communication).

‡ In three of the centers, TW and gay men live in an independent wing, which is separated from where other men live. In the remaining center, most of the TW were found at the same wing where people with HIV live. All people living with HIV and AIDS in prisons in Mexico City are transferred to this wing in this prison.

§ Bautista-Arredondo S, Gonzalez A, Servan-Mori E, Beynon F, Juarez-Figueroa L, Conde-Glez CJ et al. A cross-sectional study of prisoners in Mexico City comparing prevalence of transmissible infections and chronic diseases with that in the general population. Unpublished manuscript.

HIV Clinic

In the Clinic, medical personnel from the transgender, the psychiatric and the internal medicine departments invited all TW to participate in the survey and referred them to the interviewers. Those with no previous diagnosis of HIV and who had not tested for HIV within the past three months were requested to test for HIV in the detection center at the Clinic in order to participate in the survey. TW already diagnosed or in treatment were not requested to test for HIV and were allowed to complete the survey. As described in the informed consent, results of the test were provided by qualified personnel at the Clinic (HIV detection center).

Data analysis

We applied a probit model to the overall sample (all strata) to estimate the probability of having a positive result from the HIV test as a function of sociodemographic characteristics and self-reported sexual risk behaviors. We included age and age square to test non linear associations with the outcome, educational grade completed (no education, primary or secondary school, high school, university or higher), whether they currently live in a house (compared to a hotel/shelter/street), if they ever lived in the street, sexual work (if they reported that exchanging sex for money or gifts was a stable or primary source of income), if they had a condom during the interview and dummy variables to adjust for differences between strata. Condom use in the last sexual intercourse was asked separately for relationships with stable and casual partners. However 25% of the participants did not respond to any of these two questions, therefore we used a variable that indicates whether they had a condom during the interview. 68% reported having a condom, which is in the range of the reported use of condom in the last intercourse for those who responded (68% with causal partners, 85% with stable partners).

In a second model we added number of sexual partners in a subsample of participants that responded to this question. There were missing values on number of sexual partners because there were 15 TW who had never had a sexual intercourse, 14 reported not having had sex in the last month and 55 did not want to answer the question. We tested for differences in socioeconomic characteristics between those with and without missing values.

Cluster analysis was applied to descriptive statistics and regression models to reflect the sampling design in each stratum.

Results

The survey was completed by 585 TW (351 from meeting places, 150 from the HIV Clinic and 84 from detention centers), 101 more than the total sample size estimated in meeting places but 16 less in detention centers. The average response rate was 84%, distributed into 99% in the HIV Clinic, 89% in meeting places and 64% in prisons. In detention centers, as verbally expressed by transwomen that declined to participate, *no participation* was related to the fear of getting a HIV positive result, particularly associated with the anxiety of been transferred to the only prison that offers HIV treatment in the city, which is perceived as having a very violent environment.

In stratum 1 (meeting places), the key informants identified 77 gathering points, from which 17 were not visited or we were unable to get information because three places no longer existed, three were located in an unsafe location, in eight hotels the owners refused to provide any information and in three street venues we did not find any transwomen. From the remaining 60 venues, 21 were randomly selected for the survey. Among the 21 places, 55% were street venues (mostly sexual work venues), 20% bars, 15% hotels and shelters and 10% meeting clubs and hairdressings. The distribution of the places was very similar to the sampling framework.

We found an overall prevalence of HIV of 19.8% (95%CI: 14.6,25.0) in meeting places. At the Clinic 64% of the participants were HIV positive (95%CI: 56.2,71.8) and 31.9% (95%CI: 24.7,39.0) of those in detention centers had HIV (table I). In addition to a high prevalence of HIV, our results show a very low knowledge of HIV sero-status among participants in gathering points: only 26% of those who tested positive reported in the survey that they had HIV. As expected, almost all TW in the Clinic knew their status (98%). Knowledge of status in detention centers was high (75%) because 88% of the positive cases were on treatment and concentrated in Santa Martha prison, the only center that offers HIV treatment in Mexico City. In the other detention centers there were five cases out of 42 participants and none of them knew their status.

Mean age among TW in the analytical sample was 34 years (0.61 linearized standard deviation), 86% of them currently lived in a house (or lived in a house before being incarcerated), 60% had completed primary or secondary school, 13% reported they had lived in the street and 39% were sexual workers (table I). These socio-demographic characteristics differ by strata. In general, TW in detention centers had lower education,

Table I

HIV PREVALENCE, SOCIODEMOGRAPHIC CHARACTERISTICS AND SEXUAL PRACTICES OF 568 TRANSWOMEN WHO PARTICIPATED IN THE SURVEY, BY STRATUM. MEXICO CITY, 2012

Variable	*% [95%CI]*			
	All (n=568)	*Meeting places (n=347)*	*HIV clinic (n=137)*	*Detention centers (n=84)*
HIV prevalence	47.0 [40.8-53.2]	19.8§ [14.6-25.0]	64.0§ [56.2-71.8]	31.9§ [24.7-39.0]
Mean age	34.2 [32.9-35.4]	31.0§ [29.1-32.9]	36.6§ [35.2-38.3]	31.0§ [28.9-33.1]
Age groups				
18-29 years	36.7 [30.9-42.3]	54.6§ [45.7-63.5]	24.0§ [17.0-30.9]	47.4§ [35.8-59.0]
29-44 years	47.0 [41.2-52.7]	32.8§ [26.1-39.4]	54.0§ [45.9-62.0]	45.8§ [34.2-57.4]
>45 years	16.4 [12.1-20.5]	12.5§ [7.8-17.2]	22.1§ [15.2-28.7]	6.7§ [1.4-12.0]
Live in a house*	86.5 [82.3-90.1]	80.2§ [71.3-89.0]	96.3§ [93.1-99.5]	56.9§ [45.1-68.7]
Last school grade completed				
No education	5.5 [3.1-7.8]	6.6 [3.6-9.6]	5.1 [1.3-8.8]	4.5 [-0.0-9.8]
Primary/secondary	59.4 [54.1-64.8]	62.3§ [54.8-69.7]	53.2§ [44.8-61.7]	81.1§ [71.7-90.4]
High school	21.9 [17.6-26.2]	22.0§ [17.8-26.2]	24.0§ [16.8-31.3]	11.1§ [4.5-18.9]
University or higher	13.0 [8.5-17.4]	9.0§ [10.4-16.9]	17.5§ [11.0-23.9]	2.6§ [-1.3-6.6]
Ever lived in the street	13.4 [9.8-16.9]	11.9§ [7.0-16.8]	10.4§ [5.6-16.2]	28.6§ [17.7-39.5]
Sexual worker	39.0 [24.0-37.5]	60.5§ [48.0-73.0]	15.3§ [9.2-21.4]	25.4§ [14.8-35.9]
Had a condom during the interview	68.5 [62.7-74.3]	80.7§ [70.7-90.6]	64.2§ [56.1-72.3]	56.8§ [45.0-68.7]
Mean number of sexual partners‡	14.3 [10.8-17.7]	28.2§ [21.4-34.9]	7.4§ [4.7-10.0]	5.2§ [1.7-8.7]
Mean number of sexual partners by tertile				
Tertile 1	1.5 [1.4-1.6]	1.7§ [1.4-2.0]	1.5§ [1.7-1.6]	1.4§ [1.2-1.6]
Tertile 2	10.7 [9.5-11.8]	11.6§ [10.5-12.6]	10.3§ [8.3-12.3]	6.9§ [4.4-9.4]
Tertile 3	63.3 [51.6-75.0]	69.0§ [55.6-82.3]	47.1§ [23.0-71.2]	50.0§ [34.6-65.4]

* Compare to living in a hotel/shelter/street, in detention centers housing was asked before been incarcerated.
‡ In a subsample of transwomen who reported having sex in the last month and were willing to answer the question.
§ Statistical differences between strata using tests for complex surveys: for binary variables a test of independence based on a Chi squared statistic and for continuous variables an adjusted Wald test.

a higher percentage reported they had lived in the street and were more likely to live in a hotel/shelter or street before being incarcerated. We found that 68% had a condom during the interview and the rates were higher among TW in meeting points.

Results from the probit model suggest that age is associated with a higher probability of having an HIV result but the probability decreases afterwards (about 40.5 years, according to our specification) (model 1 in table II). Higher educational grades completed were significantly associated with a lower probability of an HIV positive result and the greater difference is seen between those with no education and those with university or higher education. Being a sexual worker and living in a house lowers the probability of a positive result, although the coefficient was not significant. Having ever lived in the street and having a condom during the interview showed the opposite direction with regard to HIV, but association was not significant either. The results from model 2 (adding number of sexual partners in the subsample questionnaires with a response), are similar although statistical significance is slightly differ-

Table II
Factors associated with the probability of an HIV positive result among transwomen in the survey. Mexico City, 2012

Variable	*Coefficient [95%CI]*	
	Model 1 (n=568)	*Model 2 adding number of sexual partners (n=499)*
Age	0.081* [0.039-0.123]	0.101* [0.053-0.149]
Age squared	-0.001* [-0.001-0.0003]	-0.001* [-0.001-0.0005]
Live in a house (reference: hotel/shelter/street)	-0.110 [-0.253-0.032]	-0.133 [-0.292-0.024]
Last school grade completed (reference: no education)		
Primary/secondary	-0.180§ [-0.369-0.049]	-0.128 [-0.325-0.067]
High school	-0.229‡ [-0.434-0.023]	-0.106 [-0.334-0.122]
University or higher	-0.439* -0.584-0.290]	-0.353* [-0.564-0.142]
Ever lived in the street	0.017 [-0.128-0.164]	0.043 [-0.130-0.217]
Sexual worker	-0.029 [-0.159-0.101]	-0.127 [-0.282-0.026]
Strata (reference: HIV Clinic)		
Meeting points	-0.505* [-0.610-0.401]	-0.583* [-0.700-0.466]
Detection centers	-0.399* [-0.508-0.290]	-0.395* [-0.524-0.265]
Had a condom during the interview	0.099 [-0.0365-0.235]	0.150§ [-0.001-0.302]
Number of sexual partners (reference first tertile (1-3)		
Second tertile (4-20)	–	0.242* [0.095-0.390]
Third tertile (>24)	–	0.157 [-0.030-0.346]

* Marginal effects (probit model), significant at 1%
‡ Marginal effects (probit model), significant at 5%
§ Marginal effects (probit model), significant at 10%

ent on the education variables: only significant between those who completed university or a higher degree compared to no education in the second model. Finally, we found a significant association between number of sexual partners and HIV when comparing the second and first tertile. We did not find statistical differences on age, education, housing or living in the street between TW with information on number of sexual partners and those with no information.

Discussion

We conducted a seroprevalence survey among 585 TW in Mexico City. Results from this study reveal a high prevalence of HIV among TW in Mexico City. The prevalence of 19.8% among TW in meeting places is in the range of the combined estimate in a recent meta-analysis of different studies worldwide.[5] Our results also show that there is little knowledge of HIV status among TW in meeting points, where only 26% of those with a positive result were aware of their sero-status. The HIV prevalence estimates and the low awareness of infection in gathering places are very similar to a study conducted in New York in 2010 that interviewed in a convenience survey a sample of MSM and transgender women members of a community house ball that gather in venues and events.[13] Results from this study show an HIV prevalence of 20% among transgender women and revealed that 73% were unaware of their status. To our knowledge this is the first survey in the country that measures HIV prevalence and sociodemographic characteristics in a representative sample of TW in Mexico City.

As in previous studies, we found that the risk of HIV increases with age and decreases with education.[4,7,14,15] We also found that number of partners in the last month was associated with a higher risk of having HIV, similar to other studies.[7,14] No significant associations were found with sexual work, living in a house or ever had lived in the street but our low sample size could explain lack of significance in some of these variables.

Although in this survey we applied a rich and comprehensive questionnaire, we did not include in it model factors such as alcohol / drug use or mental health indicators that could predict HIV because of a potential reverse causality. Substance abuse and poor mental health can be a risk factor for HIV through risky behaviors; however awareness of being HIV positive could also lead to poor mental health and drug use. Thus, among those who are unaware of their status, we ran a sensitivity analysis and found that the use of illegal drugs (not prescribed by a doctor) anytime during their lifetime was positively and significantly associated with HIV. Prevalence of poor mental health and substance abuse were very high in this survey compared to the general population, highlighting the need for future analyses.[16]

As expected, the prevalence of HIV was high in the HIV Clinic compared to detention centers and meeting points. In addition to offering treatment to HIV / AIDS patients, the Condesa HIV Clinic has a transgender department that offers prescription and application of hormones to any TW regardless of their HIV status. Participants in the survey came from this transgender department but also from internal medicine and the psychiatric department. We acknowledge that the data from the Clinic may be biased. However, when excluding the sample of the Clinic from the analyses our results show very similar findings compared to the complete sample, but only age remains statistically significant, which may be explained by the decrease in the sample size.

While Mexico provides HIV treatment for free, there is evidence that HIV patients start treatment late due to lack of comprehensive testing programs and, among those who test positive, health systems inefficiencies and social barriers can delay treatment initiation.[17] Similar to the above mentioned survey conducted to MSM in gathering places,[7] our study showed that TW have little knowledge of HIV status. Late testing and diagnosis among the most at risk populations highlights the urgent need to design prevention interventions in particular innovative means to develop HIV testing with linkage to care tailored to the needs and characteristics of the different populations. According to our survey only 58% of TW had tested for HIV in the last twelve months and the most frequent reasons for not testing were: fear / distress of getting a positive result, did not want to or did not need it. Interestingly, costs, distance or lack of knowledge of HIV counseling and testing centers were not frequent, therefore innovative interventions should be developed to convince / motivate TW by addressing their fears and concerns around HIV testing.

We found among TW in Mexico City a very worrisome combination of elements: very high HIV prevalence, low demand of HIV testing and low awareness of HIV status, as well as sexual risk behavior with multiple partners. As much as this is the situation with other subpopulations, the existence of micro-hyper-epidemics in concentrated epidemics countries will only continue to expand. There is an urgency to understand the needs and behaviors of these populations to design effective, innovative HIV detection and early ART initiation programs.

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