Internalized homonegativity and HIV testing and counseling among MSM and Transgender Women in El Salvador

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Introduction

Globally, the HIV prevalence among men who have sex with men (MSM) ranges between 14-18% [1], and is estimated at 19.1% among transgender women (TW) [2], indicating substantial increased risk and need for HIV-related intervention and support for these populations. Moreover, there is evidence of increasing incidence of HIV among MSM across high and low income country settings [1, 3-5]. Addressing the HIV-related needs of MSM and TW is paramount worldwide, and in concentrated epidemic settings such as those in Central America where MSM and TW are disproportionately infected and make-up the majority of people living with HIV (PLHIV)[6]. In El Salvador, the prevalence of HIV among MSM is estimated to be 10.8% in the capital city of San Salvador and 8.8% in the next largest city of San Miguel [7], compared to a national HIV prevalence estimate of 0.8% among adults aged 15-49 [8]. Among TW, the HIV prevalence is estimated at 19% in San Salvador [7, 9].

HIV testing and counseling (HTC) is a critical intervention for MSM and TW. Linkage to care and treatment services for PLHIV mitigates the development of opportunistic infections and AIDS, thereby increasing their lifespan and quality of life. Remarkable new empirical evidence also demonstrates reduced viral load as a result of early diagnosis and treatment of HIV, leading to a reduction per exposure transmission probability and HIV incidence [10]. These clinical trial findings prove the biological plausibility of HTC as a prevention strategy. However, translation of these findings to benefit MSM and TW requires a better understanding of HTC service provision and uptake in real world settings, particularly in contexts where homosexuality and diversity in gender identity remains socially ostracized. In low-and-middle income countries, it is estimated that on average 33% of MSM have ever been tested for HIV, with the highest estimate found in Latin American (57%) based on 2008 UNGASS country reports [11]. In El Salvador, a biological and behavioral surveillance study (BBSS) using respondent-driven sampling conducted among MSM in 2008 reports previous HIV testing at 58.2% in San Salvador and 40.8% in San Miguel for MSM. Testing during the last 12 months was reported at 29.5% in San Salvador and 22.0% in San Miguel for MSM [7]. Data disaggregated from the same study for TW, indicates that 81% had ever had an HIV test [7, 9]. Youth 18-24 were less likely to have ever tested for HIV, and were more likely to have a recent HIV infection among those testing HIV-positive, compared to older age groups. Only 36% in San Salvador and 20% in San Miguel of participants who tested HIV-positive at the time of the study were aware of their infection [7]. This represents a significant missed opportunity for MSM and TW, especially given the high level of treatment coverage for PLHIV aware of their serostatus in El Salvador [12].

Research aimed at describing factors that influence HIV testing among MSM can be categorized into four main domains: HIV-related stigma and discrimination; demographic and HIV-related risk behavior; healthcare access; and social norms and stigma related to homosexuality. There is a dearth of research

on this topic for TW. Early in the epidemic, most research focused on HIV as a stigmatized health condition, and the need for stigma reduction to increase HIV testing uptake in general and among MSM [13-15]. Efforts to mitigate illness-related stigma and advances in treatment of the disease have led to a decreased focus on HIV stigma in more recent investigations. The vast majority of findings related of HIV testing behavior stem from seroprevalence surveys, and include reports on demographic and risk behavior variables. These factors often differ by country and region, but mostly suggest that persons with lower levels of education [16-19] and who are younger [18-23] are less likely to have tested for HIV. In relation to sexual risk, those with more lifetime sexual partner are more likely to have tested for HIV [18, 22, 23] , as are MSM reporting sex work [20], substance use [16, 18, 23] , and the insertive versus receptive sex role position [17, 23]. In some cases previous testing is more likely among persons who report recent condom use [17, 23], but not in others [18, 19]. Access to healthcare services is positively associated with HIV testing history in a number of studies, likely because engagement with the health system provides an opportunity for HIV testing, or for referral. A history of HIV testing is more likely among MSM who used health services in the last 12 months [16, 24], who have a primary care provider [16, 18, 24], and who have been diagnosed with an STI [16, 22, 24].

These findings provide a basic profile of testers versus non-testers, and how traditional health system factors influence uptake of testing. However, they do not adequately address the unique reality of social marginalization, and stigma related to sexual orientation and gender identity experienced by MSM and TW, and how this may influence their HIV testing decision. It is has been demonstrated that living in a context of social exclusion, outside larger group norms, leads to the development of "minority stress [25, 26]." This is a chronic form of stress that requires individuals to cope with stigma on a continuous basis, for example through constant decisions about when and to whom to disclose, or through efforts to conceal one's orientation during daily interactions. Stronger ties to the gay community may help mitigate this stress by providing a safe space of acceptance, and a context wherein minority group norms are valued. However this form of stress may also lead to the internalization of larger group norms that stigmatize homosexuality and that manifest as shame, low self-esteem, and self-hate [27]. Applied to the behavior of HIV testing, it has been shown that lack of disclosure of sexual orientation to a healthcare provider is negatively associated with previous HIV testing [16, 24, 28], while increased interaction and connection to communities of sexual minorities is positively correlated with HIV testing [19] or perceived access to testing [29]. Internalized homonegativity has been shown to be associated risky behavior [27], and with lower levels of HIV testing among high risk men who have sex with men and women [30]. The mechanism by which minority stress serves as a barrier to HIV testing remains underexplored, but may be an important gap given the relative stagnation in gains towards increasing uptake of HIV testing, particularly first-time testers [28]. Further, limited information is available about this topic, and barriers to testing in general, in low and middle income countries with concentrated epidemics like El Salvador.

The purpose of this study is to assess modifiable factors related to having ever tested for HIV based on the four domains outlined above among a representative sample of MSM in the capital city of San

Salvador, El Salvador. An additional aim is to provide descriptive information on HIV testing among TW, given the relative dearth of information related to HIV testing for this population.

Methods

A cross sectional study using respondent driven sampling (RDS) to recruit a representative sample of MSM and TW was conducted in San Salvador, El Salvador from November 2011 – February 2012. Study protocol followed standard techniques for RDS [31]. Recruitment chains were initiated by 5 seeds, purposely selected based on their social standing and wide social networks to increase the probability of successful referrals and recruitment chains. Seeds were also selected to increase the likelihood of sexual diversity in the study sample, and included two gay/homosexual men, two bisexual men, and one bisexual transgender woman.

Each participant was administered up to three recruitment coupons to distribute to social acquaintances seen in the last two weeks, and who met study eligibility criteria. This included being 18 years of age or older, having had anal sex with a man or transgender woman in the past 12 months, having lived, worked or studied in San Salvador for a minimum of three months prior to the interview, and being in possession of a recruitment coupon. A total of 670 participants were included in this study. A design effect of 2 was used in the sample size calculation that used the standard formula for estimating differences in population proportions set at a minimum of 15% detectable difference, with an alpha=.05, 80% power, and assuming a 10% non-response rate. The base rate of HIV testing uptake was estimated at 60%.

A structured survey was administered to research participants by interviewers trained in appropriate methods for facilitating surveys including sexual risk behavior and other sensitive questions. The interview team was diverse in terms of sexual orientation, and included gay identified men, a transgender woman, and a heterosexual woman. Interviews were conducted in private rooms in a study office, located in a central location near shopping outlets and public transportation routes. Data was entered on personal digital assistants. Interviews were approximately 45 minutes in duration.

This study was approved by the Tulane University Biomedical Institutional Review Board and the National Committee for Ethics and Clinical Investigation in El Salvador.

Measures

Demographic characteristics include age (youth 18-24 vs. adult 25-65), education (less than secondary vs. complete secondary or more), income (no monthly income, less than $250 per month or $250 per month or more), and current relationship status with a man or TW. Measures of economic vulnerability included homelessness or food insecurity in the last 6 months, and ever having been in prison or jail for more than 48 hours.

Participants were also asked to self-report their gender identity and sexual orientation. For gender identity, response options included: man, woman, transgender woman and other. Respondents selecting

woman and transgender woman were collapsed into one category. For sexual orientation, response options included gay or homosexual, bisexual, heterosexual or other.

HIV-related risk characteristics included lifetime number of sexual partners (reported in categories based on a median split), unprotected sex in the last 6 months (based on responses about always, sometimes or never using condoms with last 3 sexual partners in the last 6 months), exchange of sex in last 12 months (receipt of clothing, food, money, drugs or somewhere to sleep in exchange for sex with someone), binge drinking in the last 30 days (5 or more alcoholic beverages on one occasion), crack or cocaine use in the last 30 days, and ever having experienced sexual assault.

HIV knowledge was measured as an index. Respondents were asked to report the ways HIV can be prevented with the following response options: not having sex; using condoms correctly during sex; having only one partner, not sharing needles. Participants who correctly identified 2 or more prevention methods were coded as having high HIV knowledge.

Perceived risk for HIV was measured using two items scored on a 4-point likert scale about the participant's perception of currently being infected with HIV or ever being infected with HIV (Cronbach's alpha = .79 in this study). High and low categories were created based on a median split.

A six-item scale of HIV testing stigma was used to measure participant's perception of potential stigma resulting from their participation in taking an HIV test [32], scored on a 4-point likert scale (Cronbach's alpha = .92 in this study). This measure is adapted from Boshemer's Attitudes about HIV-1 Antibody Testing Scale [33]. Example items included: "It would hurt my reputation if I tested for HIV," "People might find out I have sex with men if I test for HIV," and "People might think I've done something to be ashamed of if I test for HIV."

To measure access to healthcare services, participants were asked if they had a regular healthcare provider and if they had seen a doctor in the last 12 months. For HIV services, specifically, participants were asked if they had participated in at least one HIV education session in the last 12 months, and if they could get HIV care and treatment if they needed it (measures as strongly agree-strongly disagree and collapsed into yes/no categories).

Social proximity to HIV and HIV testing were measured through items eliciting participant's perception of the quantity of the people they know who had tested for HIV (all or almost all, half, few, or none collapsed to all or almost all 'most' and half or fewer).

Several measures were also included to capture elements of minority stress experienced due to sexual orientation or gender identity. Social network size, as a measure of connection to the MSM or TW community, was determined by sequential questioning based on eligibility criteria previously described. To measure discrimination experienced in everyday life, participants were asked if, in the last 12 months, they had suffered any type of abuse or maltreatment because of being gay, bisexual or a transgender woman or because they were suspected of having sex with men. Maltreatment was defined as, "hitting, punching, kicking, threats, scolding or humiliations." Participants were also asked about

experienced discrimination within the healthcare setting using a 5-item scale scored on a 4-point likert response scale (Cronbach's alpha = .89 in this study). Example items include, "When getting medical care how often has the following occurred because the health care provider knew or suspected that you had sex with men or with transgender women… 'you have been treated with less respect than other people,' 'they refused to provide you services,' and 'it was it necessary to pretend or explicitly say that you were heterosexual.'" The aggregate score for this measure was split at the median to create categories for high and low levels of experienced discrimination in the healthcare setting. Participants were also asked if they had disclosed their sexual orientation to a member of their family and their healthcare provider.

As a component of minority stress, MSM were also administered Mayfield's 23-item scale of internalized homonegativity (Cronbachs = .90 in this study) [34]. Responses were measured on a 4-point likert response scale. Example items include, "I am disturbed when people can tell I am gay," "I feel ashamed of my homosexuality," and "I believe it is morally incorrect for men to have sex with men." The aggregate score for this measure was split at the median to create categories for high and low levels of internalized homonegativity. A limitation of this measure it that it is only appropriate for use among MSM and was therefore not administered to TW. Thus, use of this measure in analysis is restricted to bivariate and multivariate models for MSM rather than the entire study population.

Statistical analysis

Data was cleaned and labeled in SAS, and converted to a text file for use in the statistical software package, Respondent Driven Sampling Analysis Tool 6.01 (RDSAT) (www.respondentdrivensampling.org). All univariate analyses were conducted using RDSAT and the multiplicity estimator for the weighting of data. Differences between frequencies for MSM and TW sub-groups were based on overlapping confidence intervals calculated in RDSAT at the 90% and 95% confidence level. To assess factors related to having ever tested for HIV, weights calculated for the outcome variable of ever having tested for HIV in RDSAT were exported to STATA Intercooled© version 12.0, and bivariate and multivariate logistic regressions performed to determine associations between variables. Variables statistically significant at the p<=.05 level in bivariate analysis were retained in multivariate models.

Results

All seeds actively recruited additional participants, resulting in five separate recruitment chains, and a final sample size of 670, including 506 MSM and 164 TW (Figure 1). The recruitment chain emanating from seed four was most successful. This chain represented 65% (n=437 respondents) of the entire sample and reached 24 waves. Seed one recruited only three participants, producing one wave and comprising the smallest proportion of the sample (0.60%). The average network size for participants who had never tested for HIV was 5.29, and was 6.88 for participants who had tested for HIV. Homophily was close to zero for never testers. It was slightly higher for participants who had tested for HIV, but still within an acceptable range (-0.07 for never testers and 0.22 for testers). This indicates

relatively equal propensity in both groups to recruit others similar or different from themsleves based on this characteristic. The number of recruitment waves needed to reach equilibrium for the outcome variable ever testing for HIV was 2, and this requirement was far surpassed by 4 recruitment chains. Overall, these data indicate that the assumptions needed for RDS analysis have been met.

Socio-demographic characteristics of the study sample, and select HIV-related variables are presented in Table 1, separately for MSM and TW, and for the total sample. Study participants were relatively young, with 69.4% in the age group 18-24. A majority of participants completed secondary school or had tertiary training (59.6%). However, a substantial number of participants were poor, with 27.8% earning no monthly income, 43.5% earning less than $250 per month, and 28.7% earning $250 or more per month. Sexual orientation differed significantly by MSM and TW. The majority of MSM self-identified as bisexual (52.0%), followed by gay or homosexual (43.2%), and heterosexual (4.7%). In contrast, the majority of TW self-identified as heterosexual (81.1%), followed by gay/homosexual (11.1%), and bisexual (8.1%). Approximately a quarter (26.2%) of the total sample reported homelessness in the last 6 months, with this percentage being significantly higher among MSM compared to TW (28.6% compared to 15.6%). Almost half of the sample reported food insecurity in the last 6 months (46.4%). Fifteen percent of the total sample had ever been in jail or prison, with this percentage being significantly higher among TW compared to MSM (24.9% compared to 12.5%). One third (31.4%) of the total sample was in a stable relationship with a man or TW.

In terms of HIV-related risk characteristics, the median lifetime number of sexual partners was 15. More TW reported 16 or more lifetime sexual partners than MSM (52.8% compared to 34.5%). A total of 41.5% of those who were sexually active in the last 6 months reported sex without a condom. One third (33.5%) of the total sample exchanged sex for resources in the last 12 months. This percentage was higher among TW compared to MSM (53.4% compared to 29.0%). Binge drinking was high among the total sample, with 60.5% reporting drinking 5 or more alcoholic beverages on one occasion during the last 30 days. A total of 15.3% used crack or cocaine in the last 30 days. HIV knowledge was high, with 70.6% of the total sample knowing two or more prevention methods. HIV knowledge was higher among TW compared to MSM (80.6% compared to 68.0%). A total of 20.8% of the sample had experienced sexual assault (forced to have sexual intercourse) ever in their life.

In relation to health care access, 24.3% had a regular healthcare provider. This percentage was higher among MSM compared to TW (26.6% compared to 14.0%). A total of 30.2% visited a doctor in the last 12 months. The majority of participants (62.1%) participated in an HIV education session in the last 12 months, and 80.7% perceived that they would be able to access care and treatment services if they were infected with HIV.

In relation to social proximity, a total of 39.9% of participants reported that all or almost all of their social acquaintances had tested for HIV. A majority of participants (58.8%) knew someone living with HIV. This percentage was higher among TW compared to MSM (79.0% compared to 54.1%).

In terms of characteristics related to minority stress, the median social network size was 10 (range 1-350). A total of 21.6% suffered abuse or maltreatment due to their sexual orientation or gender identity in the last 12 months. Approximately half (52.9%) had disclosed to a family member that they form sexual relationships with men or TW. This percentage was higher among TW compared to MSM (70.1% compared to 48.75). Only 7.7% of participants disclosed this information to a healthcare provider.

The constructs of perceived risk for HIV, HIV testing stigma, and experienced discrimination are not presented in Table 1 because high and low categories were created based on a median cut-point for the total sample. There was no difference in perceived risk for HIV and HIV testing stigma between MSM and TW. However, TW were more likely to report experiencing a high level of discrimination when seeking health services than MSM (65.7% compared to 41.0%).

In Table 2, results related to HIV testing are presented. The majority of participants reported testing for HIV ever in their life (74.9%), and of those participants, 65.9% tested in the last 12 months [results not shown]. Of the total sample, 60.8% tested for HIV in the last 12 months. Most participants (65.4%) also reported that they intended to test for HIV in the next year. Overall, participants who tested for HIV in the last 12 months reported a high level of quality. However, only 67.7% received condoms during the counseling session, and only 63.3% reported that the provider had sufficient knowledge about the health needs of MSM and TW.

Bivariate associations between variables included in Table 1, were explored in relation to ever having tested for HIV among MSM (Table 3). The odds of ever having tested for HIV was higher among MSM in the older age group (Odds ratio (OR) 3.35; 95% confidence interval (CI) 1.79-6.26), who earned $250 or more per month compared to those earning no monthly income (OR 2.24; 95% CI 1.04-4.85), who participated in at least one HIV education session in the last 12 months (OR 2.11; 95% CI 1.24-3.61), who visited a doctor in the last 12 months (OR 2.01; 95% CI 1.14-3.56), who had a high versus low level of perceived risk for HIV (OR 1.74; 95% CI 1.02-2.99), and who were a survivor of sexual assault (OR 2.29; 95% CI 1.11-4.74). The odds of HIV testing were lower among MSM who reported homelessness in the last 6 months (OR 0.58; 95% CI 0.39-1.00).

In terms of social proximity, the odds of MSM testing for HIV were higher among participants reporting that most of their social acquaintances had tested for HIV (OR 2.55; 95% CI 1.424.56), and among participants knowing a PLHIV (OR 2.02; 95% CI 1.18-3.46).

In terms of variables related to minority stress, network size and suffering abuse or maltreatment due to sexual orientation or identity were not correlated with having tested for HIV. However, disclosure of sexual orientation and identity were correlated with testing so that MSM having disclosed to a family member (OR 1.86; 95% CI 1.10-3.12) or to a healthcare provider (OR 2.96; 95% CI 1.01-8.68) had a greater odds of ever testing for HIV. MSM having experienced a high level of healthcare provider discrimination were less likely to have tested for HIV (OR 0.54; 95% CI 0.32-0.94). Similarly, MSM

reporting a high level of internalized homonegativity were less likely to have tested for HIV (OR 0.42; 95% CI 0.24-0.71).

In the multivariate model for MSM, older age (Adjusted Odds Ratio (aOR) 2.63; 95% CI 1.19-5.80), and being a survivor of sexual assault (aOR 2.56; 95% CI 1.01-6.57) remained positively associated with HIV testing. Internalized homonegativity remained negatively associated with HIV testing (aOR 0.46; 95% CI 0.22-0.96).

Factors associated with having ever tested for HIV were also assessed for the total sample (Table 4). In bivariate analysis, older age (OR 3.20;95% CI 1.81-5.63), earning $250 or more per month (OR 2.52; 95% CI 1.23-5.18), being a TW (OR 2.82; 95% CI 1.62-4.93), having a greater number of lifetime sexual partners (OR 2.14; 95% CI 1.28-3.56), having participated in an HIV education session in the last 12 months (OR 2.22; 95% CI 1.35-3.65), having visited a doctor in the last 12 months (OR 2.03; 95% CI 1.19-3.50), having a higher level of perceived risk for HIV (OR 1.89; 95% CI 1.15-3.09), and being a survivor of sexual assault (OR 2.77; 95% CI 1.41-5.43) were positively associated with HIV testing. Reporting a bisexual orientation (OR 0.49; 95% CI 0.29-0.83), or being homeless in the last 6 months (OR 0.61; 95% CI 0.37-1.00) were negatively associated with HIV testing.

In terms of social proximity, persons who reported that all or almost all of their social acquaintances had tested for HIV were more likely to test (OR 2.42; 95% CI 1.42-4.12), as were participants who reported knowing a PLHIV (OR 2.67; 95% CI 1.62-4.41).

In relation to minority stress, persons reporting a network size of 10 or more members of the MSM or TW community in San Salvador were more likely to test for HIV (OR 1.69; 95% CI 1.10-2.60). Disclosure of sexual orientation and identity were also positively correlated with testing so that participants having disclosed to a family member (OR 2.22; 95% CI 1.38-3.59) or to a healthcare provider (OR 2.92; 95% CI 1.13-7.60) had a greater odds of ever testing for HIV. Suffering abuse or maltreatment due to sexual orientation or identity, and experienced discrimination from a healthcare provider were not associated with HIV testing. Internalized homonegativity was not explored in relation to HIV testing for the total sample, because this measure was administered only to MSM participants.

In the multivariate model for the total sample, older age (aOR 2.10; 95% CI 1.03-4.26), being a survivor of sexual assault (aOR 2.92; 95% CI 1.22-7.02), reporting that most social acquaintances had tested for HIV (aOR 1.81; 95% CI 0.99-3.30), and knowing a PLHIV (aOR 1.94; 95% CI 1.04-3.51) were positively associated with having tested for HIV. Being homeless in the last 6 months was negatively associated with having tested for HIV (aOR 0.43; 95% CI 0.21-0.88).

Discussion:

This study documents factors associated with having ever tested for HIV in several domains that indicate new points for intervention. Findings compliment previous research in El Salvador and Central America that indicate increased risk for HIV among MSM and TW based on sexual and drug use risk behavior. Findings add to this literature by contrasting this information for MSM and TW. The proportion of TW recruited through RDS in this study is higher than in the most recent BBSS among MSM in El Salvador also using RDS [7]. This is likely due to the reframing of eligibility criteria to explicitly include TW as part of the target population, rather than relying on "MSM" as a catch-all category under which TW could be included. Similarly, all questions were worded to include MSM and TW as separate groups. Finally, questions on gender identity and sexual orientation were disaggregated, rather than combined as one measure as has been done in previous RDS studies in the region. TW were also included as one of the seeds, and as part of the interviewing team. It is recommended that future RDS studies for MSM and TW follow a similar approach so that more information on TW may be captured through these efforts.

Differences between TW and MSM were noted for several variables. Most TW reported their sexual orientation as heterosexual, while most MSM reported their sexual orientation as bisexual. MSM were more likely to report homelessness in the last 6 months, while TW were more likely to report having ever been incarcerated, and exchanging sex for resources. TW had higher HIV knowledge than MSM, and were more likely to know a PLHIV. MSM were more likely to have a regular healthcare provider, while TW were more likely to have experienced high levels of discrimination from a healthcare provider. Disclosure of sexual relationships with men or TW to family was more likely among TW compared to MSM.

These differences between MSM and TW highlight the differences in life experiences for these two groups, and the importance of considering the uniqueness of each group in targeting interventions. Both groups demonstrate a level of social and economic vulnerability. Increased incarceration among TW may be linked to increased sex exchange, a criminal offense. Less report of homelessness, may be due to the fact that while TW are economically vulnerable, they are often also part of tight social networks [9] that may provide instrumental support such as housing. Other differences may be derived from the visible nature of TW compared to MSM, who may choose to hide their sexual orientation. This may lead to increased discrimination in the healthcare setting for TW. In contrast, MSM may struggle more with the psychosocial consequences of concealing their sexual orientation from family and others.

A higher rate of HIV testing (ever and in the past year) was noted in this study compared to the recent BBSS [7], and a previous regional study among MSM that included San Salvador as a study site and used convenience sampling to recruit participants [35]. This may indicate an increase in HIV testing over time, as efforts to reach MSM and TW with HIV services have increased, although this cannot be conclusively stated from the current study. Similar to previous studies in El Salvador, HIV testing was less likely among youth 18-24. The use of a cumulative measure of ever testing for HIV may be one reason for this finding. However, it is important to target HIV testing services towards younger people

given previous findings that incidence may be higher among this group [7]. It is important to note that, with the exception of lifetime number of sexual partners, HIV-related risk behaviors were unrelated to HIV testing. This suggests that better targeting of HIV testing services is warranted to reach people at higher risk for infection. While the percentage testing in this study was high, it is not clear that those testing are the ones at highest risk for HIV, nor that the current programs are reaching new testers. For both MSM and the total sample, persons who had experienced sexual assault were more likely to have tested, indicating that this population at elevated risk is being reached successfully either due to the availability of services for this group, or through the health seeking behavior of survivors.

For both MSM and the total sample, having visited a healthcare provider and having attended an HIV education activity in the last 12 months was associated with ever testing in bivariate analysis. It is possible that persons who sought care from a healthcare provider were seeking HIV testing services. However it is also possible, that interaction with a healthcare provider increased participants' propensity to test, as has been shown in other studies [16, 24]. Similarly, persons attending an HIV educational session may already be more likely to seek HIV testing services, or may have been motivated to seek services as a result of this activity. In both cases, these variables did not remain significant in multivariate analysis, suggesting a need to focus on factors in addition to the health system that influence the decision to test.

Social proximity to persons who test for HIV and PLHIV was related to HIV testing for MSM in bivariate analysis, and the total sample in multivariate analysis. Again, this may indicate either that persons are influenced by their social acquaintances to test, or that people tend to socialize with people similar to them, including the characteristics of HIV awareness and testing behavior. This finding, and the success of the current and other recent studies in using social network methods to engage MSM and TW for research purposes, suggests that social networks recruitment might also serve as a mechanism for engaging these populations in interventions, and providing referrals for testing. However, it will be important for these efforts to employ techniques that reduce homophily, such as limitations on the number of referral coupons distributed, so that higher risk MSM and TW are reached.

For MSM, the strongest correlate of HIV testing was internalized homonegativity, adding to the growing body of research for this important construct [25, 27, 36], and supporting the importance of considering a minority stress framework, including distal and proximal determinants related to feelings of homosexuality, to increase HIV testing. A recent cross national study of internalized homonegativity, demonstrated an association between structural level factors (legalized gay marriage), and social norms (perception of neighbors acceptance of homosexuals) as correlates of internalized homonegativity [27]. Working towards increased acceptance and support for sexual minorities is important as it may decrease internalized homonegativity, thereby removing a barrier to HIV testing uptake. It is necessary to address social stigma against sexual minorities in the wider community, and to also assist individual sexual minorities struggling to cope with their sexual orientation in a heteronormative environment. It will likely by necessary to address this issue for other biomedical interventions for HIV to be successful among this population as well.

The main limitation of this study is the cross sectional nature of the study design, that prohibits the establishment of causal relationships. Data was elicited through self-report and this may have led to social desirability bias. Weighting of the variables using RDSAT is based on the social network size provided by the participant, which may be difficult for individuals to conceptualize and report with accuracy. In multivariate regression analysis it was only possible to weight the outcome variable, while item weights that account for both social network size and homophily are most appropriate for the analysis of RDS data. While TW were included as part of the study population, a measure of internalized stigma for transgender persons was not available, and is an important area for future research.

Despite these limitations, the results presented in this study make a unique contribution to the literature on HIV testing among both MSM and TW.

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Table 1. Demographic, HIV-related risk, and healthcare access, social proximity, and minority-stress related characteristics among MSM and TW, San Salvador, El Salvador, 2011-2012.

	MSM (N=506)		Transgender Women (N=164)		Total (N=670)	
	n	**Weighted % (95% CI)**	**n**	**Weighted % (95% CI)**	**n**	**Weighted % (95% CI)**
Demographics						
Age						
Youth (18-24)	333	72.3 (65.8-78.2)	93	58.1 (46.7-69.8)	426	69.4 (63.8-75.4)
Adult (25-65)	173	27.7 (21.8-34.2)	71	41.9 (30.2-53.3)	244	30.6 (24.6-36.2)
Education						
<Secondary	174	37.9 (31.5-44.1)	96	52.2 (40.0-63.7)	270	40.4 (34.7-46.3)
Secondary/Post-secondary	329	62.1 (55.9-68.5)	68	47.8 (36.3-60.0)	397	59.6 (53.7-65.3)
Income						
No income	111	27.1 (22.6-33.2)	30	29.0 (18.6-39.5)	141	27.8 (23.0-32.4)
USD 1-250	213	43.4 (36.6-48.2)	75	46.6 (36.0-58.2)	288	43.5 (38.4-48.6)
USD251-3,000	181	29.5 (24.735.1)	59	24.4 (15.4-34.0)	240	28.7 (24.3-33.5)
Sexual orientation						
Gay/homosexual	279	43.2 (35.8-51.1)	19	11.1 (3.3-25.4)	298	41.3 (35.5-46.5)
Bisexual	201	52.0 (43.8-58.5)	9	7.8 (0.7-14.5)	210	40.2 (34.6-46.3)
Heterosexual	26	4.7 (2.6-8.9)	136	81.1 (64.9-93.3)	162	18.5 (14.5-23.0)
Homelessness (past 6 months)	167	28.6 (24.2-33.8)	43	15.6 (9.9-22.4)**	210	26.2 (22.3-30.6)
Food insecure (past 6 months)	257	47.4 (41.8-53.4)	73	42.3 (31.7-52.7)	330	46.4 (41.3-51.7)
Ever in prison or jail for more than 48 hours	85	12.5 (9.9-15.8)	47	24.9 (15.9-32.2)*	132	15.0 (11.6-18.8)
In a stable relationship with an MSM or TW	173	31.5 (26.0-36.8)	60	29.2 (19.5-39.0)	233	31.4 (26.4-36.1)
HIV-related risk characteristics						
16+ lifetime number of sexual partners (median split)	213	34.5 (28.7-40.6)	106	52.8 (40.8-65.0)**	319	38.2 (32.9-43.8)
Unprotected sex in the past 6 months	198	42.5 (37.2-49.7)	63	36.6 (26.5-51.0)	261	41.5 (36.7-47.8)
Exchanged sex last 12 months	168	29.0 (24.0-34.4)	102	53.4 (41.3-65.2)**	270	33.5 (28.9-38.5)
Binge drinking in the last 30	320	61.6 (56.0-67.6)	90	54.4 (43.6-65.8)	410	60.5 (55.5-65.8)
Crack or cocaine use in the last 30	63	15.0 (11.0-19.2)	42	16.5 (10.3-23.5)	105	15.3 (11.8-19.1)
High HIV knowledge	326	68.0 (63.5-72.0)	116	80.6 (73.1-87.6)*	442	70.6 (66.0-75.1)
Survivor of sexual assault	110	18.8 (14.5-23.1)	63	28.5 (19.8-39.0)	173	20.8 (17.1-25.0)
Suffered abuse or maltreatment due to sexual orientation/identity	133	21.7 (17.6-26.3)	52	20.8 (13.4-29.6)	185	21.6 (18.0-25.6)

	MSM (N=506)		Transgender Women (N=164)		Total (N=670)	
	n	**Weighted % (95% CI)**	**n**	**Weighted % (95% CI)**	**n**	**Weighted % (95% CI)**
Healthcare access						
Has a regular healthcare provider	158	26.6 (21.7-31.7)	41	14.0 (8.7-21.0)**	199	24.3 (20.2-28.7)
Visited a doctor in the last 12 months	198	32.2 (27.2-37.9)	52	20.5 (12.9-30.4)	250	30.2 (25.7-35.1)
Participated in at least one HIV education session last 12 months	303	58.9 (52.1-64.6)	126	76.8 (65.9-86.1)**	429	62.1 (56.2-67.5)
Could get access to HIV treatment and care if they needed it.	394	80.0 (74.6-84.8)	132	82.8 (73.2-90.7)	526	80.7 (76.0-84.9)
Social proximity to HIV and HIV testing						
Most social acquaintances have tested for HIV	218	40.6 (64.4-46.5)	70	38.6 (27.4-49.5)	288	39.9 (34.9-45.1)
Knows at least one PLHIV	302	54.1 (48.4-60.2)	129	79.0 (69.7-88.5)**	431	58.8 (53.8-64.3)
Minority stress-related characteristics						
Social network size Median (range)	8 (1-350)		12 (1-350)		10 (1-350)	
Suffered abuse or maltreatment due to sexual orientation/identity	133	21.7 (17.6-26.3)	52	20.8 (13.4-29.6)	185	21.6 (18.0-25.6)
Disclosed sexual orientation to family	279	48.7 (43.1-54.4)	119	70.1 (59.8-79.7)**	398	52.9 (47.7-58.0)
Disclosed sexual orientation to healthcare provider	51	7.4 (4.8-10.4)	15	8.5 (2.9-15.2)	66	7.7 (5.2-10.4)

*p<.05, **p<.01, ***p<.001, indicating differences in variables between MSM and TW

Table 2. HIV testing and testing experiences among MSM and TW, San Salvador, El Salvador, 2011-2012.

	MSM (N=486)		Transgender Women (N=160)		Total (N=646)	
	n	Weighted % (95% CI)	n	Weighted % (95% CI)	n	Weighted % (95% CI)
Ever tested for HIV	370	72.1	144	85.7	514	74.9
Tested for HIV in the last 12 months	304	57.8	122	71.6	426	60.8
Intends to tested for HIV in the next 12 months	353	67.3	96	56.5	449	65.4
When testing in the last 12 months (N=426)						
The provider explained the possible results of the diagnostic test	276	92.2 (88.5-95.4)	113	94.0 (83.9-99.6)	389	91.9 (88.4-95.1)
The provider explain how HIV or STI are transmitted and prevented	218	80.2 (75.7-87.9)	96	90.6 (79.1-98.2)	314	86.5 (81.5-91.4)
The provider gave you condoms	203	63.6 (50.9-69.6)	98	85.9 (73.4-94.2)**	301	67.7 (62.2-74.5)
The healthcare providers such as doctors and nurses, did not discriminate against you	236	81.1 (79.1-89.2)	74	60.2 (41.5-70.6)**	310	77.1 (70.9-81.9)
The health center staff such as the security guard, receptionist or administrator, did not discriminate against you	248	86.4 (83.3-91.9)	65	55.5 (36.0-66.8)**	313	79.1 (73.5-84.0)
The other patients did not discriminate against you	256	88.5 (86.7-94.2)	82	70.4 (51.3-80.9)**	338	85.5 (80.5-89.3)
The provider had sufficient information about the health needs of MSM or transgender women	186	58.6 (48.5-66.8)	91	74.7 (62.5-86.3)	277	63.3 (57.2-70.0)
The provider maintained confidentiality	235	78.2 (70.1-85.6)	105	79.0 (64.2-90.8)	340	78.3 (72.5-83.6)

*p<.05, **p<.01, ***p<.001, indicating differences in variables between MSM and TW

Table 3. Factors associated with having ever tested for HIV among MSM, San Salvador, El Salvador, 2011-2012.

	Unadjusted OR (95% CI)	**Adjusted OR (95% CI)^**
Demographics		
Age (18-24 vs. 25-65)	3.35 (1.79-6.26)***	2.63(1.19-5.80)*
Education (<secondary vs. secondary/post-secondary)	1.29 (0.75-2.20)	---
Income (no income, ref)	1.00	1.00
USD $1-250	0.96 (0.51-1.83)	0.92 (0.40-2.10)
USD $251-3,000	2.24 (1.04-4.85)*	1.55 (0.66-3.64)
Sexual orientation (gay/homosexual, ref)	1.00	1.00
Bisexual	0.47 (0.27-0.80)**	0.67 (0.33-1.39)
Heterosexual	1.12 (0.30-4.19)	3.30 (0.46-23.73)
Homelessness at least one night last 6 months (yes)	0.58 (0.39-1.00)*	0.51 (0.22-1.16)
Food insecure last 6 months	0.89 (0.53-1.51)	---
Ever in prison or jail for more than 48 hours	.93 (.47-1.81)	---
In a stable relationship with an MSM or TW	1.34 (0.75-2.39)	---
HIV-related characteristics		
Lifetime number of sexual partners (1-15 vs. 16+)	1.67 (0.96-2.92)	---
Unprotected sex in the past 6 months	1.23 (.70-2.15)	---
Exchanged sex last 12 months	1.13 (.63-2.01)	---
Binge drinking in the last 30	1.13 (.66-1.94)	---
Crack or cocaine use in the last 30	.91 (.39-2.09)	---
HIV knowledge (high)	1.59 (.92-2.71)	---
Perceived risk for HIV (high)	1.74 (1.02-2.99)*	0.97 (0.49-1.91)
HIV testing stigma (high)	.64 (.38-1.08)	---
Survivor of sexual assault ever	2.29 (1.11-4.74)*	2.56 (1.01-6.57)*
Healthcare access		
Has a regular healthcare provider	1.55 (0.85-2.83)	---
Visited a doctor in the last 12 months	2.01 (1.14-3.56)*	1.86 (0.80-4.30)
Participated in HIV education session last 12 months	2.11 (1.24-3.61)**	1.52 (0.82-2.82)
Could access care and treatment service for HIV if needed	0.86 (0.44-1.65)	---
Social proximity to HIV and HIV testing		
Most social acquaintances have tested for HIV	2.55 (1.42-4.56)**	1.98 (0.97-4.04)
Knows at least one PLHIV	2.02 (1.18-3.46)*	1.55 (0.79-3.03)
Minority-stress related characteristics		
Social network size (1-9 vs. 10-350)	1.49 (0.93-2.38)	---
Suffered abuse or maltreatment due to sexual orientation/identity last 12 months	.96(.53-1.75)	---
Disclosed sexual orientation to family	1.86 (1.10-3.12)*	1.00 (0.52-1.95)
Disclosed sexual orientation to healthcare provider	2.96 (1.01-8.68)*	0.73 (0.15-3.44)
Experienced discrimination from a healthcare provider due to sexual orientation/ gender identity	.54 (.32-.94)*	0.90 (0.46-1.75)
Internalized homonegativity (high)	0.41 (0.24-0.71)***	0.46 (0.22-0.96)*

*p<.05, **p<.01, ***p<.001

^ N=417 for multivariate regression model

For multivariate analysis, we retained variables with a p-value equal to or less than 0.05 from bivariate analysis

Table 4. Factors associated with having ever tested for HIV among MSM and TW, San Salvador, El Salvador, 2011-2012.

	Unadjusted OR (95% CI)	**Adjusted OR (95% CI)^**
Demographics		
Age (18-24 vs. 25-65)	3.20 (1.81-5.63)***	2.10 (1.03-4.26)*
Education (<secondary vs. secondary/post-secondary)	0.98 (0.60-1.60)	---
Income (no income, ref)	1.00	1.00
USD $1-250	1.14 (0.64-2.03)	0.91 (0.45-1.84)
USD $251-3,000	2.52 (1.23-5.18)**	1.73 (0.79-3.77)
Gender identity (male ref)		
Transgender woman	2.82 (1.62-4.93)***	0.78 (0.31-1.95)
Sexual orientation (gay/homosexual, ref)		
Bisexual	0.49 (0.29-0.83)**	.65 (.34-1.25)
Heterosexual	1.34 (0.63-2.85)	1.46 (0.56-3.78)
Homelessness at least one night last 6 months	0.61 (0.37-1.00)*	0.43 (0.21-0.88)*
Food insecure last 6 months	0.85 (0.52-1.38)	---
Ever in prison or jail for more than 48 hours	1.33 (.72-2.48)	---
In a stable relationship with an MSM or TW	1.23 (0.72-2.10)	---
HIV-related characteristics		
Lifetime number of sexual partners (1-15 vs. 16+)	2.14 (1.28-3.56)**	1.57 (0.86-2.86)
Unprotected sex in the past 6 months	1.19 (.71-2.00)	---
Exchanged sex last 12 months	1.39 (.82-2.36)	---
Binge drinking in the last 30	1.22 (.75-2.00)	---
Crack or cocaine use in the last 30	1.17 (.53-2.56)	---
HIV knowledge (high)	1.54 (.94-2.54)	---
Perceived risk for HIV (high)	1.89 (1.15-3.09)*	1.22 (0.64-2.32)
HIV testing stigma (high)	.75 (.46-1.21)	---
Survivor of sexual assault ever	2.77 (1.41-5.43)**	2.92 (1.22-7.02)*
Healthcare access		
Has a regular healthcare provider	1.55 (0.85-2.83)	---
Visited a doctor in the last 12 months	2.03 (1.19-3.50)**	1.87 (0.91-3.87)
Participated in HIV education session last 12 months	2.22 (1.35-3.65)**	1.55 (0.89-2.69)
Could access care and treatment service for HIV if needed	0.80 (0.43-1.48)	---
Social proximity to HIV and HIV testing		
Most social acquaintances have tested for HIV	2.42 (1.42-4.12)**	1.81 (0.99-3.30)*
Knows at least one PLHIV	2.68 (1.62-4.41)***	1.91 (1.04-3.51)*
Minority-stress related characteristics		
Suffered abuse or maltreatment due to sexual orientation/identity last 12 months	1.19 (.64-1.96)	---
Social network size (1-9 vs. 10-350)	1.69 (1.10-2.60)*	1.19 (0.70-2.01)
Disclosed sexual orientation to family	2.22 (1.38-3.59)***	1.27 (0.70-2.29)
Disclosed sexual orientation to healthcare provider	2.92 (1.13-7.60)*	1.04 (0.30-3.52)
Experienced discrimination from a healthcare provider due to sexual orientation/ gender identity	.69 (.42-1.13)	---

*p<.05, **p<.01, ***p<.001

^ N=604 for multivariate regression model

For multivariate analysis, we retained variables with a p-value equal to or less than 0.05 from bivariate analysis

Figure 1**.** Recruitment graphic of sample (N=670), San Salvador, El Salvador 2011-2012