



Published in final edited form as:

*AIDS Behav.* 2016 October ; 20(10): 2178–2185. doi:10.1007/s10461-015-1276-7.

## Sexual Orientation, Gender Identity and Perceived Source of Infection among Men Who Have Sex with Men (MSM) and Transgender Women (TW) Recently Diagnosed with HIV and/or STI in Lima, Peru

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### Abstract

Risk perception and health behaviors result from individual-level factors influenced by specific partnership contexts. We explored individual- and partner-level factors associated with partner-specific perceptions of HIV/STI risk among 372 HIV/STI-positive MSM and transgender women (TW) in Lima, Peru. Generalized estimating equations (GEE) explored participants' perception of their three most recent partner(s) as a likely source of their HIV/STI diagnosis. Homosexual/gay (PR = 2.07; 95% CI 1.19-3.61) or transgender (PR = 2.84; 95% CI 1.48-5.44) partners were more likely to be considered a source of infection than heterosexual partners. Compared to heterosexual respondents, gay and TW respondents were less likely to associate their partner with HIV/STI infection, suggesting a cultural link between gay or TW identity and perceived HIV/STI risk. Our findings demonstrate a need for health promotion messages tailored to high-risk MSM partnerships addressing how perceived HIV/STI risk aligns or conflicts with actual transmission risks in sexual partnerships and networks.

### Keywords

HIV; STI; MSM; Perceived Risk; Transgender

## INTRODUCTION

Men who have sex with men (MSM) and male-to-female transgender women (TW) in Peru are disproportionately affected by the HIV epidemic (1). HIV prevalence among Peruvian MSM has been estimated at 11-22% and 30% among TW as compared to a 0.4% HIV

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prevalence in the general population (1-6). Ulcerative STIs, such as HSV-2 and syphilis, are also common among MSM and TW and contribute to HIV transmission (2, 4, 7, 8). Though factors underlying the disproportionate burden of disease within MSM and TW are numerous and complex, the high frequency of condomless anal intercourse (CAI) is a key contributing factor (2, 9). Since sexual risk assessments and subsequent risk reduction behaviors occur at both the dyadic and the individual level (i.e., not only as individual patterns of behavior, but also as partnership-specific constructs), it is important to delineate how perceptions of risk and actual HIV and STI transmission differ according to partnership context.

Previous studies have demonstrated that partnership type and other dyadic characteristics inform perceptions of risk for HIV and STI acquisition and influence sexual risk behaviors (10-14). While MSM are more likely to participate in condomless intercourse in the context of stable partnerships, CAI has also been reported in many casual partnerships in the United States and Latin America (15, 16). Other partner-level characteristics associated with perceived risk for HIV and STI and decisions concerning condom use include: knowledge of the partner's sexual history, trust, degree of familiarity with the partner, and prior disclosure of HIV serostatus (11, 12, 17). While previous research in Peru has described associations between partnership type and CAI, information concerning individuals' *perceptions* of partner-level risks for HIV and STI and their impact on sexual risk behavior is limited.

Cultural constructions of sexuality and epidemiologic patterns of disease prevalence also influence MSM and TW's perceptions of HIV and STI vulnerability. As outlined in previous research, HIV/STI prevalence varies between subpopulations of MSM and TW, with higher frequencies of HIV, syphilis, and rectal STIs observed among gay-identified *pasivo* and *moderno* men and TW who engage in receptive anal intercourse compared with heterosexual-identified MSM who are primarily insertive, or *activo*, during intercourse (18). Qualitative evidence from the same sample suggested that differences in STI prevalence coincided with cultural constructions of sexuality and gender that defined gay-identified MSM and TW as carriers of disease. However, the same study found a high prevalence of HIV and other STIs among non-gay identified *activo* MSM, suggesting that cultural ideologies linking gay or transgender identity with HIV and STI risk are incomplete at best, and insufficient for accurate assessments of partner-level risk for disease transmission.

In order to further explore the question of how partnership characteristics influence individuals' estimations of HIV/STI risk, we examined the association between sexual identity and perceived partner-specific risk of HIV/STI transmission in a group of MSM and TW in Peru recently diagnosed with HIV and/or STI. Improved understanding of how individuals diagnosed with HIV/STI perceive their likelihood of having acquired and/or transmitted the infection with their recent sexual partners can help to define both individual and dyadic factors associated with HIV and STI risk perceptions and contribute to a better understanding of how social and cultural constructions of vulnerability define individual- and partner-level frameworks for harm reduction practices. In order to develop targeted, context-specific public health interventions for MSM and TW in Latin America, we assessed individual- and partner-level factors associated with the perceived source of infection among MSM and TW in Peru recently diagnosed with HIV and STI.

## METHODS

### Study Setting, Design and Population

As part of a larger cross-sectional study assessing partner notification beliefs and practices among MSM and TW in Lima, Peru, we conducted a secondary analysis of the association between sexual orientation/gender identity and perceived source of infection among MSM and TW recently diagnosed with HIV and/or STI.

The study methods have been previously described (19). Briefly, between January 2011 to January 2012, 397 MSM and TW newly diagnosed with HIV and/or STI completed a survey of attitudes, beliefs, and anticipated practices related to partner notification. Enrollment was limited to individuals assigned male sex at birth 18 years of age who reported oral or anal intercourse with a male or TW partner during the previous year and who had been diagnosed with HIV and/or STI (syphilis, genital ulcer disease, genital herpes, proctitis, and/or urethritis) within the previous 30 days. All participants received 10 *Nuevos Soles* (approximately \$4.00 USD) as compensation for their transportation costs.

Written informed consent was obtained from all participants prior to enrollment. The study protocol was reviewed and approved by the Office of Human Research Participant Protection (OHRPP) at the University of California, Los Angeles (UCLA) (G10-03-036-01) and the *Comite Institucional de Bioética* at Asociación Civil Impacta Salud y Educación (0104-2010-CE).

### Demographics

Participants were asked about their age, education, sexual orientation/gender identity, specific STI diagnosed (which was later grouped into three categories), sexual role, and sexual practices both as an aggregate of behavior in the past three months and individually with each of their most recent partners (to a maximum of three partners).

### Partnership-level variables

Questions specific to the three most recent sexual contacts included each partner's perceived sexual orientation/gender identity, partnership type, length of the partnership, whether the participant considered the partner a likely source of their HIV/STI, and whether the participant considered themselves to be a likely source of infection for the partner. Due to the small number of female partners reported, we excluded female partnerships from our analysis (n=42), giving a sample of 993 total partners reported. Respondents were asked to classify each recent partner as stable, casual, anonymous, commercial (client), or commercial (sex worker). For our analysis, we reclassified partnerships into three categories: stable, casual (casual and anonymous) and commercial (commercial sex client or worker). Respondents were asked if they practiced receptive and/or insertive CAI with each partner, and we then dichotomized this variable into partnerships with any CAI (either insertive and/or receptive) and partnerships without any CAI. Respondents were also asked to classify their own sexual role as well as the perceived role of their partner(s) as *activo* (insertive), *pasivo* (receptive), or *moderno* (versatile) or "Does Not Apply" (18).

## Perception of Partner-Specific STI Risk

The primary outcome for our analysis was whether the participant described their recent partner(s) as a likely source of their recently diagnosed infection. For each of the most recent partners (up to a maximum of three partners), participants were asked “Do you think it is likely that this partner infected you (i.e., that they were the source of your infection)?” Possible responses included: “Yes, I am sure that this person was the source of my infection”, “Yes, this person probably was the source of my infection”, “No, this person probably was not the source of my infection”, “No, this person definitely was not the source of my infection”, or “I don't know”. For our analysis, we dichotomized the outcome as “Likely” or “I don't know/Unlikely”. Participants were also asked to estimate their likelihood of having infected each of their most recent partners (to a maximum of three partners) with the STI diagnosed, repeating the same response options and categorizations described above.

## Data Analysis

We assessed associations between sexual orientation/gender identity and perceived HIV/STI risk at both the individual-level (e.g., participant) and the dyadic-level (e.g., partnership). Cluster-adjusted chi square tests were used to assess respondent-level factors (age, education, sexual orientation/gender identity, sexual role, STI diagnosis) and partnership-level factors (partner sexual orientation/gender identity, partner sexual role, partnership type, CAI) with the primary outcome, using the respondent as the cluster and partnership-level factors as units within the cluster.

We used generalized estimating equations (GEEs) to model the association between the main predictor (sexual orientation/gender identity) as well as other respondent- and partnership-level covariates with perceived risk of HIV/STI transmission among each of the respondent's reported partners (up to a maximum of three partnerships reported per participant). As each respondent could report data on up to 3 partnerships and the main outcome (perception) was measured at the partnership-level, GEEs were used to account for the correlated data structure in this study (20). Given that condom use within the partnership was likely to influence perceptions surrounding risk of HIV/STI acquisition and transmission, we controlled for CAI in multivariable analysis. Our final multivariable model adjusted for both participant-level (age, education, sexual orientation/gender identity, specific HIV /STI diagnosis) and partnership-level factors (partner sexual orientation/gender identity, partner type, and CAI with the partner). We created an additional multivariable model, with the same participant- and partnership-level factors as predictors, using respondent's self-perception as the actual source of infection for each of their reported partnerships as the main outcome. While sexual orientation/gender identity and sexual role of the participant were associated with perceived source of infection in the bivariate analysis, we excluded participant and partner's sexual role from the multivariable models due to the conceptual overlap between sexual role and sexual orientation/gender identity in this context (18). Crude and adjusted prevalence ratios (PR) with 95% confidence intervals were calculated using GEEs with a Poisson distribution family for the primary outcome, a logarithmic link function, exchangeable working correlation matrix and robust standard

errors (21). All data analyses were conducted using Stata 12.0 (Stata Corporation, College Station, TX).

## RESULTS

### Participant characteristics

We analyzed data from 372 participants, with most participants (85.2%) providing data on three recent sexual partners. The mean age of respondents was 30.6 years (SD 8.9), with 133 (35.9%) completing high school and 154 (41.5%) reporting some level of higher education (university or technical school). The majority of respondents self-identified as homosexual/gay (66.6%), followed by bisexual (15.6%), TW (14.5%), and heterosexual (3.3%). The most common diagnoses among respondents were STI (non-HIV) (52.2%), HIV and STI co-infection (25.8%), followed by only HIV (22%). Participant characteristics are reported in Table 1.

### Partnership characteristics

Of 993 partnerships reported, 524 (55.0%) were casual and 298 (31.3%) were with stable partners. Most participants described their partner's sexual orientation as bisexual (41.0%) or homosexual/gay (42.6%), and reported CAI in 335 (41.2%) of all partnerships. Among all recent partners, 26.0% (CI 22.9%-29.4%) were perceived as a likely source of STI transmission. In contrast, participants believed themselves likely to have transmitted an STI to their partners in only 159 (16%) partnerships. Partnership characteristics are reported in Table 1.

### Perceived infection source

In bivariate analysis (Table 2), respondent factors significantly associated with perceiving a recent partner as a likely source of HIV and/or STI were self-reported sexual orientation/gender identity and sexual role ( $p < 0.05$ ). Prior to adjusting for selected individual- and partnership-level variables, respondents who reported their sexual role as *pasivo* (receptive) (PR crude = 0.54; CI 0.38-0.77) or *moderno* (versatile) (PR crude = 0.58; CI 0.42-0.81) were significantly less likely to consider their partner as a source of infection as compared with respondents who reported an *activo* (insertive) sexual role. Partner-level factors associated with perceived HIV/STI risk included: partner sexual orientation/gender identity, partnership type, and history of CAI with the partner. Compared to partners who endorsed an *activo* sexual role during intercourse, *moderno*-identified partners were more likely to be perceived as the source of infection (PR crude = 1.44; CI 1.03-2.01). Compared to stable partnerships, commercial partnerships were significantly less likely to be considered sources of infection (PR crude = 0.43; CI 0.26-0.70). Respondent age, education, STI diagnosis, and partner sexual role were not significantly associated with perception of the partner as being the source of HIV and/or STI in bivariate analysis.

Of the 993 partnerships reported, 159 participants considered themselves likely to have infected their partner with HIV/STI. Perceived likelihood of infecting partners was lower in commercial partnerships (compared to stable partnerships) and in partnerships where CAI was practiced. In multivariable models (see Table 3), both CAI and participant/partner

sexual orientation/gender identity were significantly associated with perceived HIV/STI source. Compared to heterosexual-identified respondents, bisexual (PR = 0.52; CI 0.30-0.90), homosexual (PR = 0.47; CI 0.31-0.73), and TW (PR = 0.37; CI 0.19-0.70) respondents were significantly less likely to consider their partner a likely source of their infection. Additionally, partners who were identified as gay (PR = 2.07; CI 1.19-3.61) and TW (PR = 2.84; CI 1.48-5.44) were significantly more likely to be perceived as a source of infection compared to heterosexual male partners. CAI within a partnership was independently associated with perception of the partner as the source of infection (PR = 3.2; CI 2.28-4.46) while partnership type, type of HIV/STI diagnosis, education level, and respondent age were not significantly associated.

## DISCUSSION

Our findings highlight that self-reported gay men and transgender women in Peru were less likely to perceive their partner (irrelevant of partner sexual orientation/gender identity) as a source of infection when compared with self-described heterosexual MSM. Similarly, partners described as gay or transgender were more likely to be perceived as a source of infection compared to heterosexual male partners. While CAI was associated with perceived HIV and STI acquisition and transmission risk in a partnership, the link between sexual identity and perceived source of HIV and STI transmission remained significant even after controlling for partner-specific CAI. Jointly, these results suggest that sexual orientation/gender identity significantly impact risk perceptions in MSM and TW partnerships at both the individual- and dyadic-level and influence use of health protective behaviors within specific partnership contexts.

As noted in previous studies, CAI was associated with perceived likelihood of HIV/STI transmission to and from the partner, independent of education, age, partnership type and sexual orientation/gender identity of partner/respondent. Given the well-documented association between CAI and HIV/STI risk, the increased perceived risk of HIV and STI acquisition from partnerships where CAI was practiced is not surprising, though the high reported frequency of CAI is of public health concern in a sample where all respondents had recently tested positive for HIV/STI. Despite the fact that CAI was associated with increased bidirectional risk perception, CAI was reported in 41.2% of partnerships, consistent with previous research in Peru where CAI was reported in 35.2%-55.1% of MSM/TW partnerships (2, 3, 15, 22). The high frequency of CAI reported in this sample of high-risk MSM and TW underscores the need for public health interventions that are tailored to the needs of this group and highlights the potential importance of alternative biomedical prevention interventions (such as pre-exposure prophylaxis, rectal microbicides, test and treat, and STI control) in addition to condom use promotion.

Independent of CAI, sexual orientation/gender identity of both the individual and the partner were important predictors of perceived HIV and STI source. Partners described as gay or TW were significantly more likely to be considered a source of participants' recently acquired infection. Perceived likelihood of having acquired HIV and/or STI from a TW partner was almost 3-fold greater than from heterosexual male partners. At the same time, respondents who identified as part of a sexual minority (e.g., gay, bisexual) were less likely



to consider their recent partners probable sources of infection. Among our sample, TW were least likely to perceive their partners as the likely STI source, followed by gay, and then bisexual respondents. Our findings highlight a latent cultural logic that associates identification as transgender or homosexual/gay with HIV/STI risk and as a result (inaccurately) defines non-gay identified MSM as lower risk than other, gay-identified male and TW partners (6, 18). As all MSM included in this study were recently diagnosed with HIV/STI and therefore objectively at “high-risk” for HIV and STI acquisition, and despite the fact that only a minority of participants regarded themselves as such, this flawed logic reflects a lack of congruency between perceptions of HIV and STI risk and actual likelihood of disease transmission underlying their common failure to take appropriate health prevention measures. Because of the assumption that they represent a low-risk for HIV and STI to themselves and their partners, regardless of their actual sexual behavior, heterosexual MSM often fail to receive important public health messages and continue to engage in sexual practices that increase HIV/STI transmission risk for themselves and their partner(s), whether male, female or transgender.

The lower likelihood that the partners of gay-identified and TW would be considered a likely HIV/STI source may be due to a complex interaction of individual- and partnership-level factors. The assumption among gay and TW participants that their heterosexual-identified partners are unlikely to be sources of HIV/STI is an obvious corollary of the cultural link between gay men/TW and sexually transmitted disease. This cultural logic could have a profound effect on partner risk perception whereby gay MSM and TW always consider themselves to be the “risky partner,” regardless of their actual HIV or STI status, leading them to minimize their likelihood of acquiring HIV or STI during unprotected intercourse with a non-gay identified male partner.

Complex issues of trust, vulnerability, and sexual risk behavior are also likely to be at play in these differences in partner-specific HIV/STI risk perception. Prior studies in Latin America have identified partnership status and commitment in a partnership as important determinants of partner-specific condom use. At the same time, previous studies with gay-identified MSM and TW have described their prioritization of intimacy and long-term partnerships, in contrast to the description of male sexual partners as transient sexual contacts commonly articulated by heterosexual- and bisexual-identified MSM (18, 23-26). As a result, by minimizing potential risks of HIV/STI acquisition within what they regard as committed partnerships, gay men and TW are often led to further increase their vulnerability to HIV/STI acquisition with high-risk sexual partners. To address this problem, public health efforts need to de-link social constructions of sexual orientation/gender identity from cultural concepts of HIV/STI risk, emphasizing the primacy of sexual practices and sexual networks in defining risk for HIV and STI transmission, and recognizing how nuances of identity and behavior may influence an individual's perceived susceptibility to HIV/STIs in a specific partnership context.

Some limitations of this study need to be considered when interpreting our data. First, there is an inherent bias in secondary analysis of self-reported data from a cross-sectional study. Since enrollment was limited to individuals diagnosed with HIV and/or STI within the last 30 days, and participants were recruited through convenience sampling methods, our

findings cannot be generalized to the entire MSM and TW population in Peru or elsewhere. However, by limiting eligibility to individuals with a recent HIV or STI diagnosis, our study was designed to address HIV/STI risk in a subpopulation of MSM and TW at high risk for future HIV infection and/or transmission, a group that is a priority for prevention efforts. Another potential limitation of our study is that our results are based on participant reports of the sexual orientation and gender identity of their partners rather than collecting this information directly from the partners. However, as the primary focus of our analysis was on the perception of risk, including respondents' perceptions of their partners' sexual orientation/gender identity was an important component of our analysis. While our survey used commonly accepted classifications of sexual identity for MSM and TW in Peru at the time it was originally written, we were unable to assess the differential effects of gender and sexual orientation among TW, as the survey did not collect that information.

Our findings suggest the need for health promotion efforts that promote recognition of the potential for HIV/STI risk among non-gay identified MSM by increasing their knowledge of how behaviors and networks, not identities and communities, structure HIV/STI transmission, and influence partner-specific HIV and STI risk. While the findings from our study suggest that differences in social and cultural contexts of risk perception vary according to participants' and partners' sexual orientation/gender identity, it is important to stress that transmission dynamics within partnerships are influenced by individual behavioral decision-making processes, partner-level sexual interactions, population-level patterns of HIV/STI prevalence, and sexual network structure. More research is needed to understand how sexual orientation/gender identity and risk perceptions vary between different partnership contexts in order to improve understanding of partner- and network-specific patterns of risk behavior and disease transmission and to inform future health promotion efforts among MSM and TW in Latin America.

## ACKNOWLEDGEMENTS

The authors would like to thank the staff at Asociación Civil Impacta Salud y Educación and the CERITS Alberto Barton for their help in completing the study. We would also like to thank the participants of this study for sharing their lives with us. Research funding was provided by NIH grant K23 MH084611.

## REFERENCES

1. UNAIDS.. Global report: UNAIDS report on the global AIDS epidemic 2013. Joint United Nations Programme on HIV/AIDS (UNAIDS); Geneva, Switzerland: 2013.
2. Sanchez J, Lama JR, Kusunoki L, Manrique H, Goicochea P, Lucchetti A, et al. HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex with men in Lima, Peru. *J Acquir Immune Defic Syndr*. 2007; 44(5):578–85. [PubMed: 17279049]
3. Perez-Brumer AG, Konda KA, Salvatierra HJ, Segura ER, Hall ER, Montano SM, et al. Prevalence of HIV, STIs, and risk behaviors in a cross-sectional community- and clinic-based sample of men who have sex with men (MSM) in Lima, Peru. *PLoS One*. 2013; 8(4):e59072. [PubMed: 23634201]
4. Lama JR, Lucchetti A, Suarez L, Laguna-Torres VA, Guanira JV, Pun M, et al. Association of herpes simplex virus type 2 infection and syphilis with human immunodeficiency virus infection among men who have sex with men in Peru. *J Infect Dis*. 2006; 194(10):1459–66. [PubMed: 17054077]
5. Bautista CT, Sanchez JL, Montano SM, Laguna-Torres VA, Lama JR, Kusunoki L, et al. Seroprevalence of and risk factors for HIV-1 infection among South American men who have sex with men. *Sex Transm Infect*. 2004; 80(6):498–504. [PubMed: 15572623]



6. Silva-Santisteban A, Raymond H, Salazar X, Villayzan J, Leon S, McFarland W, et al. Understanding the HIV/AIDS epidemic in transgender women of Lima, Peru: results from a seroepidemiologic study using respondent driven sampling. *AIDS Behav.* 2012; 16(4):872–81. [PubMed: 21983694]
7. Sanchez J, Lama JR, Peinado J, Paredes A, Lucchetti A, Russell K, et al. High HIV and ulcerative sexually transmitted infection incidence estimates among men who have sex with men in Peru: awaiting for an effective preventive intervention. *J Acquir Immune Defic Syndr.* 2009; 51:S47–S51. [PubMed: 19384102]
8. Konda KA, Klausner JD, Lescano AG, Leon S, Jones FR, Pajuelo J, et al. The epidemiology of herpes simplex virus type 2 infection in low-income urban populations in coastal Peru. *Sex Transm Dis.* 2005; 32(9):534–41. [PubMed: 16118601]
9. Clark J, Konda K, Munayco C, Pun M, Lescano A, Leon S, et al. Prevalence of HIV, herpes simplex virus-2, and syphilis in male sex partners of pregnant women in Peru. *BMC Public Health.* 2008; 8(1):65. [PubMed: 18284696]
10. Mustanski B, Newcomb ME, Clerkin EM. Relationship characteristics and sexual risk-taking in young men who have sex with men. *Health Psychology.* 2011; 30(5):597–605. [PubMed: 21604883]
11. Adam BD, Winston H, Murray J, Maxwell J. AIDS optimism, condom fatigue, or self-esteem? Explaining unsafe sex among gay and bisexual men. *J Sex Res.* 2005; 42(3):238–48. [PubMed: 19817037]
12. Zea M, Reisen C, Poppen P, Bianchi F. Unprotected anal intercourse among immigrant Latino MSM: the role of characteristics of the person and the sexual encounter. *AIDS Behav.* 2009; 13(4):700–15. [PubMed: 19030982]
13. Golub S, Starks T, Payton G, Parsons J. The critical role of intimacy in the sexual risk behaviors of gay and bisexual men. *AIDS Behav.* 2012; 16(3):626–32. [PubMed: 21630012]
14. Cambou MC, Perez-Brumer AG, Segura ER, Salvatierra HJ, Lama JR, Sanchez J, et al. The risk of stable partnerships: associations between partnership characteristics and unprotected anal intercourse among men who have sex with men and transgender women recently diagnosed with HIV and/or STI in Lima, Peru. *PLoS One.* 2014; 9(7):e102894. [PubMed: 25029514]
15. Nagaraj S, Segura E, Peinado J, Konda K, Segura P, Casapia M, et al. A cross-sectional study of knowledge of sex partner serostatus among high-risk Peruvian men who have sex with men and transgender women: implications for HIV prevention. *BMC Public Health.* 2013; 13(1):181. [PubMed: 23448153]
16. Zablotzka I, Grulich A, De Wit J, Prestage G. Casual sexual encounters among gay men: familiarity, trust and unprotected anal intercourse. *AIDS Behav.* 2011; 15(3):607–12. [PubMed: 20376696]
17. Matser A, Heijman T, Geskus R, de Vries H, Kretzschmar M, Speksnijder A, et al. Perceived HIV status is a key determinant of unprotected anal intercourse within partnerships of men who have sex with men in Amsterdam. *AIDS Behav.* 2014; 18(12):2442–56. [PubMed: 24920343]
18. Clark J, Salvatierra J, Segura E, Salazar X, Konda K, Perez-Brumer A, et al. Moderno love: sexual role-based identities and HIV/STI prevention among men who have sex with men in Lima, Peru. *AIDS Behav.* 2012; 17(4):1313–28. [PubMed: 22614747]
19. Clark JL, Segura ER, Perez-Brumer AG, Reisner SL, Peinado J, Salvatierra HJ, et al. Potential impact and acceptability of internet partner notification for men who have sex with men and transgender women recently diagnosed as having sexually transmitted disease in Lima, Peru. *Sex Transm Dis.* 2014; 41(1):43–5. [PubMed: 24326581]
20. Hanley JA, Negassa A, Edwardes MDd, Forrester JE. Statistical analysis of correlated data using generalized estimating equations: an orientation. *Am J Epidemiol.* 2003; 157(4):364–75. [PubMed: 12578807]
21. Barros AJD, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. *BMC Med Res Methodol.* 2003; 3(1):21. [PubMed: 14567763]
22. Verre M, Peinado J, Segura E, Clark J, Gonzales P, Benites C, et al. Socialization patterns and their associations with unprotected anal intercourse, HIV, and syphilis among high-risk men who have

- sex with men and transgender women in Peru. *AIDS Behav.* 2014; 18(10):2030–39. [PubMed: 24788782]
23. Fernández-Dávila P, Salazar X, Cáceres CF, Maiorana A, Kegeles S, Coates TJ, et al. Compensated sex and sexual risk: sexual, social and economic interactions between homosexually- and heterosexually-identified men of low income in two cities of Peru. *Sexualities.* 2008; 11(3):352–74. [PubMed: 19890491]
  24. Ugarte Guevara WJ, Valladares Cardoza E, Essén B. Sexuality and risk behavior among men who have sex with men in León, Nicaragua: a mixed methods approach. *J Sex Med.* 2012; 9(6):1634–48. [PubMed: 22489636]
  25. Aguila, EVd. ‘God forgives the sin but not the scandal’: coming out in a transnational context – between sexual freedom and cultural isolation. *Sexualities.* 2012; 15(2):207–24.
  26. Clark JL, Perez-Brumer A, Salazar X. “Manejar la situacion”: partner notification, partner management, and conceptual frameworks for HIV/STI control among MSM in Peru. *AIDS Behav.* 2015:1–10. [PubMed: 24668254]

**Table 1**

Participant- and partnership-level characteristics of MSM and TW recently diagnosed with HIV and/or STI; Lima, Peru, 2011.

	No.	%
<b>Respondent characteristics (n = 372)<sup>a</sup></b>		
Education		
Less than high school	84	22.6
Completed high school	133	35.9
Higher education <sup>b</sup>	154	41.5
Sexual orientation/gender identity		
Heterosexual	12	3.3
Bisexual	57	15.6
Homosexual	243	66.6
Transgender	53	14.5
Sexual role		
Activo (insertive)	52	14.1
Pasivo (receptive)	140	37.9
Moderno (versatile)	177	48.0
<b>Partnership characteristics (n = 993)<sup>c</sup></b>		
Partner sexual orientation/gender identity		
Heterosexual	124	13.7
Bisexual	372	41.0
Homosexual	386	42.6
Transgender	24	2.7
Partner sexual role		
Activo (insertive)	500	52.2
Pasivo (receptive)	148	15.5
Moderno (versatile)	310	32.4
Partnership type		
Stable	298	31.3
Casual	524	55.0
Commercial	131	13.7

<sup>a</sup>Some variables do not total 372 due to missing data

<sup>b</sup>Received some post-secondary education (e.g., university or technical school)

<sup>c</sup>Some variables do not total 993 due to missing data

**Table 2**

Participant- and partnership-level characteristics associated with perception of sexual partner as the source of transmitted infection among MSM and TW recently diagnosed with HIV and/or STI; Lima, Peru, 2011.

Characteristics	Partner perceived as source of infection (n=258) n (%)	Partner not perceived as source of infection (n=735) n (%)	<sup>a</sup> P
Age (years) mean; sd	30.8 ; 0.8	30.3 ; 0.5	0.55
Education			
Less than high school	47 (20.4)	184 (79.6)	0.11
Completed high school	86 (25.4)	253 (74.6)	
Higher education <sup>b</sup>	125 (29.8)	295 (70.2)	
Respondent sexual orientation/gender identity			
Heterosexual	13 (68.4)	6 (31.6)	<0.05
Bisexual	44 (31.7)	95 (68.3)	
Homosexual	170 (25.6)	495 (74.4)	
Transgender	26 (17.1)	126 (82.9)	
Respondent sexual role during intercourse			
Activo (insertive)	48 (41.0)	69 (59.0)	<0.05
Pasivo (receptive)	91 (23.1)	303 (76.9)	
Moderno (versatile)	117 (24.5)	360 (75.5)	
STI diagnosis			
Any non-HIV STI	135 (26.6)	373 (73.4)	0.23
HIV	47 (20.8)	179 (79.2)	
HIV plus any other STI	76 (29.3)	183 (70.7)	
Partner sexual orientation/gender identity			
Heterosexual	18 (14.5)	106 (85.5)	<0.05
Bisexual	82 (22.0)	290 (78.0)	
Homosexual	126 (32.6)	260 (67.4)	
Transgender	13 (54.2)	11 (45.8)	
Partner sexual role			
Activo (insertive)	116 (23.2)	384 (76.8)	0.08
Pasivo (receptive)	50 (33.8)	98 (66.2)	
Moderno (versatile)	88 (28.4)	222 (71.6)	
Partnership type			
Stable	98 (32.9)	200 (67.1)	<0.05
Casual	136 (26.0)	388 (74.0)	
Commercial	18 (13.7)	113 (86.3)	
Unprotected anal intercourse			
Yes	137 (40.9)	198 (59.1)	<0.05
No	75 (15.7)	403 (84.3)	

<sup>a</sup>Cluster-adjusted chi-square analysis

<sup>b</sup>Received some post-secondary education (e.g., university or technical school)

**Table 3**

Participant- and partner-level characteristics associated with perception of the partner as a likely HIV/STI source among recently diagnosed MSM/TW; Lima, Peru, 2011.

Characteristics	Crude Prevalence Ratio (n = 993)	95% CI	P	Adjusted Prevalence Ratio <sup>a</sup> (n = 743)	95% CI	P
Age (years)	1.00	0.99-1.02	0.64	1.00	0.99-1.02	0.91
Education						
Less than high school	Ref	-	-	Ref	-	-
Completed high school	1.25	0.85-1.83	0.26	0.88	0.60-1.30	0.53
Higher education <sup>b</sup>	1.42	0.98-2.05	0.06	1.00	0.69-1.44	0.99
Respondent sexual orientation/gender identity						
Heterosexual	Ref	-	-	Ref	-	-
Bisexual	0.51	0.32-0.81	<b>&lt;0.05</b>	0.52	0.30-0.90	<b>&lt;0.05</b>
Homosexual	0.40	0.27-0.59	<b>&lt;0.05</b>	0.47	0.31-0.73	<b>&lt;0.05</b>
Transgender	0.26	0.15-0.46	<b>&lt;0.05</b>	0.37	0.19-0.70	<b>&lt;0.05</b>
STI diagnosis						
Any non-HIV STI	Ref	-	-	Ref	-	-
HIV	0.80	0.56-1.13	0.20	0.82	0.56-1.21	0.32
HIV plus any other STI	1.06	0.78-1.46	0.70	0.95	0.69-1.30	0.75
Partner sexual orientation/gender identity						
Heterosexual	Ref	-	-	Ref	-	-
Bisexual	1.53	0.94-2.50	0.08	1.49	0.85-2.61	0.16
Homosexual	2.33	1.46-3.70	<b>&lt;0.05</b>	2.07	1.19-3.61	<b>&lt;0.05</b>
Transgender	3.71	2.02-6.80	<b>&lt;0.05</b>	2.84	1.48-5.44	<b>&lt;0.05</b>
Partnership type						
Stable	Ref	-	-	Ref	-	-
Casual	0.83	0.64-1.07	0.16	1.05	0.77-1.42	0.77
Commercial	0.43	0.26-0.70	<b>&lt;0.05</b>	0.71	0.44-1.16	0.17
Unprotected anal intercourse	2.93	2.17-3.97	<b>&lt;0.05</b>	3.2	2.28-4.46	<b>&lt;0.05</b>

Note: Bold indicates statistical significance

<sup>a</sup>Adjusted for all variables included in table

<sup>b</sup>Received some post-secondary education (e.g., University or technical school)