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## Social networks and condomless intercourse with female partners among male sex workers in the Dominican Republic

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### Abstract

Male sex workers (MSW) in the Dominican Republic (DR) have multiple sexual partners, including personal and client-relationships, and are disproportionately affected by human immunodeficiency virus (HIV). We examined the prevalence of condomless anal and/or vaginal intercourse (CI) among MSW in the DR as a function of social network factors. Self-report surveys and social network interviews were administered to MSW recruited through venue-based sampling (N = 220). A generalized linear model was used to complete a Poisson Regression model and identify variables significantly associated with the outcome of interest. CI was more common with female (28.3%) than with male partners (4.9%). Factors associated with CI with the last female partner included older age of MSW, CI with the last male partner, having a stable female partner (a consistent or main partner), and having 1 family member in the participants' social network. Partner and social network characteristics associated with CI among MSW suggest the utility of dyadic and network interventions to reduce HIV risk.

### Keywords

Social networks; male sex worker; Dominican Republic; HIV; condom use

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## Introduction

Men who have sex with men (MSM) and sex workers in the Dominican Republic (DR) are disproportionately affected by human immunodeficiency virus (HIV). According to UNAIDS, HIV prevalence in the DR is 0.9% in the general population, 3.7% in sex workers, and 7.1% in MSM.<sup>1</sup> Sex work is central to the HIV epidemic in the DR as many cities are destinations for sex tourism. Indigent men in the DR often relocate to tourist destinations for work, sometimes participating in sex work due to easy entry and money-making potential.<sup>2-4</sup> These male sex workers (MSW) often meet partners in tourist venues where significant alcohol and drug use commonly contribute to HIV risk.<sup>2,3,5</sup> Many epidemiologic studies group MSW with MSM or with female sex workers (FSW), making it difficult to differentiate the HIV risk dynamics specific to MSW and their association with sex work, social norms, and societal stigma.<sup>6</sup>

Many HIV risk-mitigating interventions target heterosexual- or homosexual-identified individuals, neglecting the social context and condom use patterns of behaviorally bisexual men, or men who have sex with both men and women.<sup>7</sup> Condoms are the primary strategy to protect MSW and their partners against HIV *and* sexually transmitted infections (STI) in the DR, as pre-exposure prophylaxis (PrEP) is not widely available through the public health system, with limited data on PrEP usage in-country.<sup>1,8</sup> Sex work in the DR is unregulated and HIV/STI testing is not required.<sup>9</sup> While clients of MSW in the DR are predominantly male, most of these MSW have both males and females in their sexual networks.<sup>2,10,11</sup> A qualitative study by Padilla et al. found that CI by MSW in the DR is more frequent with female partners,<sup>10</sup> as condomless intercourse (CI) with men is considered 'risky', and the importance of condom use with female partners is minimized in comparison.<sup>7,10</sup> Understanding different condom use patterns across different sexual partnership types of MSW is therefore important to shaping public health interventions to promote sexual health and well-being among MSWs and their partners.

Social network structures impact condom use among MSW by transmitting perceptions of behaviors that place MSW at risk for HIV and cultural norms of trust and masculinity.<sup>12</sup> Social support can decrease risky behavior by encouraging health seeking behaviors.<sup>13</sup> Social network structure and lack of social support can also increase HIV risk through transmission of norms of masculinity and fidelity, impacting condom use among MSW with both male and female partners.<sup>12</sup> However, limited research examines the relationship between social network factors and condom use by MSW, especially in the context of female sexual partners.<sup>6,14</sup> Because HIV risk and condom use decision-making is influenced by social context; studying how social networks influence risk behavior can help shape interventions that leverage networks to promote healthy sexual practices.<sup>15-17</sup> We aimed to understand the individual and social network factors associated with CI among MSW in the DR with both male and female partners to inform future sexual health programs tailored to MSW in the DR.

## Methods

### Participants and procedures

We used secondary data from a cross-sectional study that examined the relationship between social networks, technology use, and HIV risk among MSW in the DR. Detailed methods from the parent study are described elsewhere.<sup>5</sup> Briefly, staff and researchers from the Instituto de Sexualidad Humana at the Universidad Autónoma de Santo Domingo (UASD) utilized venue-based sampling to recruit participants from the capital city (Santo Domingo) and another popular tourist destination (Boca Chica) in the DR from June to August 2015. Recruiters visited bars, clubs, and beaches known to be centers of tourism and male sex work activity. Participants were eligible to participate if they identified as male, were at least 18 years of age, able to speak Spanish, a resident of either Santo Domingo or Boca Chica, and reported transactional oral or anal sex with a male partner in the past six months (i.e. reported receiving goods or money in exchange for sex). Of the 233 men recruited, 228 were screened, 222 were eligible, and 220 consented to participate. Participants received \$RD 500 (~\$USD 10) for involvement in the study. Institutional Review Boards of the University of California, Los Angeles (UCLA Institutional Review Board#14-000997) and the Comité de Éticas at the Universidad Autónoma de Santo Domingo approved the parent study.

### Measures

The primary outcomes were CI during the last sexual encounter with a female partner and CI during the last sexual encounter with a male partner, including vaginal and/or anal intercourse. Trained data collectors used paper surveys to gather demographic information (age, sexual orientation, partnership status). Additional data regarding sexual habits (number of partners, partner type), substance use during sexual encounters, and HIV and STI testing were also collected. Biologic testing for HIV status was also utilized.

A social network interview assessed participants' social network structure and composition. Participants named up to ten alters (social network members), with whom they interacted with most in the past three months, of whom at least five had to be sexual partners. Network density was calculated by dividing the total number of alters who knew each other by the total number of potential connections. Network density is a well-established measure of social cohesion.<sup>18</sup> Alters were also categorized in different types, such as non-sexual partner, client, non-client sexual partner. Characteristics of alters in the network were used to evaluate demographic composition of networks, relationship types, perceptions of alters' behaviors, and social support. We operationalized each element of social support through a specific question, i.e. whether each alter provided help/advice as a tool to measure emotional support, whether the participant could talk to the alter about condoms and safe sex to measure informational support, and whether the alter could provide financial assistance to measure instrumental support.

Social network composition was measured through dichotomous descriptors and proportions of different relationship types. Most social network variables that asked whether the participant engaged in a specific activity with a given alter were converted to dichotomous variables to measure whether participants engaged in that activity with *any* members of

their network (e.g. if the participant used drugs with at least one person in their network). Dichotomization captures social influence by noting whether the presence of an alter who engages in a specific behavior affects a corresponding behavior by the participant.<sup>19</sup> To characterize the diversity of the network regarding specific compositional variables, proportions were calculated by adding the number of alters linked to the subject by a similar relationship-type (i.e. client) and dividing that by the total number of alters in the network.<sup>19</sup>

## Analyses

Bivariate tests identified variables associated with CI with the last female partner; the prevalence of CI with last male partner was low in this population. Variables with a P-value of <0.05 in bivariate analysis were included in the multivariable model alongside conceptually relevant age and social network density variables. A generalized linear model with robust standard errors was used to calculate Poisson regression estimates of crude and adjusted prevalence ratios (aPR) as the main outcome for the cross-sectional analysis.<sup>20–22</sup> Both individual and social network characteristics were included in the multivariable regression model. Analyses were performed in a case-wise format to deal with missing variables, so only participants with complete data for our chosen variables were included in the analysis. All analyses were performed using Stata 14.0 (StataCorp LLC, College Station, TX).

## Results

### Descriptive statistics

Characteristics of participants and their social networks are reported in Table 1. Most participants (80.0%) identified as bisexual, with almost all identifying as *activo* (insertive during anal intercourse). For half of participants, sex work was their primary source of income. Ten participants (5.0%) were living with HIV (by rapid-test or self-report), 158 participants (72.2%) had ever had an HIV test, and 45 (29.2%) had been tested within the last three months.

Half of the sample reported having a stable partner, with 74.5% of this subset partnering with female partners, 14.5% with male partners, and 10.9% with both male and female stable partners. Of participants with a stable partner, 29.4% lived with their female partner and 1.8% lived with their male partner. The average numbers of male and female sexual partners in the last six months were 10.1 (SD 12.0) and 9.4 (SD 20.3), respectively.

The prevalence of CI with the last male partner was 4.9% and 28.3% with the last female partner. Separately, one-quarter (24.4%) reported CI with *only* the last female partner; 1% reported CI with *only* their last male partner; and 3.6% reported CI with both their last male and female partner. Of HIV-positive participants, 40.0% (N=4/10) reported CI with their last partner (regardless of partner sex), while 28.4% (54/190) of the HIV-negative participants reported CI with their last partner.

### Social network characteristics

The average size of participants' social networks was 9.4 (SD 1.2) people, while the average network density was 0.3 (SD 0.3). Regarding network composition, 57.6% of participants' social networks were sexual partners, with 32.4% non-client sexual partners and 25.2% commercial sex work clients. The remainder of network members was classified as friends, family, or 'other' relations. For emotional support, 92.2% had someone with whom they spoke to when they needed help. For informational support, 88.4% of participants had someone with whom they could talk to about condoms and safe sex. For instrumental support, 95.8% of participants had someone in their network whom they could ask for money. Over one-third (34.1%) had a religious counselor in their network and 36.1% of participants had at least one social worker, doctor, or employee of a community-based organization in their social network.

Regarding HIV risk behavior, 85.6% had at least one person in their network with whom they drank alcohol to the point of drunkenness and 40.3% had at least one partner in their network with whom they did not use condoms at last intercourse. At the same time, over half the sample (58.1%) had someone in their network with whom they had spoken about where to get HIV or STI testing.

### Bivariate and multivariate analyses

Due to the small percentage of the sample who had CI with their last male partner, we were unable to reliably calculate bivariate associations for this outcome. Table 2 displays the prevalence ratios (PR) from the crude analysis for variables correlated with CI with last female partner. In the bivariate analysis, having a stable female partner (PR: 2.43 [95% confidence interval – CI: 1.49–3.96]), engaging in CI with the last male partner (PR: 3.04 [95% CI: 1.98–4.67]), and having at least one family member in the social network (PR: 2.14 [95% CI: 1.23–3.72]) were positively associated with CI with the last female partner. Conversely, drinking alcohol before a sexual encounter with a female partner was associated with a lower probability of CI (PR: 0.47 [95% CI: 0.28–0.78]).

Table 2 also shows aPR from the multivariable regression analysis with CI with the last female partner as the outcome. In adjusted models, MSW who reported CI with their last male partner (aPR: 2.85 [95% CI: 1.74–4.67]), had a female stable partner (aPR: 2.07 [95% CI: 1.26–3.41]), reported 1 family member in their social network (aPR: 1.95 [95% CI: 1.17–4.67]), and were older (aPR: 1.02 [95% CI: 1.00–1.04]) had a greater probability of engaging in CI with their last female partner. The association between drinking alcohol with female partners and decreased CI was not significant in the multivariate analysis.

### Discussion

This work adds to a growing body of literature focused on MSW in Latin America and the Caribbean<sup>23</sup> and is among the first to contextualize condom use among MSW in the DR through social network factors. We found that CI with the last male partner, having a stable female partner, having a family member in the social network, and older age were associated with CI with last female partner. Few studies explore the HIV risk behaviors of MSW

with female partners outside of Southern and Eastern Africa, where HIV disproportionately affects women.<sup>6,24</sup> Previous research has characterized CI with last male partner to be around 14% in this context, and though the frequency of CI with male partners in our sample is low, this research contributes to our understanding of how social network variables influence HIV risk in MSW.<sup>3</sup>

We found that MSW with a stable female partner (defined as a consistent or main partner) were more likely to have had CI in their last sexual encounter with a female. A 2008 qualitative study of behaviorally bisexual MSW in the DR showed that most MSW described women as desired partners, while sexual relations with men were considered occupational.<sup>10</sup> Norms of masculinity discourage MSW from disclosing bisexual activity to female partners, increasing HIV/STI risk for both MSW and their female partners.<sup>10,25</sup> To compensate, these men adhere to hyper-masculine roles in their personal lives through public relationships and CI with female partners to convey trust.<sup>2,7,10,25,26</sup> While the majority of MSW in our sample were in stable partnerships with women, the main outcome of 'CI with the last female partner' may include casual female partners. Our work highlights the need for additional research to understand how cultural norms of masculinity and sexuality are transmitted in networks of MSW and how the stigmas can affect HIV risk behavior.

Further, we found that CI with the last male partner was associated with greater CI with last female sexual partner. Previously reported reasons for CI among behaviorally bisexual men include concomitant substance use and limited condom access.<sup>7</sup> Further, behaviorally bisexual men face diverse forms of stigma, prompting secrecy, increasing CI and HIV risk-taking behavior.<sup>27,28</sup> Although only 3.6% of our sample reported CI with *both* their last male and female partners, these participants importantly face HIV/STI transmission risks *to* and *from* both types of partners. Findings suggest the need to understand diversity of sexual networks in order to tailor interventions for behaviorally bisexual men.

HIV-positive participants more frequently reported CI with their last male *or* female partner, compared to HIV-negative participants. While we did not collect information on partner serostatus or viral suppression, the number of sexual partners within HIV-positive men's networks was high (9.3 partners on average). This could indicate men living with HIV ceasing condom use after diagnosis. A recent push for undetectable viral load as a cornerstone of transmission (undetectable = untransmissible) emphasizes the importance of documenting viral load for MSW with HIV.<sup>29</sup> According to UNAIDS, 56% of people living with HIV (PLWH) in the DR are on ART, and only 37% currently have an undetectable viral load.<sup>30</sup> Thus, the majority of the population remains dependent on condoms for HIV prevention in the DR. However, MSW may still have limited access to condoms, as condom distribution is largely toward MSM or FSW.<sup>2,11,27</sup> These barriers to condom use have strong implications for public health, as interventions and future research could be tailored to understanding condom use in this population and increasing condom availability, especially for the MSW at highest risk.

In our analysis of social network variables, participants with at least one family member in their social network were more likely to have had CI with their last female partner. In one study of men with primary female partners and multiple male sexual partners, the authors



found that pressure to maintain secrecy often came from fear of family members' negative perceptions of same-sex activity.<sup>26,31</sup> MSW with family members in their social networks may have a heightened perception of homophobic stigma, encouraging CI with primary female partners to avoid suspicion of same-sex sexual behavior.<sup>12</sup> Further research regarding family influence on condom use of MSW in the DR is warranted.

Older age was statistically significantly correlated with increased prevalence of CI with the last female partner; specifically, each additional year of age was associated with a 2% increase in CI. This contradicts prior research that correlates younger age with elevated HIV risk conditions such as misinformation about sex and substance abuse in the DR.<sup>32</sup> Despite these risks for younger people, the prevalence of HIV risk among MSW is high and may not conform to the same age-related risk patterns as the general DR population. For example, MSW are consistently exposed to substance use and difficult economic conditions,<sup>33</sup> which may accumulate over time.

This study has several limitations. The small sample size and cross-sectional data prevent us from establishing causal inference. It is unclear if specific social network structures influence condom use, or if MSW who engage in CI affiliate more with social networks where CI is common. The variables to measure social support were adapted from a larger survey, so the measures may not be comprehensive. Finally, as MSW can be a difficult-to-reach population, selection bias may have influenced our results and those most stigmatized may not have been represented in this study. We recruited from specific venues that are known MSW-client meeting spots. Thus, we could potentially be missing MSW who already have long-standing relationships with clients, potentially implying lower condom-usage due to heightened trust.<sup>3</sup> Similarly, although interviewers were trained to maintain a neutral stance, social desirability bias may have affected participants' self-report of stigmatized behaviors.

Despite these limitations, we highlight correlations between social network characteristics and condom use with female partners among MSW in the DR. We used local partners to develop our survey and methodology, maximizing our ability to engage this difficult-to-reach population. The analysis highlights some social network factors that can impact condom use among MSW. Situating our research within a larger body of work on cultural norms and expectations about masculinity in MSW in the DR helps to explain some of our findings.<sup>26,34</sup>

## Conclusions

MSW in the DR face elevated risk for STI and HIV acquisition.<sup>3</sup> Condom use among this population, which is impacted by social and structural factors, is a natural intervention target, especially in the absence of PrEP for HIV prevention. We found that MSW in the DR report less condom use with female sex partners in comparison to male partners. The prevalence of CI in this population was correlated with social network composition, but not social support factors. Social network analysis can help us understand how immediate social context influences decision-making about CI. Future interventions should target sociocultural stigma on same-sex sexual behavior and commercial sex work through



network influences. Additional research is needed to delineate the mechanisms of influence of family and friends on sexual behaviors of MSW in the DR.

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**Table 1.**

Participant characteristics associated with condomless intercourse (CI) with last female partner among MSW in the DR (n = 220).<sup>a</sup>

	Full sample description (n = 220) Total (n = 220)	CI with last female partner, n (%) or mean (SD) (n = 205) <sup>a</sup>	
		Yes (n = 58)	No (n = 147)
Age	27.5 (8.1)	28.0 (8.5)	26.8 (7.8)
Sexual orientation			
Heterosexual	26 (11.8)	8 (13.8)	18 (12.2)
Bisexual	176 (80.0)	49 (84.5)	124 (84.4)
Gay	16 (7.3)	0	5 (3.4)
Other	2 (0.9)	1 (1.7)	0
Sexual role identification			
Activo	6(2.7)	1 (1.7)	4(2.7)
Pasivo	189 (86.3)	49 (84.5)	138 (94.5)
Both	17(7.8)	5 (8.6)	3 (2.1)
Otro	7 (3.2)	3 (5.2)	1 (0.7)
Sex work primary source of income			
Yes	110 (50.0)	32 (55.2)	74 (50.3)
No	110 (50.0)	26 (44.8)	73 (49.7)
Sexual relations			
Stable partner status			
No Stable Partner	110 (50.0)	18 (31.0)	82 (55.8)
Both man and woman	12 (5.5)	4 (6.9)	8 (5.4)
Woman	82 (37.3)	35 (60.3)	45 (30.6)
Man	16 (7.3)	1 (1.7)	12 (8.2)
Number of male partners in last 6 months	10.1 (12.0)	11.2 (13.0)	10.0 (11.3)
Number of female partners in last 6 months	9.4 (20.3)	12.0 (32.2)	9.2 (14.0)
Risky sex behaviors			
Last female or male partner used any drugs before or during sex	51 (23.2)	14 (24.1)	35 (23.8)
Last female or male partner drank alcohol before or during sex	43 (21.0)	41 (70.1)	114 (77.6)
Drank alcohol before or during sex in last sexual encounter with male	50 (22.7)	38 (65.5)	98 (66.7)
Drank alcohol before or during sex in last sexual encounter with female	161 (73.2)	14 (24.1)	64 (43.8)
Used drugs before or during sex in last sexual encounter with male	141 (64.1)	14 (24.1)	37 (25.2)
Used drugs before or during sex in last sexual encounter with female	78 (38.2)	10 (17.2)	33 (22.5)
CI with last male partner	10 (4.9)	7 (13.0)	2(1.4)
CI with last female partner	58 (28.3)		
Social network			

	Full sample description (n = 220) Total (n = 220)	CI with last female partner, n (%) or mean (SD) (n = 205) <sup>a</sup>	
		Yes (n = 58)	No (n = 147)
Size	9.4 (1.2)	9.7 (0.8)	9.4 (1.2)
Overall network density	0.3 (0.3)	0.3 (0.3)	0.3 (0.4)
Social cohesion (non-sexual network density)	0.6 (0.4)	0.5 (0.4)	0.6 (0.5)
Average alter age	30.2 (6.6)	30.8 (5.8)	29.4 (6.8)
Network composition			
Proportion of social network made of sexual partners	0.57 (0.13)	0.52 (0.12)	0.53 (0.13)
Proportion of social network made of clients	0.25 (0.19)	0.25 (0.17)	0.26 (0.19)
Proportion of social network made of non-client sex partners	0.32 (0.20)	0.31 (0.19)	0.33 (0.21)
At least one person in social network is family	135 (61.2)	44 (77.2)	81 (55.1)
At least one person in social network is friend	179 (82.1)	43 (75.4)	123 (83.7)
At least one person in social network is a religious or spiritual advisor	78 (36.1)	22 (38.6)	49 (33.8)
Supportive behaviors			
Has at least one person to talk to about condoms or safe sex	190 (88.4)	47 (83.9)	129 (89.0)
Has at least one person for help/advice	199 (92.1)	54 (94.7)	131 (90.3)
Has at least one person who can give participant RD\$ 500 if needed	207 (95.8)	55 (96.5)	138 (95.2)
Risky behaviors			
Has at least one person in network who has gotten drunk in last month	192 (88.9)	52 (91.2)	130 (89.7)
Has at least one person with whom participant has gotten drunk	180 (83.3)	50 (87.7)	125 (86.2)

<sup>a</sup>Only participants who reported the primary outcome were included. Similarly, for each variable, only participants who reported the outcome and their answer to that variable were included.

**Table 2.**

Bivariate and multivariate associations between characteristics and condomless intercourse (CI) with last female partner among MSW in the DR (n = 189).<sup>a</sup>

	CI with last female partner			
	PR	aPR	95% CI	p-values
Did not use condom with last male partner	<b>3.04</b> <sup>b</sup>	<b>2.85</b> <sup>b</sup>	<b>1.74–4.67</b>	<0.01
Stable partner				
Woman	<b>2.43</b> <sup>b</sup>	<b>2.07</b> <sup>b</sup>	<b>1.26–3.41</b>	<0.01
Both	1.85	2.24	0.90–5.54	0.08
Man	0.43	0.39	0.08–1.91	0.25
At least one person in social network is family	<b>2.14</b> <sup>b</sup>	<b>1.95</b> <sup>b</sup>	<b>1.17–4.67</b>	0.01
Age	1.01	<b>1.02</b> <sup>b</sup>	<b>1.00–1.04</b>	0.04
Network density	0.65	0.65	0.33–1.3	0.23
Drank alcohol 2 h before or during sex in last sexual encounter with female	<b>0.47</b> <sup>b</sup>	0.60	0.35–1.02	0.05

<sup>a</sup>Only participants who provided answers for the primary outcome and all the variables of interest were included in the multivariate analysis.

<sup>b</sup>P-value < 0.05.