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The Relationship Between Social Support, HIV Serostatus, and Perceived Likelihood of Being HIV Positive Among Self-Settled Female, Foreign Migrants in Cape Town, South Africa

Margaret Giorgio[1], **Loraine Townsend**[2], **Yanga Zembe**[2], **Mireille Cheyip**[3], **Sally Guttmacher**[1], **Farzana Kapadia**[1], and **Cathy Mathews**[2,4]

[1]College of Global Public Health, New York University, 411 Lafayette Street, 5th Floor, New York, NY 10003, USA

[2]Health Systems Research Unit, South African Medical Research Council, Cape Town, South Africa

[3]Centers for Disease Control and Prevention, Pretoria, South Africa

[4]School of Public Health and Family Medicine, University of Cape Town, Cape Town, South Africa

Abstract

Female cross-border migrants experience elevated risks for HIV, and migrants in South Africa may face additional risks due to the country's underlying HIV prevalence. These risks may be mitigated by the receipt of social support. A behavioral risk-factor survey was administered using respondent-driven sampling. Multivariable regression models assessed the relationships between social support and two HIV outcomes: HIV serostatus and perceived HIV status. Low social support was not significantly associated with HIV status (aOR = 1.03, 95 % CI 0.43–2.46), but was significantly related to a perception of being HIV positive (aPR = 1.36, 95 % CI 1.04–1.78). Age, marital status, and education level were significantly associated with HIV serostatus. Illegal border-crossing, length of time in South Africa, anal sex, and transactional sex were significantly associated with aperception of being HIV positive. Future research should investigate how HIV risks and the receipt of social support change throughout the migration process.

Keywords

Migration; HIV; Social support; Gender

Background

Individuals who cross international borders during the migration process have been recognized as uniquely vulnerable to HIV/AIDS [1–3]. The relationship between HIV/AIDS

Correspondence to: Margaret Giorgio.

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and cross-border migration is particularly salient within South Africa, which has one of the highest HIV/AIDS prevalence rates in the world (17 %) [4], while also hosting a large population of cross-border migrants (estimated 1.6–2 million) [5]. Across contexts, female cross-border migrants experience a different HIV risk profile as compared to their male counterparts [6–11]. Within South Africa, a number of studies have revealed elevated HIV/AIDS rates among internal female migrants compared to men [12, 13]. However, less in know about gendered differences in HIV prevalence and related risks among cross-border migrants in the country. While there are no published studies documenting HIV prevalence among male cross-border migrants in South Africa, HIV prevalence was reported as 8 % among female cross-border migrants in Cape Town, although estimates ranged widely by country of origin [14]. Female cross-border migrants have been shown to be at an elevated risk for sexual violence while traveling to and after settling in South Africa [15, 16], and limited employment opportunities have resulted in transactional sex becoming a main survival tool after women arrive in South Africa [17, 18].

Cross-border migrants in varying contexts have an increased need for social support, as individuals experience high rates of psychological distress [19–21], as well as difficulties accessing social services in host countries [22]. However, traditional mechanisms for the receipt of support are often disrupted as individuals move from an established community to a foreign country [18, 23, 24]. This increased need coupled with difficulties accessing support underscores the importance of understanding the relationship between social support and HIV risk among cross-border migrants.

Recent work has identified social support as a main determinant of HIV risk among cross-border migrants [25–37]. However, the majority of these studies use proxies for social support, such as social isolation [25–29], weak social networks [30–32, 37], separation from family/loneliness [30, 33, 34], or contact with friends or family back home [35, 36]. While these measures are conceptually related to perceived social support, they represent distinct processes [38, 39]. Other work has attempted to measure social support through validated scales among cross-border migrants, finding that lower perceived social support are associated with increased risk for intimate partner violence [40], depression [41], and PTSD [42]. While studies have shown that lower social support scale scores were associated unprotected sex and injecting drug use among male cross-border migrants [43, 44], little is known about the relationship between social support and HIV risk among cross-border migrant women. Further, no studies have investigated perceived social support's relationship with HIV serostatus in this population.

This paper contributes to the current body of literature by providing empirical data that measures the relationship between perceived social support, quantified through a validated social support scale, and HIV-risk among a large sample of cross-border female migrants in Cape Town, South Africa. This study hypothesizes that lower levels of perceived social support are associated with increased risk for HIV, which we measure through two outcomes: HIV seroprevalence and perceived likelihood of being HIV positive. While HIV seroprevalence reflects the current state of the HIV epidemic in a population, we investigate perceived likelihood of HIV positivity as it is a proxy for identifying individuals who are more at risk for future HIV infections; previous studies have found that perceived HIV-

positive status was associated with increased engagement in risky sexual behaviors [45, 46]. Further, other measures of risk, such as self-reported behaviors, are subject to underreporting, whereas perceptions of disease status are less sensitive to this bias [47].

Methods

The methods for this study are described elsewhere [14]. Briefly, a cross-sectional study was conducted among cross-border migrant women in 2012. Participants were recruited using respondent-driven sampling (RDS), a form of chain-referral sampling that is capable of reaching members of hard-to-reach populations and allows investigators to obtain a broadly representative sample when a reliable sampling frame is lacking [48, 49]. RDS requires starting with a predetermined number of initial contacts (“seeds”) who meet the study’s eligibility criteria. After participation, seeds are given a specified number of coupons with which to recruit eligible individuals from their social network. This recruitment process continues until the required sample size is reached.

Eleven seeds were initially recruited. Each seed and participant was given four recruitment coupons. Eight of the 11 recruitment chains continued for more than 10 waves, and 1029 women returned to the study site with valid coupons. Eligibility criteria limited participation to women who were aged 16–39, born outside of South Africa, living in Cape Town, and able to speak one of eight study languages. All eligible women (n = 935, 91 %) provided written informed consent. Women were then asked to take a 125-item behavioural risk assessment survey. Consenting participants also provided a dried blood spot (DBS) for HIV/AIDS serotesting. For this analysis, the final sample size was 711, as 48 women (5 %) did not provide a DBS for HIV/AIDS testing and 176 (19 %) had missing data on key variables.

The independent variable for this analysis is perceived social support, which was assessed using the Medical Outcomes Study (MOS) Social Support scale [50]. Participants were asked if they received 19 types of support “none of the time”, “a little of the time”, “some of the time”, “most of the time”, or “all of the time” in the past 4 weeks [50]. Scores on the MOS scale range from 1 to 5, with higher scores indicating more support. The scale had a Cronbach’s alpha of 0.95. The social support variable was dichotomized into “low” (score < 3) versus “moderate-to-high” (score ≥ 3). A cut-off of 3 was used as this score indicates that, across the 19-items, the participant received social support a minimum of some of the time, on average. This cut-off has been used previously to define moderate-to-high support on the MOS scale [51–54].

Two measures of HIV status served as the dependent variables. HIV serostatus was measured through biological testing. Serum was eluted from dried blood samples and tested with a 4th generation HIV ELISA (Vironostika Uniform II plus 0). Initially reactive samples were re-tested with a 3rd generation (antibody only) HIV ELISA (SD Bioline). Samples reactive in both assays were reported as positive. Discordant samples were tested by Western blot (HIV 1/2 Biorad). The second dependent variable is perceived likelihood of being HIV positive, which was assessed on a four-point Likert scale by asking migrant women “how likely is it that you are HIV positive?” Responses were dichotomized into very/somewhat likely vs. very/somewhat unlikely.

This study investigated a number of potential confounders. Socio-demographic characteristics include age, education, marital status, and main source of income. To measure housing histories in South Africa, women were categorized as either always living in a private home, always living on the street/in a shelter, or having spent some time on the street/in a shelter. To assess push/full factors, women were asked to select their main reason for migrating from the following: in search of work or educational opportunities, to escape an unhappy home life, to avoid political persecution, or some other reason. After sensitivity analyses, political persecution and "other" were collapsed into one category. Illegal border-crossing was defined as entering South Africa outside legal entry points without proper documentation. Length of time in South Africa was assessed in terms of months and years since arriving. Sexual violence was defined as having been raped and/or forced to exchange sex during migration to South Africa. Several sexual risk behaviors were assessed, including having two or more sexual partners in the past 3 months, inconsistent condom use in the past 3 months, ever having anal sex, and transactional sex, which was defined as exchanging sex for money or other material goods with one's most recent sexual partner.

Estimates of population proportions and 95 % confidence intervals (CIs) were calculated using the Respondent-Driven Sampling Analysis Tool (RDSAT 7.1) (http://www.respondentdrivensampling.org). RDSAT was also used to generate individualized sample weights that took into account variations in participants' network sizes and homophily. The prevalence of HIV in this sample was approximately 8 %. Therefore, logistic regression was used to calculate unadjusted and adjusted odds ratios for HIV serostatus. For analyses examining perceived risk of HIV as the dependent variable, where approximately 35 % of women reported being very or somewhat likely to be HIV positive, Poisson regression with robust variance was used to estimate unadjusted and adjusted prevalence ratios, as this method is a more appropriate for estimating risk for common outcomes [55]. In all models, the dependent variable was weighted with RDS-generated individualized weights, and factors found to be significantly associated ($p < 0.05$) with the model's dependent variable in the unadjusted analysis were included in the adjusted models. Odds ratios, prevalence ratios, and corresponding p-values were calculated using Stata, version 12. This study received ethical approval from both the [name retracted] and locally from [name retracted]. See Appendix A for further discussion of the ethical considerations for this study.

Results

The sample HIV seroprevalence was 8.3 % (n = 59), and the RDS-weighted HIV seroprevalence was 7.1 % (95 % CI 4.8–10.4) (Table 1). Approximately one-third of women in the RDS-weighted analysis (34.7 %, 95 % CI 29.0–10.4) reported feeling it was "very" or "somewhat likely" that they were currently HIV positive, and 14.9 % (37 of 249) of these women tested HIV-positive through the study's biological DBS testing. The sample mean for the MOS Social Support Scale was 2.94. Slightly more than half of women were estimated as receiving low levels of social support (52.5 %, 95 % CI 48.9–60.6).

Women in the RDS-weighted analysis were most commonly between the ages of 21 and 30 (50.0, 95 % CI 44.9–54.7), had a high school education or less (80.0, 95 % CI 76.1–84.5),

were married (69.9, 95 % CI 64.9–76.3), and reported their main income source as their husband or other family member (68.8, 95 % CI 62.6–73.8). Only 31.8 % (95 % CI 26.9–38.2) had always lived in a private home in Cape Town. Women varied in their motivation for migrating, with 32.8 % (95 % CI 25.7–38.2) seeking better opportunities for work or education, 28.4 % (95 % CI 24.5–34.4) reporting an unhappy home life, and 38.7 % (95 % CI 33.8–44.8) escaping political persecution or another reason. Just over half (51.4, 95 % CI 44.1–55.8) of women entered South Africa illegally. Additionally, 13.1 % (95 % CI 10.4–18.7) reported experiencing sexual violence during the journey to South Africa. One-third (32.9, 95 % CI 27.4–39.0) of migrants had been in South Africa for 2 years or less. Approximately one-quarter of women reported having two or more sexual partners in the previous 3 months (23.4, 95 % CI 19.2–29.1), and 58.7 % (95 % CI 55.4–65.4) used condoms inconsistently during that time. Lifetime engagement in anal sex was 12.5 % (95 % CI 9.4–17.2), and over onethird of the study sample (39.9, 95 % CI 34.0–44.6) reported transactional sex with their most recent sexual partner.

Unadjusted and adjusted odds ratios (uORs and aORs) describing the relationship between social support and HIV serostatus are presented in Table 2. In the unadjusted analyses, social support was not significantly associated with HIV seropositivity (uOR = 1.26, 95 % CI 0.63–2.54). Statistically significant covariates in the bivariate analysis were age (31–39 vs. 16–20: $p = 0.041$), having a high school education or less ($p < 0.001$), being unmarried ($p = 0.008$), income source (self vs. no income: $p = 0.022$), living situation in South Africa (always lived on the street/in a shelter vs. always in a private home: $p = 0.016$), and push/pull factors (unhappy home life vs. work/education: $p = 0.049$; political persecution/other vs. work/education: $p = 0.038$).

After including these covariates in the multivariable logistic regression model, social support remained non-significant (aOR = 1.03, 95 % CI 0.43–2.46). Factors that remained significantly associated with HIV serostatus included being aged 31–39 (aOR = 10.86, 95 % CI 1.56–75.54), having a high school education or less (aOR = 6.76, 95 % CI 2.39–19.09), being unmarried (aOR = 2.79, 95 % CI 1.34–5.82), and reporting an unhappy home life as the main reason for migrating (aOR = 0.35, 95 % CI 0.14–0.83).

Unadjusted and adjusted prevalence ratios (uPRs and aPRs) for the relationship between social support and perceived likelihood of being HIV positive are presented in Table 3. In the unadjusted analysis, low social support was significantly associated with a perceived likelihood of being HIV positive (uPR = 1.58, 95 % CI 1.17–2.12). Perceived likelihood of being HIV positive was significantly associated with living situation in South Africa (some time on street/in a shelter: $p = 0.021$, always on street/in a shelter: $p = 0.038$), illegal border crossing ($p < 0.001$), sexual violence during the journey to South Africa ($p = 0.005$), living in South Africa for 2 years or less ($p = 0.008$), reporting 2 or more partners in the past 3 months ($p = 0.021$), ever having anal sex ($p < 0.001$), and recent transactional sex ($p < 0.001$) in the unadjusted analysis.

In the adjusted model, social support remained significantly associated with perceived HIV status; women with low social support scores were 1.36 times more likely to perceive themselves to be HIV positive than for women who received moderate-to-high scores (aPR

= 1.36, 95 % CI 1.04–1.78). Other factors that remained significantly associated with perceived HIV positivity were illegal entry into South Africa (aPR = 1.51, 95 % CI 1.18–1.95), living in South Africa for 2 years or less (aPR = 1.31, 95 % CI 1.03–1.68), anal sex (aPR = 1.64, 95 % CI 1.26–2.14), and recent transactional sex (aPR = 1.36, 95 % CI 1.05–1.76).

Discussion

While this study hypothesized that social support acts as a protective factor against HIV acquisition, the results show that lower levels of perceived social support were not significantly associated with prevalent HIV in the study population. This non-finding may be an accurate reflection of the relationship between social support and HIV infection. However, it could also be a result of the cross-section nature of this study, which did not allow for the measurement of social support at the time of seroconversion. The MOS social support scale only measures the receipt of social support in the previous month, and it is reasonable to assume that women's experience of social support varies as they move through the migration process. At the same time, women may have contracted HIV long before participating in this study. Women fleeing conflict settings can be particularly vulnerable to HIV-infection in the pre-departure phase as sexual violence is often used as a tool of war [56]. Female migrants have also been shown to engage in riskier behaviors in the first years after arriving in a host country [57]. The unknown onset of HIV infection among the study population may explain why a measure of recent social support was not significantly associated with current HIV serostatus.

While HIV seroprevalence was relatively low, approximately one-third of women felt it was likely that they were HIV positive (Fifteen percent of this group tested positive for HIV). The results from this analysis link perceived likelihood of HIV positivity to a number of HIV-related risk behaviors, including anal sex and transactional sex. Therefore, perceived likelihood of HIV positivity may be a good proxy for identifying individuals at greater risk for future HIV infections. This study revealed that women with lower levels of recent social support were more likely to perceive themselves to be HIV positive. One possible explanation for this relationship is that sexual risk behaviors act as mediating factors. Some evidence exists to support this; studies have linked low levels of social support to increased sexual risk behaviors among cross-border migrants [43, 44]. Further, previous studies have found that individuals who engage in risky sexual behaviors are more likely to perceive themselves to be at risk for HIV infection [45, 46]. In this study, social support remained significantly associated with perceived HIV positive status even after controlling for sexual risk behaviors, indicating that these specific risk factors may only partially mediate the relationship between social support and risk perception.

Although steps were taken to increase self-report of sensitive behaviors [14], this study likely underestimated the prevalence of risk behaviors and sexual violence. Over 20 % of the sample was excluded due to missing data on at least one study covariate. Sensitivity analyses revealed that the prevalence of study covariates did not significantly vary by exclusion status, with the exception of number of partners; a smaller percentage of excluded participants reported 2+ partners in the past 3 months (17 % vs. 22 %, respectively).

However, these estimates are likely an underestimate of the true prevalence of multiple partners, so it is unlikely that the exclusion of these individuals adds undue bias into the results. Since RDS relies on recruitment through participants' social networks, it may have under-represented some subgroups of women with limited social connections. Nevertheless, the use of RDS allowed this study to access a largely hidden population, which would not have been possible using other sampling methods. As a result of this study's cross-section design, this analysis cannot investigate causal links between the study covariates and the two HIV dependent variables, only associations. Further, this study was unable to assess at what point in the migration process women contracted HIV, or whether reported risk factors occurred prior to HIV infection.

New Contribution to the Literature

The results of this study provide mixed evidence for the growing body of literature regarding the relationship between social support and HIV-risk; although this study did not find a relationship between social support and HIV status, social support was associated with a proxy for HIV risk and future infections. Researchers have begun to stress the importance of investigating risk behaviors and environments across the multiple phases of migration [58]. The results of this study underscore this importance; the non-significant relationship between social support and prevalent HIV may be a result of this study's inability to assess social support during different phases of the migration process. It may be that social support received during the specific points in the migration process when women are most vulnerable to HIV would indeed act as a protective factor against HIV acquisition. Future research that provides a more encompassing view of risk throughout the migration process is needed to better understand the complex relationships between social support and HIV-risk among cross-border female migrants. This study provides some evidence that increasing social support may be an appropriate HIV prevention strategy. Organizations providing services to cross-border migrant women in South Africa should consider offering interventions aimed at increasing social support, and future research should evaluate the effectiveness of these interventions in reducing HIV-related risks and incident HIV infections.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Sample and RDS estimated demographic characteristics, migration factors, sexual risk factors, and social support among female, foreign migrants in Cape Town, N = 711

	Crude % (N)	RDS-Adjusted %[a] (95 % CI for adjusted %)
HIV positive	8.3 (59)	7.1 (4.8–10.4)
Perceived likelihood of HIV positive		
Very/somewhat likely	35.0 (249)	34.7 (29.0–40.2)
Very/somewhat unlikely	65.0 (462)	65.3 (59.6–71.0)
MOS social support scale score (mean 2.9, range 1–5)		
Low	50.5 (359)	52.5 (48.9–60.6)
Moderate to high	49.5 (352)	47.5 (39.4–51.1)
Demographic characteristics		
Age (mean 28.3, range 16–39)		
16–20	12.0 (85)	18.4 (13.7–23.4)
21–30	49.7 (353)	50.0 (44.9–54.7)
31–39	38.4 (273)	31.6 (27.7–35.9)
Education		
High school or less	75.4 (536)	80.0 (76.1–84.5)
Post high school	24.6 (175)	20.0 (15.5–23.9)
Married	72.0 (512)	69.9 (64.9–76.3)
Income source		
No income	14.5 (103)	13.2 (9.4–17.1)
Husband/family member	66.8 (475)	68.8 (62.6–73.8)
Self	18.7 (133)	18.1 (14.0–23.5)
Housing history in South Africa		
Always in a private home	33.8 (240)	31.8 (26.9–38.2)
Some time in shelter/on the street	32.5 (231)	34.8 (27.8–38.6)
Always in a shelter/on the street	33.8 (240)	33.4 (29.2–39.9)
Migration factors		
Push/pull factors		
Work/education	27.3 (194)	32.8 (25.7–37.2)
Unhappy home life	26.6 (189)	28.4 (24.5–34.4)
Political persecution/other	46.1 (328)	38.7 (33.8–44.8)
Border crossing		
Illegal	46.4 (330)	48.6 (44.2–55.9)
Legal	53.6 (381)	51.4 (44.1–55.8)
Sexual violence during journey	12.9 (92)	13.1 (10.4–18.7)
Lived in South Africa for less than 2 years (range 1 month–16.5 years)	26.0 (185)	32.9 (27.4–39.0)
Sexual risk factors		
Two or more partners in past 3 months	22.1 (157)	23.4 (19.2–29.1)
Unprotected sex in past 3 months	59.4 (422)	58.7 (55.4–65.4)

	Crude % (N)	RDS-Adjusted %[a] (95 % CI for adjusted %)
Ever had anal sex	13.2 (94)	12.5 (9.4–17.2)
Recent transactional sex	35.4 (252)	39.9 (34.0–44.6)

[a]RDS estimates of underlying population prevalence calculated using RDSAT

Table 2

Unadjusted and adjusted odds ratios for the relationship between hiv serostatus and demographic, migration, and sexual risk factors (n = 711)

	Unadjusted ORs[a]	p-value	Adjusted ORs[a]	p-value
Low MOS social support scale score	1.26 (0.63–2.54)	0.513	1.03 (0.43–2.46)	0.942
Demographic characteristics				
Age				
16–20	ref		ref	
21–30	2.42 (0.53–10.10)	0.252	4.89 (0.77–30.97)	0.092
31–39	4.84 (1.07–22.01)	0.041	10.86 (1.56–75.54)	0.016
High school education or less	2.59 (1.60–4.18)	<0.001	6.76 (2.39–19.09)	<0.001
Unmarried	1.59 (1.13–2.23)	0.008	2.79 (1.34–5.82)	0.006
Income source				
No Income	ref		ref	
Husband/family member	0.94 (0.37–2.38)	0.899	0.85 (0.29–2.48)	0.766
Self	3.20 (1.19–8.65)	0.022	1.34 (0.47–3.83)	0.588
Housing history in South Africa				
Always in a private home	ref		ref	
Some time in shelter/on the street	1.40 (0.52–3.73)	0.504	1.48 (0.51–4.28)	0.466
Always in a shelter/on the street	2.78 (1.21–6.39)	0.016	2.27 (0.95–5.41)	0.064
Migration factors				
Push/pull factors				
Work/education	ref		ref	
Unhappy home life	0.42 (0.18–0.99)	0.049	0.35 (0.14–0.83)	0.017
Political persecution/other	0.42 (0.19–0.95)	0.038	0.51 (0.22–1.18)	0.116
Illegal border crossing	0.69 (0.35–1.35)	0.276		
Sexual violence during journey	1.59 (0.61–4.12)	0.342		
Lived in South Africa for less than 2 years	0.64 (0.29–1.40)	0.261		
Sexual risk factors				
Two or more partners in past 3 months	0.64 (0.29–1.40)	0.261		
Unprotected sex in past 3 months	0.77 (0.39–1.52)	0.451		
Ever had anal sex	1.70 (0.77–3.76)	0.191		
Recent transactional sex	0.99 (0.50–2.01)	1.000		

[a]RDSAT generated individualized weights used in unadjusted and adjusted logistic regression

Table 3

Unadjusted and adjusted prevalence ratios for the relationship between perceived likelihood of positive hiv status and demographic, migration, and sexual risk factors (n = 711)

	Unadjusted PRs[a]	p-value	Adjusted PRs[a]	p-value
Low MOS social support scale score	1.58 (1.17–2.12)	0.003	1.36 (1.04–1.78)	0.026
Demographic characteristics				
Age				
16–20	ref			
21–30	2.01 (0.99–3.71)	0.067		
31–39	1.54 (0.83–2.88)	0.172		
High school education or less	1.03 (0.87–1.23)	0.701		
Unmarried	0.93 (0.79–1.09)	0.357		
Income source				
No Income	ref			
Husband/family member	0.82 (0.57–1.19)	0.299		
Self	0.94 (0.62–1.42)	0.765		
Housing history in South Africa				
Always in a private home	ref		ref	
Some time in shelter/on the street	1.51 (1.06–2.13)	0.021	1.27 (0.92–1.74)	0.145
Always in a shelter/on the street	1.41 (1.02–1.95)	0.038	1.06 (0.77–1.44)	0.731
Migration factors				
Push/pull factors				
Work/education	ref			
Unhappy home life	1.28 (0.92–1.78)	0.143		
Political persecution/other	0.78 (0.55–1.12)	0.174		
Illegal border crossing	1.70 (1.29–2.23)	<0.001	1.51 (1.18–1.95)	0.001
Sexual violence during journey	1.54 (1.14–2.09)	0.005	1.11 (0.79–1.55)	0.543
Lived in South Africa for less than 2 years	1.46 (1.11–1.93)	0.008	1.31 (1.03–1.68)	0.030
Sexual risk factors				
Two or more partners in past 3 months	1.41 (1.05–1.89)	0.021	1.23 (0.92–1.64)	0.157
Unprotected sex in past 3 months	1.19 (0.89–1.59)	0.237		
Ever had anal sex	1.88 (1.43–2.46)	<0.001	1.64 (1.26–2.14)	<0.001
Recent transactional sex	1.63 (1.24–2.13)	<0.001	1.36 (1.05–1.76)	0.021

[a]RDSAT generated individualized weights used in unadjusted and adjusted Poisson regression