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High Prevalence of Concurrent Male-Male Partnerships in the Context of Low Human Immunodeficiency Virus Testing Among Men Who Have Sex With Men in Bamako, Mali

Avi Hakim, MA MPH^{*}, Padmaja Patnaik, PhD[†], Nouhoum Telly, MD[‡], Tako Ballo, MD[§], Bouyagui Traore, MD[§], Seydou Doumbia, MD[‡], and Maria Lahuerta, PhD^{†,||}

^{*} Division of Global HIV and Tuberculosis, Centers for Disease Control and Prevention (CDC), Atlanta, GA

[†] ICAP at Columbia University, Mailman School of Public Health, New York, NY

[‡] International Center of Excellence in Research (ICER-Mali), Faculty of Medicine and Odontostomatology, University of Sciences, Techniques and Technology of Bamako (USTTB)

[§] Cellule Sectorielle de Lutte contre le Sida, Ministère de la Santé, Bamako, Mali

^{||} Department of Epidemiology, Mailman School of Public Health, Columbia University, New York, NY

Abstract

Background: Concurrent male-male sexual partnerships have been understudied in sub-Saharan Africa and are especially important because human immunodeficiency virus (HIV) prevalence and acquisition probability are higher among men who have sex with men (MSM) than among heterosexual men and women.

Methods: We conducted a respondent-driven sampling survey of 552 men who have sex with men in Bamako, Mali from October 2014 to February 2015. Eligibility criteria included 18 years or older, history of oral or anal sex with another man in the last 6 months, residence in or around Bamako in the last 6 months, ability to communicate in French.

Results: HIV prevalence was 13.7%, with 86.7% of MSM with HIV unaware of their infection. Concurrent male-male sexual partnerships were common, with 60.6% of MSM having a concurrent male sexual partnerships or believing their sex partner did in the last 6 months, and 27.3% having a concurrent male sexual partnerships and believing their sex partner did in the last 6 months. Over half (52.5%) of MSM had sex with women, and 30.8% had concurrent male partnerships and sex with a woman in the last 6 months. Concurrence was more likely among MSM with limited education, telling only MSM of same-sex behaviors, high social cohesion, and not knowing anyone with HIV.

Correspondence: Avi Hakim, 1600 Clifton Rd, NE MS-E30 Atlanta, GA30333 404.374.4686. hxv8@cdc.gov.

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Conclusions: The high proportion of HIV-infected MSM in Bamako who are unaware of their HIV infection and the high prevalence of concurrent partnerships could further the spread of HIV in Bamako. Increasing testing through peer educators conducting mobile testing could improve awareness of HIV status and limit the spread of HIV in concurrent partnerships.

Concurrent sexual partnerships or overlapping sexual relationships with more than one person, may increase HIV risk by connecting sexual networks and potentially lending themselves to the transmission of HIV during the acute phase of infection. Most studies on concurrency have been conducted on heterosexuals. The relationship between HIV and concurrent sexual partnerships among heterosexuals is inconclusive, with mixed results yielding varied conclusions.¹⁻³ Data on concurrent male sexual partnerships among men who have sex with men (MSM) are limited and come from outside sub-Saharan Africa.⁴⁻⁶ The focus on concurrency among MSM has instead been on bisexual partnerships, that is, men who have sex with men and women.⁷⁻¹²

And some studies do not clearly indicate the sex of sexual partners involved in concurrent relationships.¹³⁻¹⁵ Concurrent male sexual partnerships among MSM are especially important because HIV prevalence and acquisition probability are higher among MSM than among heterosexual men and women.¹⁶⁻²⁰

As part of Mali's national HIV surveillance strategy, we conducted a respondent-driven sampling (RDS) survey of MSM in Bamako, Mali to learn about HIV, risk behaviors, and service utilization. Here, we identify correlates of concurrent sexual partnerships among these men and discuss their implications for Mali's epidemic.

METHODS

We used RDS to survey MSM in Bamako, Mali from October 2014 to February 2015.²¹⁻²³ Eligibility criteria for participation included 18 years or older, history of oral or anal sex with another man in the last 6 months, residence in or around Bamako in the last 6 months, ability to communicate in French or Bambara and to provide written informed consent, and possession of a valid RDS recruitment coupon. A target sample size of 550 people was calculated based on an estimated HIV prevalence of 20%, a 95% confidence with a width of 10%, and a design effect of 2. Potential seeds were identified during the formative assessment and were purposively selected for age, neighborhood of residence, education, marital status, HIV status, and engagement in prevention and clinical services. Data collection began with 6 seeds. One additional seed was added during data collection in an effort to reach older MSM. Participants were given 3 coupons to recruit peers. Coupons expired 2 weeks after being issued.

Individuals could participate in 1 of 2 study sites on different sides of the Niger River that divides Bamako. The sites alternated operating days and the same staff worked at both sites. An Excel-based RDS Coupon Management system was used to track recruitment; coupons included unique codes to facilitate tracking the recruiter-recruit relationship.

Participants undertook an electronic face-to-face interview (SurveyCTO [(Version 1.23; Doherty, 2015, MA)] and were tested for HIV after the national algorithm of screening with

Determine (Alere, MA). Reactive specimens were confirmed with Clearview (Alere, MA) and Oraquick (OraSure Technologies, Inc, PA) was used as a tie-breaker. The interview covered demographics, alcohol consumption using the AUDIT-C scale, sexual behaviors including number of sexual partners in the last 6 months according to type (ie, main male, casual male, commercial male, and female), condom use at last sex with each partner type, access to HIV services, and other topics. High social cohesion and high internalized homophobia were defined based on higher than mean responses to 5 questions concerning social cohesion and 5 questions reflecting on their feelings about their sexual attraction to men. Those testing positive for HIV were referred for care and treatment. They also received condoms, lubricants, and HIV-related information in addition to a reimbursement of 4000 CFA (approximately US \$8) for their time and transportation. At a second visit, they could receive up to 1000 CFA (US \$2) for each successful recruit and 2000 CFA (US \$4) for transportation.

We defined concurrent sexual partnership as engagement in overlapping sexual relationships where sexual intercourse with 1 partner occurs between 2 acts of intercourse with another partner, or belief that the participant's last sexual partner "probably did" or "definitely did" have other sexual partners between two acts of intercourse with the participant.²⁴ Data were analyzed in SAS9.3 (Cary, NC) and RDS-Analyst 0.54 (Los Angeles, CA) using Gile's successive sampling estimator to weight results.²⁵ Network size was based on a series of questions that together produced the number of MSM living in Bamako aged 18 years or older that the participant had seen in the last 2 weeks. Survey logistic procedures were used for bivariate and multivariate analyses to identify associations with concurrent sexual partnerships. Age and variables significant at the 0.10 level in bivariate analysis were included in the multivariate model.

Participants provided written informed consent before engaging in survey activities. The protocol received approval from the Malian Ethical Committee of the Faculty of Medicine, Pharmacy and Dentistry, the United States Centers for Disease Control and Prevention, and the Columbia University Medical Center Institutional Review Board.

RESULTS

We enrolled 552 MSM into our survey over 18 waves. Of the people who came to the survey site, 56 (9.2%) were not eligible for participation. Recruitment homophily for sexually active MSM in Bamako was 1.3; consequently, 83.0% of the MSM network component our survey represents is younger than 30 years. MSM were also relatively well educated with 63.7% completing secondary school or university. Students comprised 43.3% of MSM, and 12.7% were unemployed. Nearly all MSM were Malian (94.5%), Muslim (88.3%), and had never been married (91.8%), and 98.8% identified as gay/homosexual or bisexual. According to the AUDIT-C scale, alcohol consumption was a problem for 19.8% of MSM.

Over half of MSM (53.7%) had more than 1 male sex partner in the last 6 months, and 52.5% had 1 or more female sex partners in the same period (Table 1). The last male and female partners were main partners for 75.2% and 76.6% of MSM, respectively. Concurrent male-male sexual partnerships—either having a secondary partner or believing a sex partner

has one—in the last 6 months were common (60.6%). Over a quarter of MSM (27.3%) had a secondary male partner and believed that their last partner had their own secondary partner, suggesting that at least four people ultimately engaged in concurrent partnerships. Additionally, 30.8% of MSM had a concurrent male partnership and at least 1 female sex partner in the last 6 months.

Condom use was inconsistent with 76.0% of MSM using a condom at last sex with a male partner; 19.0% had condomless receptive anal intercourse and 16.9% had condomless insertive anal intercourse. In contrast, 43.3% used a condom at last sex with a female partner. The majority of MSM did not discuss HIV status with their most recent partner (57.1%) and 31.8% learned the status of their partner. Furthermore, 13.7% of MSM were HIV positive, of whom 86.7% were unaware of their HIV infection.

In multivariate analysis, MSM with at least a primary education were less likely than those with less than a primary education to have had a concurrent sexual partnership with other men in the last 6 months (Table 2). MSM who have only told other MSM of their same-sex behaviors were nearly twice as likely to be in a concurrent relationship than those who had told non-MSM (adjusted odds ratio [aOR], 1.9; 95% confidence interval [CI], 1.0–3.5) (Table 3). Men who have sex with men with lower than average levels of social cohesion were less likely to be in a concurrent relationship (aOR, 0.6; 95% CI, 0.3–1.0), and those who did not know someone with HIV were more likely (aOR, 2.6; 95% CI, 1.2–5.3).

DISCUSSION

Concurrent sexual partnerships have been shown to be a key factor in the spread of HIV among the general population as it speeds the rate at which sexual networks are connected.^{3,26,27}

Although heterosexual behavior among MSM has been widely reported, the literature contains little about concurrent male-male partnerships among MSM.^{4,5,7,28–30} Our survey reveals that not only do MSM in Bamako, Mali, have sexual relationships with women, but they also engage in concurrent partnerships with other men. Given the high prevalence of HIV among MSM (13.7%) and the large proportion of MSM who are unaware that they are living with HIV (86.7%), the potential for the rapid spread of HIV among MSM, and on to their female partners, is ever present in Bamako.

Few studies have documented that individuals may themselves have a concurrent partnership, whereas one of these partners has their own concurrent partnerships.²⁸ This could be the case for over a quarter of MSM in Bamako, whose sexual networks may consequently include up to 4 people in a given period.

Our finding that approximately 60.6% of MSM have engaged in a concurrent sexual partnership in the last 6 months is similar to some findings and higher than others.^{28,30}

Multiple sex partners are associated with HIV infection.^{11,31} However, in Bamako, the number of sex partners is not associated with engagement in concurrent male-male sexual relationships. Thus, targeting MSM with the largest number of partners may do little to

reduce concurrent partnerships. Neither HIV status nor symptoms of sexually transmitted diseases were associated with concurrent male-male partnerships.

Like many RDS surveys of MSM, our survey is representative of the network component of MSM in Bamako who are largely younger than 30 years old.^{11,30,32,33} That such a large share are students and have never been married is therefore not surprising. As HIV is a chronic condition and prevalence increases with age, it is reasonable to assume that HIV prevalence is higher in the broader MSM population. Our analysis is limited by exploring concurrency with the most recent sexual partner rather than all partners in the reference period.

The majority of MSM in Bamako had not tested for HIV in the 12 months before the survey. Although peer educators do not provide HIV testing in Bamako, interacting with a peer educator in the last 12 months was strongly correlated with HIV testing.³⁴

The impact of peer educators could be enhanced by training them to conduct mobile HIV testing, including couples testing.^{35,36}

Limited data on couples testing for MSM in Africa suggest that it has substantial potential.³⁷ More frequent HIV testing and couples testing in particular could help limit risks of HIV acquisition and transmission among MSM engaging in concurrent partnerships. Peer educators could further boost HIV testing by tailoring their messaging to build community and strengthen social cohesion among MSM, factors that have been associated with HIV testing in Bamako.³⁴ Peer educators have a pivotal role in facilitating HIV couples testing in Bamako and their numbers should be increased to reach additional men.

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TABLE 1.

Background Characteristics of MSM in Bamako, Mali (N = 552)

	n	Weighted %	95% CI
Age, y			
18–19	71	15.3	10.8–19.8
20–24	290	54.3	48.1–60.6
25–29	89	13.4	9.3–17.5
30–34	36	7.1	3.9–10.3
35	65	9.9	6.4–13.4
Highest level of education			
Never attended school	29	5.2	2.0–8.5
Primary	152	31.0	25.0–37.0
Secondary	254	47.3	41.1–53.6
University	115	16.4	12.5–20.4
Main occupation			
No work	68	12.7	8.3–17.2
Student	220	43.3	37.1–49.6
Unskilled labor	29	5.9	3.0–8.9
Professional/services	135	22.0	16.8–27.1
Other (Includes military and civil service)	100	16.0	11.6–20.5
Money earned last month			
< 49,999 CFA (<US \$84)	351	72.3	67.0–77.6
50,000–149,999 CFA (US \$84–250)	103	15.4	11.2–19.6
More than 150,000 CFA (>US \$250)	90	12.3	8.5–16.0
Don't know	7	1.0	0.1–1.8
Nationality			
Malian	534	94.5	91.0–98.0
Other African nationalities	17	5.5	2.0–9.0
Marital status			
Never married	497	91.8	88.5–95.1
Married, divorced, separated, or widowed	54	8.2	4.9–11.5

	n	Weighted %	95% CI
Religion			
Muslim	487	88.3	84.0–92.6
Christian	28	8.5	4.5–12.5
Other (Animist/No religion)	26	3.2	1.4–5.0
Sexuality			
Gay/homosexual	267	45.5	39.1–51.8
Bisexual	283	53.5	47.2–59.9
Straight	2	1.1	0.0–3.0
People informed of same-sex behaviors			
MSM and non-MSM	422	73.7	68.0–79.3
Only MSM	130	26.3	20.7–32.0
High internalized homophobia (above the mean: 2.45)			
Yes	226	39.4	33.3–45.5
Low Social cohesion (below the mean: 2.88)			
Yes	224	48.1	41.8–54.4

TABLE 2.

Sexual Behaviors and HIV Status Among MSM in Bamako, Mali

	n	Weighted %	95% CI
Sexual behaviors			
Ever experienced forced sex	96	15.1	10.6–19.6
No. male sexual partners in last 6 mo			
1	210	46.3	39.9–52.6
2	135	22.9	17.8–28.1
3+	206	30.8	25.3–36.3
Last male sexual partner was a main partner			
Number of female sexual partners in last 6 mo	411	75.2	69.9–80.6
0	282	47.5	41.3–53.7
1	161	29.1	23.3–34.8
2+	108	23.4	17.8–29.0
Last female sex partner was a main partner			
Had concurrent male sexual partnerships or believe sex partner did in the last 6 mo	352	60.6	54.3–66.9
Had concurrent male sexual partnerships and believe partner did in the last 6 mo	168	27.3	22.2–32.4
Had concurrent male sexual partnerships and at least one female sex partner in the last 6 mo	165	30.8	25.0–36.6
Had condomless insertive anal intercourse with most recent male partner in last 6 mo	139	26.9	22.6–33.7
Had condomless receptive anal intercourse with most recent male partner in last 6 mo	109	19.0	14.1–23.8
Used a condom at last sex with most recent male partner	423	76.0	70.8–81.2
Used condom at last sex with most recent female sex partner in the last 6 mo	151	43.3	35.6–50.9
Disclosure of HIV status with last male sex partner			
I disclosed	42	11.0	6.6–15.4
Only my partner disclosed	14	2.4	0.2–4.7
We both disclosed	198	29.4	23.8–34.9
Neither disclosed	297	57.1	50.7–63.6
HIV positive	79	13.7	9.1–18.3
Unaware of HIV infection	66	86.7	82.6–97.6

TABLE 3.

Bivariate and Multivariate Associations With Concurrent Male Sexual Partnerships

Variable	% concurrent	OR (95% CI)	P	aOR (95% CI)	P
Age, y					
18–19	72.8	1.0	0.4747	1.0	0.7892
20–24	58.7	1.9 (0.9–4.0)		1.5 (0.7–3.3)	
25–29	62.1	1.6 (0.6–4.2)		1.9 (0.6–5.8)	
30–34	53.5	2.3 (0.7–7.4)		1.3 (0.4–4.4)	
35	56.3	2.1 (0.8–5.7)		1.2 (0.4–3.6)	
Highest level of education					
Less than primary	29.6	1.0	0.0198	1.0	0.0094
Primary	63.2	0.3 (0.1–0.7)		0.2 (0.1–0.6)	
Secondary	63.6	0.2 (0.1–0.6)		0.3 (0.1–0.6)	
University	64.4	0.2 (0.1–0.6)		0.3 (0.1–0.7)	
Marital status to a woman					
Never married	61.8	1.0	0.2131		
Married, divorced, separated, or widowed	48.5	1.7 (0.7–4.0)			
Problematic consumption of alcohol (AUDIT-C score greater than or equal to 4)					
Yes	60.9	1.0	0.8899		
No	59.8	1.0 (0.5–1.9)			
Recreational use of noninjectable drugs					
Yes	45.7	1.0	0.2548		
No	61.3	0.5 (0.2–1.6)			
Sexuality					
Gay/homosexual	63.1	1.0	0.4857		
Bisexual/straight	58.7	1.2 (0.7–2.0)			
People informed of same-sex behaviors					
MSM and non-MSM	64.5	1.0	0.0477	1.0	0.0385
Only MSM	50.1	1.8 (1.0–3.3)		1.9 (1.0–3.5)	
Have a profile on an MSM website					
Yes	66.8	1.0	0.6509		

Variable	% concurrent	OR (95% CI)	P	aOR (95% CI)	P
No	60.5	1.3 (0.4–4.3)			
High internalized homophobia (above the mean: 2.45)					
Yes	66.5	1.0	0.1264		
No	56.9	1.5 (0.9–2.5)			
Low social cohesion (below the mean: 2.88)					
No	67.9	1.0	0.0167	1.0	0.0542
Yes	52.9	0.5 (0.3–0.9)		0.6 (0.3–1.0)	
Total no. male sex partners in the last 6 mo					
1	56.5	1.0	0.0540	1.0	0.0631
2	80.7	0.4 (0.2–0.8)		0.4 (0.2–0.8)	
3+	66.3	0.9 (0.5–1.6)		0.8 (0.5–1.5)	
Unprotected anal intercourse during last sex with a male					
Yes	55.7	1.0	0.3616		
No	62.2	1.3 (0.7–2.3)			
Given a man money, goods, or services in exchange for sex					
Yes	60.3	1.0	0.9445		
No	60.8	1.0 (0.6–1.8)			
Ever experienced forced sex					
Yes	73.0	1.0	0.0617	1.0	0.4204
No	58.5	1.9 (1.0–3.8)		1.4 (0.6–2.8)	
Had oral, vaginal, or anal sex with a woman					
Yes	59.4	1.0	0.1988		
No	68.6	0.7 (0.4–1.2)			
Had an STI in the past 12 mo					
Yes	68.5	1.0	0.3319		
No	59.5	1.5 (0.8–3.3)			
Tested for HIV in the last 12 mo					
Yes	67.2	1.0	0.0499	1.0	0.2027
No	54.9	1.7 (1.0–2.8)		1.4 (0.8–2.5)	
Knows someone with HIV					
Yes	75.9	1.0	0.0066	1.0	0.0109

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Variable	% concurrent	OR (95% CI)	P	aOR (95% CI)	P
No	57.2	2.4 (1.3–4.4)		2.6 (1.2–5.3)	
Complete knowledge of HIV					
Yes	63.4	1.0	0.3334		
No	57.2	1.3 (0.8–2.2)			
HIV status					
Negative	60.0	1.0	0.5597		
Positive	65.4	0.8 (0.4–1.7)			
Unaware					
Yes	57.4	1.0	0.3560		
No	76.0	2.1 (0.4–10.2)			