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Approaches to identify unknown HIV-positive men who have sex with men in Nairobi, Kenya

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Abstract

Kenya has been home to one of the most severe HIV/AIDS epidemics in Sub-Saharan Africa. This persistent epidemic requires interventions tailored to affected populations, particularly men who have sex with men (MSM). Given the resource constraints of many clinics and ecological challenges of Kenya, such as the illegality of sex among MSM, interventions to address HIV must strategically engage this population. This quasi-experimental pilot study of N=497 sought to explore differences in discovering previously unknown HIV-positive MSM in Nairobi, Kenya. The study used four clinical sites to compare a social and sexual network index testing (SSNIT) strategy compared to traditional HIV screening. Clinics using the SSNIT strategy had significantly higher incidence rates of HIV diagnoses than control clinics (IRR = 3.98, p<.001). This study found that building upon the social and sexual networks of MSM may be one promising strategy while discovering critical cases of HIV.

Keywords

HIV; MSM; social network testing; Kenya; biobehavioral prevention; HIV testing

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Introduction

Kenya and HIV

More than three decades into the HIV epidemic, there have been tremendous advances in screening and treatment for those living with HIV, yet not all populations have benefited equally. HIV disproportionately effects marginalized populations and among those most impacted are men who have sex with men (MSM), especially in Sub-Saharan Africa (1). MSM in this region face homophobia, discrimination and stigma, which exacerbate the HIV epidemic (2). In several countries, including Kenya, sex among men is still illegal, creating unique impediments to targeted intervention among MSM (1). One study of health workers found that there were both systematic barriers as well as personal prejudices that resulted in less candidness surrounding HIV risk among MSM in Kenya (2).

Given these challenges, estimates of HIV epidemiology among MSM in Kenya vary. A summary article reported HIV prevalence estimates among MSM in cohort studies in Kenya to vary between 10.8 and 38 percent (3-5). Partly, this variation is due to the inability to characterize and adequately describe the population of MSM in Kenya (1). A recent study used three methods (population sample multipliers, wisdom of the crowds participant responses and bio-behavioral surveys) in order to estimate that the population of MSM living in Nairobi is just over 11,000, with a plausible confidence interval from 10,000 to 22,222 (1).

As there is a dearth of information about the HIV epidemic among MSM in Kenya, there are few studies that adequately convey the urgent need to increase research on this population. In an analysis of the previous studies, researchers attempted to estimate HIV prevalence in several countries by using samples collected by voluntary counseling and testing (VCT), respondent-driven sampling (RDS), and snowball sampling (6). A study from 2002 through 2005 in Nairobi estimated a prevalence of 10.6%, however, this study was only based on VCT. A 2010 study of MSM in Nairobi using RDS found HIV prevalence of 18.2% (95% CI: 13.1, 23.6) and further described the unique differences among the prevalence in MSM who were involved in sex work, 26.3%, compared to 12.2% in other MSM (1). Both groups of MSM had significantly higher HIV prevalence than other men in Nairobi (3.4%) and adult men in Kenya in general (4.6%) (7). The use of social networking strategies such as RDS has demonstrated efficacy and cost-effectiveness in uncovering HIV in smaller, or otherwise hidden populations such as MSM and sex workers within the United States (8). Using this kind of social network method and may also yield promising results in other countries (8, 9) such as Kenya.

The importance of HIV screening, diagnosis and treatment

Advances in HIV treatment since the mid-1990s have indicated that a lack of routine testing and adherence to antiretroviral therapy (ART) are significant factors contributing to the HIV epidemic in limited-resource settings (10). The focus on discovering previously undiagnosed HIV-positive persons is of vital importance given that viremic individuals have increased transmission potential (11). There is a growing body of research that suggests that once individuals are aware of their HIV-positive status, HIV transmission risk is reduced (12-14).

Using social and sexual networks to discover new positives

Given the often-concealed nature of social and sexual connections between MSM in Kenya, one method that has previously demonstrated efficacy for new diagnoses has been social network recruitment (8, 15). Studies from the United States, in California (16), Washington (17) and a US Centers for Disease Control and Prevention demonstration project of 9 community based organizations (8) suggests that network testing could hold promise in improving epidemiological surveillance in smaller populations. The purpose of the present pilot study, Approaches to Identify unknown HIV-positive MSM (AIM), was to compare a social network testing strategy to standard VCT and engage them as recruiters to identify other undiagnosed HIV-positive MSM in their social networks.

Methods

To compare traditional voluntary counseling and testing (VCT) methods with social and sexual network index testing (SSNIT), four clinical sites in Nairobi, Kenya specializing in HIV prevention, screening, and linkage to care services for MSM were selected in this study. Clinical sites were selected if they served MSM, offered VCT and linkage, and were registered with the Kenyan government. Using a quasi-experimental cross-sectional design, two clinics were randomized as controls using traditional VCT methods while the remaining two clinics implemented the SSNIT protocols as described in other literature in addition to a structured survey after HIV antibody screening (8, 18).

Study design

The two clinics serving as the control used traditional VCT methods of screening MSM in addition to consenting participants to compete a behavioral survey. Clinical staff obtained consent from participants to enroll in the study and study participants were compensated 300 Kenyan shillings (USD $3) for taking the survey.

The two clinics implementing the SSNIT strategy used four phases as noted in previous literature (8). In the first phase, enlistment, clinical staff identified MSM recently diagnosed with HIV to enlist these MSM as index recruiters. Eight recruiters were used from the two intervention sites. Recruiters were asked to contact MSM associates in their social or sexual networks that they felt were at risk for HIV and encourage these associates to come into the clinical site for HIV screening. Among those associates who screened, those who were diagnosed with HIV and those who tested HIV-negative with considerable risk such as recent condomless anal sex, recent sexually transmitted infection or reported sex work were asked if they wanted to refer members of their networks (8).

In the second phase of the study, index recruiters received an orientation to the study. MSM identified as a potential recruiter reviewed a study consent with clinical staff of the study. The consent included a description of the purpose and procedure of the study, possible risks and benefits to the participants, compensation for participation, confidentiality of the study, contact information for study administration and a statement affirming that participation in the study was voluntary, could be discontinued at any time and participation had no impact on other services to which participants were otherwise entitled. Upon verbal consent, clinical

staff enrolled recruiters into the study. After enrollment, recruiters were coached using various methods (i.e. role play scenes) to maximize social network associate recruitment. At the conclusion of coaching, each index recruiter received color-coded index cards to accompany network associates as they came to the clinical site for HIV screening and survey administration.

In the third phase of the study, recruited social network associates were provided with an index card attributing the referral source. Each index card contained a unique code associated with a consented index recruiter in the study. For each social network associate successfully recruited, the recruiter was compensated 500 Kenyan shillings (USD $5). Study site personnel were trained between September and November 2015. All HIV screening and survey data collection took place between December, 2015 and June, 2016.

In the final phase of the study, recruited network associates were offered HIV counseling, testing and referral (CTR) at the clinical site. Consent to participate was obtained from each network associate prior to CTR session. Each recruited associate was compensated 300 Kenyan shillings (USD $3) for completion of the HIV screening and study survey. Associates that were newly diagnosed with HIV were offered post-test counseling and linkage to HIV comprehensive care services. Among recruited associates, those who tested HIV-positive and those who tested HIV-negative with significant HIV risk were assessed by clinical staff to determine if they were appropriate as additional index recruiters.

Participant Eligibility

Participants in the traditional VCT clinical sites: (1) self-identified as men; (2) were aged 18 years and older; (3) reported at least three months since their last HIV-negative test or did now know their HIV status; (4) reported gay, bisexual identity or sexual activity with another male in their lifetime; and (5) provided informed consent to be a part of the study.

SSNIT strategy participants met all eligibility criteria for the VCT sites, and in addition, participants within the SSNIT strategy clinical sites could serve as index recruiters. Initial seed recruiters were peer advocates, while the majority of recruiters were newly diagnosed MSM or HIV-negative MSM with reported increased risk for HIV.

Theory and Measures

The measures administered were used to test the efficacy of Kimbrough's model on identifying unknown positives by use of the social network strategy. The model was tested with a set of variables already shown to contribute to health outcomes of Sub-Saharan African MSM. Consistent with this theoretical model, the interview- administered behavioral survey assessed sociodemographic characteristics, HIV screening history, substance use, previous six-month screening behavior, HIV status disclosure, depression symptomology, discrimination history, experiences of stress and internalized homophobia. Survey administration lasted approximately 30 minutes.

Sociodemographic Variables—Sociodemographic measures included: (1) age in three categories: 18-25, 26-34, 35+; (2) highest level of education; (3) employment status; (4)

monthly income; (5) sexual orientation (gay, bisexual, heterosexual, other) and (6) HIV status provided by antibody test.

Data collection—Each eligible participant was provided with a consent form that outlined the study's objectives and a unique identification number (UIN) (19, 20). The use of the UIN was two-fold: the ability to determine that participants were unduplicated as well as an accounting measure for properly attributing recruited participants to recruiters for intervention sites. After consent was obtained, clinical staff administered the survey and HIV antibody screening. The screening result was shared with the participant and was linked to the survey and UIN for confidentiality purposes.

Analytical Procedure—Conventional descriptive statistics were used in order to characterize study participants from all four clinical sites and report any significant differences between control and intervention sites. Outcome variables were reported dichotomously. Categorical independent variables were examined using percentages and frequencies for each intervention group and compared using chi-square tests to investigate statistically significant differences. Comparisons at the clinic-level were based on counts of participants tested and prevalence of positive antibody screenings. Poisson regression was used to calculate an incidence rate ratio (IRR) which tests our primary research question: does SSNIT yield greater rates of HIV-positive MSM than traditional VCT? This model controlled for clinic-level HIV-positivity rate in the previous six months prior to the intervention trial, in order to control for any preexisting differences in the clinics' positivity rates.

Human subjects review procedures—This pilot study was reviewed and approved by the [redacted for review] Institutional Review Board (USA) and the Kenyatta National Hospital Ethical Review Committee (Nairobi, Kenya).

Results

Sociodemographic Characteristics

A total of 497 participants (Table I) were enrolled in the pilot study, with n=258 (52%) enrolled in the SSNIT intervention strategy and n=239 enrolled in the VCT clinics. All participants completed the survey and HIV antibody screening. Clinic sites did not significantly differ related to any sociodemographic variable in chi-squared testing with the exception of serostatus ($\chi^2 = 30.86$, $p<.001$) as seen in Table I. Index recruiters for the SSNIT strategy recruited between 13 and 51 participants over the project period, averaging 30 participants per recruiter.

Comparisons by Recruitment Strategy

Table II compares HIV positivity across intervention and control sites based during the study. Among the SSNIT strategy group, the percentage of newly-identified HIV-positive participants (24.4%) was greater than the positivity rate at control sites (6.3%). Clinic-level positivity trends in the previous six months prior to the study were also displayed in Table II in order to demonstrate any frequency-based departure from previous trends. Intervention

and control sites were similar in HIV-positivity rates prior to the intervention trial (10.1% and 12.2% respectively). Results of from the multivariable Poisson regression are in Table III. Clinics that used the SSNIT strategy had statistically higher incidence rates of new HIV diagnoses than control clinics according to the incidence rate ratio (IRR = 3.98, p<.001).

Discussion

These findings suggest that using a social and sexual network index testing strategy can increase the identification of undiagnosed HIV-positive MSM, potentially leading to more timely diagnoses among MSM in limited-resource settings like Kenya. Given that sexual activity among MSM is still illegal, using the social and sexual network of MSM allows HIV screening to better follow pathways of greatest risk, while building on the social comfort and trust previously established among MSM which may not be available in traditional VCT. These findings support earlier findings in California (16), Washington (17) and the Social Networks Demonstration Project (8) which suggest that network-oriented strategies remain an essential tool and may be of pivotal importance in HIV epidemics rooted in countries with multi-layered marginalization of MSM.

Despite best efforts, this study did contain limitations. Due to the nature of HIV screening, it is not clear when, if at all, men who were newly diagnosed by recruiter referral would have been tested. While our analysis indicated differences by recruitment method, these results may not generalizable, particularly for MSM who refused HIV screening referrals and men who live outside of urban areas in Kenya. This study used modest incentives in order to encourage HIV screenings and referrals of network members. It is not known if this recruitment method would experience sustained success without ongoing financial support. An additional consideration is the potential for harm from loss of confidentiality. It is recommended that ongoing confidentiality training is continued throughout diffusion of the intervention for the safety of the participants as was stressed in this pilot study.

Diagnosing previously unknown HIV-positive MSM is essential in addressing HIV in Kenya. Thus, the next directions for research on identification, linkage and engagement in care for MSM should include: a larger-scale trial of the SSNIT strategy of HIV screening so that clinics can make the best use of available resources. A larger trial may also allow for the use of cost effectiveness studies and the ability to scale such a promising intervention to other countries in the region. By engaging social networks of MSM, public health professionals can improve surveillance and also improve information dissemination infrastructure among a critical population in Kenya.

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Table I:

Descriptive statistics of participants in AIMS pilot study, 2015-2016, n=497

		INTERVENTION		CONTROL		
	Total	**SITE 1**	**SITE 2**	**Total**	**SITE 3**	**SITE4**
Social demographics						
Age (Years)						
18-25	116 (45.0%)	70 (55.1%)	46 (35.1%)	112 (46.9%)	60 (46.9%)	52 (46.8%)
26-34	122 (47.3%)	49 (22.3%)	73 (55.7%)	98 (41.0%)	49 (38.3%)	49 (44.1%)
35+	20 (7.8%)	8 (6.3%)	12 (9.2%)	29 (12.1%)	19 (14.8%)	10 (9.0%)
Highest level of education						
Primary	18(7.0%)	5(3.9%)	13(9.9%)	13(1.3%)	10(7.8%)	3(2.7%)
High school	116(45.0%)	45(35.4%)	71(54.2%)	131(28.9%)	62(48.4%)	69(62.2%)
College	90(34.9%)	55(43.3%)	35(26.7%)	62(10.0%)	38(29.7%)	24(21.6%)
University	30(11.6%)	20(15.7%)	10(7.6%)	33(6.3%)	18(14.1%)	15(13.5)
Others	4(1.6%)	2(1.6%)	2(1.5%)	0(0.0%)	0(0.0%)	0(0.0%)
Employment status						
Looking for work	101(40.2%)	41(34.2%)	60(45.8%)	87(13.8%)	54(42.2%)	33(22.6%)
Self employed	46(18.3%)	13(10.8%)	33(25.2%)	68(14.2%)	34(26.6%)	34(26.6%)
Employed	40(15.9%)	22(18.3%)	18(13.7%)	32(8.8%)	11(8.6%)	21(18.9%)
Not looking for work	2(0.8%)	1(0.8%)	1(0.8%)	4(0.8%)	2(1.6%)	2(0.8%)
Student	60(23.9%)	42(35.0%)	18(13.7%)	47(8.8%)	26(20.3%)	21(10.9%)
Other	2(0.8%)	1(0.8%)	1(0.8%)	0(0.0%)	0(0.0%)	0(0.0%)
Monthly income (Ksh.)						
Less than 5,000	79(44.4%)	18(36.0%)	61(47.7%)	26(20.0%)	14(22.2%)	12(17.9%)
5,000-10,000	44(24.7%)	10(20.0%)	34(26.6%)	55(42.3%)	28(44.4%)	27(40.3%)
10,001-20,000	39(21.9%)	18(36.0%)	21(16.4%)	34(26.2%)	16(25.4%)	18(26.9%)
20,001-30,000	13(7.3%)	2(4.0%)	11(8.6%)	13(10.0%)	5(7.9%)	8(11.9%)
30,001-40,000	3(1.7%)	2(4.0%)	1(0.8%)	0(0.0%)	0(0.0%)	0(0.0%)
40,001 and over	0(0.0%)	0(0.0%)	0(0.0%)	2(1.5%)	0(0.0%)	2(3.0%)
Sexual Identity						
Gay	164 (63.8%)	80 (64.6%)	84 (64.6%)	141 (59%)	69 (53.9%)	72 (64.9%)
Bisexual	86 (33.5%)	44 (34.6%)	42 (32.3%)	96 (40.2%)	58 (45.3%)	38 (34.2%)
Heterosexual	3 (1.2%)	1 (0.8%)	2 (1.5%)	2 (0.8%)	1 (0.8%)	1 (0.9%)
Other	4 (1.6%)	2 (1.6%)	2 (1.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
HIV Status (Serostatus)						
Positive	**63 (24.4%)**	**29 (22.8%)**	**34 (26.0%)**	**15 (6.3%)**	**7 (5.5%)**	**8 (7.2%)**
Negative	**195 (75.6%)**	**98 (77.2%)**	**97 (74.0%)**	**224 (93.7%)**	**121 (94.5%)**	**103 (92.8%)**

Note: Bold type indicates significance p<.05 for Chi Squared tests of difference

Table II.

HIV testing and HIV positivity by intervention status and site in AIMS pilot study

	INTERVENTION			CONTROL		
Characteristic	**Total**	**Site 1**	**Site 2**	**Total**	**Site 3**	**Site 4**
Clinic-level results during Intervention Trial						
Number who received HIV positive test result	63	29	34	15	7	8
Number who took HIV test	258	127	131	239	128	111
Percentage of HIV positive participants	24.4	22.8	26.0	6.3	5.5	7.2
Clinic-level results six months prior to Intervention Trial*						
Number who received HIV positive test result	37	11	26	94	58	36
Number who took HIV test	365	53	312	768	409	359
Percentage of HIV positive participants	10.1	20.8	8.3	12.2	14.2	10.0

Note: clinic results for the previous six months are for all populations, not solely MSM.

Table III.

Results of multivariable Poisson regression model for the effect of intervention on HIV positivity rates in AIMS pilot study

Characteristic	IRR (95% CI)	*p*
Intervention Status		
Control	1.00 (referent)	
Intervention	3.98 (2.26, 7.03)	<0.001
HIV Positivity in Past six months (per 100 people)	0.99 (0.95, 1.03)	0.558

IRR = incidence rate ratio; CI = confidence interval