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Population Size, HIV, and Behavior Among MSM in Luanda, Angola: Challenges and Findings in the First Ever HIV and Syphilis Biological and Behavioral Survey

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Objectives: To conduct the first population size estimation and biological and behavioral surveillance survey among men who have sex with men (MSM) in Angola.

Design: Population size estimation with multiplier method and a cross-sectional study using respondent-driven sampling.

Setting: Luanda Province, Angola. Study was conducted in a large hospital.

Participants: Seven hundred ninety-two self-identified MSM accepted a unique object for population size estimation. Three hundred fifty-one MSM were recruited with respondent-driven sampling for biological and behavioral surveillance survey.

Methods: Interviews and testing for HIV and syphilis were conducted on-site. Analysis used Respondent-Driven Sampling Analysis Tool and STATA 11.0. Univariate, bivariate, and multivariate analyses examined factors associated with HIV and unprotected sex. Six imputation strategies were used for missing data for those refusing to test for HIV.

Main Outcome: A population size of 6236 MSM was estimated. Twenty-seven of 351 individuals were tested positive. Adjusted HIV prevalence was 3.7% (8.7% crude). With imputation, HIV seroprevalence was estimated between 3.8% [95% confidence interval (CI): 1.6 to 6.5] and 10.5% (95% CI: 5.6 to 15.3). Being older than 25 (odds ratio = 10.8, 95% CI: 3.5 to 32.8) and having suffered episodes of homophobia (odds ratio = 12.7, 95% CI: 3.2 to 49.6) significantly increased the chance of HIV seropositivity.

Conclusions: Risk behaviors are widely reported, but HIV seroprevalence is lower than expected. The difference between crude and adjusted values was mostly due to treatment of missing values in Respondent-Driven Sampling Analysis Tool. Solutions are proposed in this article. Although concerns were raised about feasibility and adverse outcomes for MSM, the study was successfully and rapidly completed with no adverse effects.

Key Words: HIV, syphilis, sexual behavior, homosexuality, male, sampling studies

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INTRODUCTION

Since 2004, HIV prevalence in Angola has been estimated from sentinel prenatal sites. UNAIDS calculates an overall national HIV prevalence of 1.9% for the 15–49 year age group, with higher prevalence rates in provinces with international borders.[1] This makes Angola one of the lowest HIV prevalence countries in the Southern Africa zone. This relatively low prevalence is attributed, in part, to the country's long civil war (1975–2002) and closed borders. As Angola's isolation diminishes, this effect is likely to diminish, and a number of behavioral, sociocultural, and economic characteristics such as low levels of specific knowledge, low perception of risk of infection, low levels of condom use, multiple sexual partners, great economic disparities, migration, and rapid urbanization of the population may contribute to higher seroprevalence in the future. Angola is bordered by Botswana, Zambia, and Namibia, where the estimates of HIV prevalence in the general population of sexually active adults are higher than 15%.[1,2]

Although Southern Africa is the region most affected by HIV/AIDS in the world, data about the population of men who have sex with men (MSM) in the region are relatively sparse. Over the past few years, a number of epidemiological and behavioral studies have been conducted among MSM in

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Africa, even in countries where homosexuality is illegal. Such studies have demonstrated high rates of risky sexual behavior, associated with low perception of risk and vulnerability, and little knowledge of how to prevent sexually transmitted infections (STIs) and HIV.[3–9]

Studies based on a convenience samples of MSM in Africa show HIV prevalence rates of 21.5% in Senegal,[9] 13.4% in Nigeria,[10] 10.6% in Kenya,[11] and 7.8% in Sudan,[12,13] for men practicing receptive or insertive anal sex. All these estimates are higher than those observed for the general population in their respective countries[14] (based on UNAIDS estimates 2006).

Other studies of MSM in Africa also indicate high rates of unprotected anal intercourse.[5,9,10,13,15] This is associated in several studies with low levels of knowledge about virus transmission and prevention among MSM.[16,17]

Low self-awareness of STI and HIV risk by MSM involved in sexual intercourse with women has been reported by van Griensven[7] in his epidemiological and behavioral data review of the African continent. Umar et al[18] reported that 75% of the 200 MSM studied in Malawi reported having had an average of 14 sexual partners, both men and women, in the 6 months before the study. Adebajo et al[10] reported that among the 1125 MSM recruited through respondent-driven sampling (RDS) in 2 Nigerian towns, 50% reported having had vaginal or anal sex with women in the 12 months preceding the research. Another potential issue for surveillance and program is the occurrence of sexual acts between men who do not identify themselves as homosexual or who do not identify sex with another man as homosexual.[19]

The participants in the surveillance survey were recruited with RDS. Although conventional probabilistic sampling methods are ideal, they cannot be used to study hidden populations such as MSM. Most studies have used nonprobabilistic sampling methods to sample MSM, despite the risk of creating biased estimates that are difficult to evaluate.[20–23] To minimize such biases, alternative ways of sampling have been proposed,[24,25] including RDS.[26–29] Using RDS and making valid claims for results requires weighting for differential recruitment and other biases, a problem in the literature when Respondent-Driven Sampling Analysis Tool (RDSAT) is not used. However, under certain conditions, as here, this weighting results in apparently anomalous findings, as will be discussed below.

METHODS

To estimate the population size of MSM in Luanda, a capture–recapture method was used. We distributed a small flashlight key chain imported to Angola for this study as the unique object distributed. The objects were distributed in 91 locations identified by MSM as meeting places between January 19 and February 6, 2011, before the biological and behavioral surveillance survey (BBSS) by the study team and local coworkers and in consultation with the MSM community. "Recapture" occurred during the BBSS using RDS conducted after this distribution. We did not adjust the number of individuals identified in the BBSS with RDSAT for purposes of the population estimate.[30,31]

We calculated a sample size of 350 MSM aged older than 18 years. The sample size is based on the feasibility of recruitment as assessed during formative research and estimated HIV and syphilis prevalence, with a design effect of 2 for RDS. In the absence of reliable data for MSM before the research, HIV and syphilis prevalence was estimated to be 4 times higher than that in the general population.[16] The estimated HIV prevalence for the population is 2.1% in 2007 (UNAIDS, 2008). For syphilis, data from prenatal clinics have indicated a median prevalence of 3.6% in 2007.[32] This figure has been corrected by the 0.8 factor used by UNAIDS to estimate HIV prevalence for the general population from prenatal clinic data, translating into a prevalence of 8.4% for HIV and 11.5% for syphilis. We use a confidence interval (CI) of 95% and a design effect of 2. Similarly, there are no reported data related to sexual behavior among MSM in Angola, but condom use during the last anal intercourse with another man is reported as varying from 20% to 80% in the same UNGASS reports from other African countries.[4] Using these data, and to maximize the sample, an estimate of 50% of condom use in the last anal intercourse was used. A sample size of 350 allows for the prevalence estimate error of $\pm$4.2% for HIV, $\pm$4.8% for syphilis, and $\pm$7.4% for the frequency of condom use during the last anal intercourse.

For the BBSS, voluntary HIV and syphilis testing and syphilis treatment were separately consented and offered. Pretest and posttest counseling for HIV was provided, as was referral for monitoring and treatment of HIV and syphilis.

RDS was initiated with 6 nonrandomly selected "seeds." Each seed received 3 unique coupons to use in recruiting their peers. After being interviewed, the seed-recruited participants received 3 coupons to recruit their peers. This process was repeated until sample size was reached.

All participants received a primary incentive with a value of US $15.00 plus 2 refills of 125 unit phone cards. They were also offered a secondary incentive of a 125 unit phone card for each eligible participant recruited (maximum of 3 recruits). Each phone card was worth about US $10. The total cash value that a participant could receive was equivalent to about $65.

The protocol called for a sample size of 350 individuals. The actual survey population consisted[33] of 351 MSM who fulfilled the following inclusion criteria: (1) had at least 1 receptive or insertive anal contact with another man in the previous 6 months; (2) aged 18 years or older; (3) fluent in Portuguese; (4) residing in 1 of the 9 municipalities of Luanda Province; (5) have not participated previously in the current BBSS study; (6) present a valid coupon to participate in the study; (7) agree to provide verbal informed consent for the questionnaire; and (8) not obviously under the influence of drugs or alcohol at the time of enrollment. Transwomen were not excluded from the study.

A semi-structured questionnaire, based on Family Health International's instrument for MSM,[33] was modified for Centers for Disease Control and Prevention (CDC) and Angolan use. Two of the interviewers identified themselves as members of the MSM community, 1 did not. Interviewers used a pocket PC (Handheld-Assisted Personal Interview) to record data. Data were downloaded daily and checked.

The questionnaire was developed and pretested among MSM volunteers from NGOs associated with the study in Angola.

Clinical and Laboratory Procedures

HIV and syphilis testing was consented separately from the questionnaire. Rapid serological tests were performed for HIV-1, HIV-2, and syphilis. Whole blood was used in all diagnostic tests, and manufacturer instructions for storage, use, and disposal were closely followed. For HIV diagnosis, the algorithm for quick testing established by the Ministry of Health of the Republic of Angola was followed: first test using Determine HIV 1/2 (Inverness Medical Innovations, Inc., Alere Inc., Waltham, MA), and if positive, confirmatory test with Uni-Gold HIV (Trinity Biotech; Bray, Co. Wicklow, Ireland.). If the results of these tests are discordant, a new blood sample collected immediately for retesting. Syphilis testing used Determine Syphilis *Treponema pallidum* (Inverness Medical Innovations, Inc.). All testing supplies and procedures are US Federal Food and Drug Administration and CDC approved. Pretest and posttest counseling were provided as per Government of Angola and CDC policy.

Management, Safety, and Quality Control of Interview Data

The pocket PC questionnaire was created with QDSTM (Questionnaire Development System; Nova Research Company, Silver Spring, MD). Responses to the questionnaire were stored in an SPSS compatible database. The database was converted to an Excel worksheet and formatted for the RDSAT available at http://www.respondentdrivensampling.org/. Coupons were managed with custom software developed for the project in Excel.

The field supervisor, a Brazilian surveillance official, remained on-site through the entire data collection period, monitoring all phases of the study, including recruitment, consent, interviews, coupon management, data management, data security and confidentiality, and clinical and laboratory procedures.

The office was staffed with a receptionist, 3 interviewers, 4 health professionals for testing and counseling, and the field supervisor. All were trained and participated in a pilot study. Written standard operating procedures were available.

Ethical Considerations

This study was conducted in accordance with all relevant ethical guidelines and regulations in the United States and Angola. The protocol was approved by the CDC in Atlanta, GA, the National Ethics Committee of the Ministry of Health, Republic of Angola (FWA00013700), and the Institutional Review Board at Tulane University.

Data Analysis

In the main study, recruitment patterns were examined according to key characteristics of participants to identify possible biases in the recruitment chain (ie, selection bias in preference for homophily or differential recruitment because of different sizes of subjects' social networks). RDSAT was used to weight responses to partially control for these biases. To perform multivariate analysis, STATA was used, exporting these weights from RDSAT. Recruitment chains were explored visually using NetDraw (http://www.analytictech.com/downloadnd.htm).

Descriptive analysis was conducted on all variables including HIV prevalence, and estimates were calculated with 95% CIs. Multivariate analyses were performed using nonconditional logistic regression to estimate predictors of HIV infection and factors associated with having unprotected sex with any partner. Because there is no consensus on the best statistical method for more complex analyses such as logistic regression using RDS, we followed the recommendations of Johnston et al.[34]

A problem using RDS emerged in this study, as not all individuals agreed to be tested for HIV. If listed as "missing," RDSAT effectively converts recruited individuals of that respondent to new seeds. It breaks the chain, and in treating the next respondent as a seed, ignores their response for the variable selected. To correct for this, the analysis needs to impute values in place of missing. Six different imputation strategies were used: (1) all the participants who did not test were considered HIV negative; (2) all the participants who did not test were considered HIV positive; (3) all participants not testing for HIV were given a third value, rather than missing (the conventional approach); (4) recruitment chains were examined, and if the respondent who refused to test was between 2 HIV+ respondents, HIV seropositivity was imputed; (5) social networks of participants were analyzed, and those missing were assigned HIV positive status if they were adjacent to a chain (minimum 2) of positives; (6) status was imputed using values from an unweighted logistic regression model of indicators associated with seropositivity. The independent variables that would make up the initial model were selected from those of HIV+ individuals, which in contingency tables showed a significant association using Fisher exact test (10% significance).

RESULTS

Estimated Population Size of MSM

For the population estimation, 891 MSM were approached, of whom 870 agreed to participate. Of these, 797 were eligible and 792 volunteered to take the keychain. In the BBSS study, the proportion of participants who said they received the keychain was 12.7% (45/353). Thus, the estimated size of the MSM population in Luanda Province is 6236.

BBSS: Analysis of the Pattern of Recruitment and Social Networking

A total of 370 men visited the study site to be interviewed. Of these, 5.1% (19) were not eligible. Most of the individuals who were not eligible (17/19) reported not having had sex with men in the last 6 months (Table 1).

Socioeconomic and Demographic Characteristics

The majority of respondents identified themselves as ethnically Kimbundu (59.7%), single (93.3%), reported no income last month (52.9%), and living with their mother and/

TABLE 1. Estimates of Prevalence for HIV+ Using Different Imputation Methods for Missing Test Data

	Observed	HIV+, %*	95% CI*	Equilibrium Wave
HIV test result in BBSS				
Negative	301	96.3	93.4 to 98.7	8
Positive	27	3.7	1.3 to 6.6	—
Total	328	100.0	—	—
Total test result (n = 351)				
Negative	301	89.5	84.8 to 94.3	5
Positive	27	3.7	1.5 to 6.3	—
Did not test in the study	23	6.8	3.0 to 10.8	—
Test result HIV + 1 self-report HIV+				
Negative	301	89.4	84.6 to 94.4	5
Positive	28	3.8	1.6 to 6.5	—
Did not test in the study	22	6.8	2.8 to 10.6	—
Imputation: all positive				
Negative	301	89.5	84.6 to 94.4	**3**
Positive	50	10.5	5.6 to 15.3	—
Imputation: all negative				
Negative	323	95.8	93.1 to 98.1	**3**
Positive	28	4.2	2.0 to 6.9	—
Network imputation: simulation 1				
Negative	312	93.3	89.3 to 97.6	**4**
Positive	39	6.7	2.4 to 10.6	—
Network imputation: simulation 2				
Negative	316	94.2	90.3 to 98.0	**4**
Positive	35	5.8	2.0 to 9.8	—
Allocation by logistic regression†				
Negative	311	93.4	89.5 to 96.8	4
Positive	40	6.6	3.1 to 10.3	—

*Values estimated by RDSAT with RDSAT 5.6.
†Logistic regression with raw data.

or father (58.7%). A large minority reported no occupation (30.5%). The average monthly income reported was US $258.00. The large number reporting no income skewed results (SD: $710, range: US $0–6450).

HIV and Syphilis Testing

Total of 203 participants (61.8%) reported never testing for HIV. Of those who did, 52 (27.7%) had been tested in the last 3 months; another 52 (31.1%) reported being tested between 3 and 12 months ago. Multiple testing was common, and for those testing in the last year, about 43% tested multiple times. Ten (5.2%) reported that they are positive, and only 1 respondent did not offer to provide their result. Of the respondents, 302 (86.5%) intended to test for HIV in this study. Most, 273 (71.3%), know where to test, and 134 (38.7%) think they have little or no (13.2%) chance of being infected. Of the 351 participants, 92.5% took the test for HIV, resulting in 27 positive individuals (8.2% crude value, 3.7% adjusted with RDSAT). Only 1 individual tested positive for syphilis (1/310) (Fig. 1).

Imputation

Six strategies were used for imputation of seroprevalence. Results varied between 3.7% and 10.5%. CIs were quite large (Table 1).

Sexual Behavior

Many respondents (40.6%) had their first sexual relationship between 15 and 17 years of age. About 52.9% said that their first sexual relationship was with a man and the majority did not use condoms (192, 53.8%).

The majority of MSM reported having a regular partner in the last 6 months (80.1%). More than one-third (36.6%) reported commercial sex (paid and/or receiving payment), and in combination with steady partners, also participated in casual and commercial sex (Table 2). The number of partners over the last 6 months varied, regardless of the type of partner, from 1 to 283 partners (Table 2). A small but important proportion of men reported transwomens, men, and women concurrently as partners (mean = 15.71, SD = 18.56, median = 11, range: 4–117).

Of the respondents who reported a regular partner (transwomen, man, or woman), the percentage of always use of condoms during vaginal or anal sex was low, ranging from 11.5% with a transwomen partner to 36.1% with male partners. The use of condom at last sexual intercourse was lowest (50.3%), when the transwomen partner was insertive, and highest (79.6%; 74), when a regular male partner was insertive. Ignorance of the serostatus of regular partners was high (97.6% when partner was a transwomen and 71.4% when partner was male).

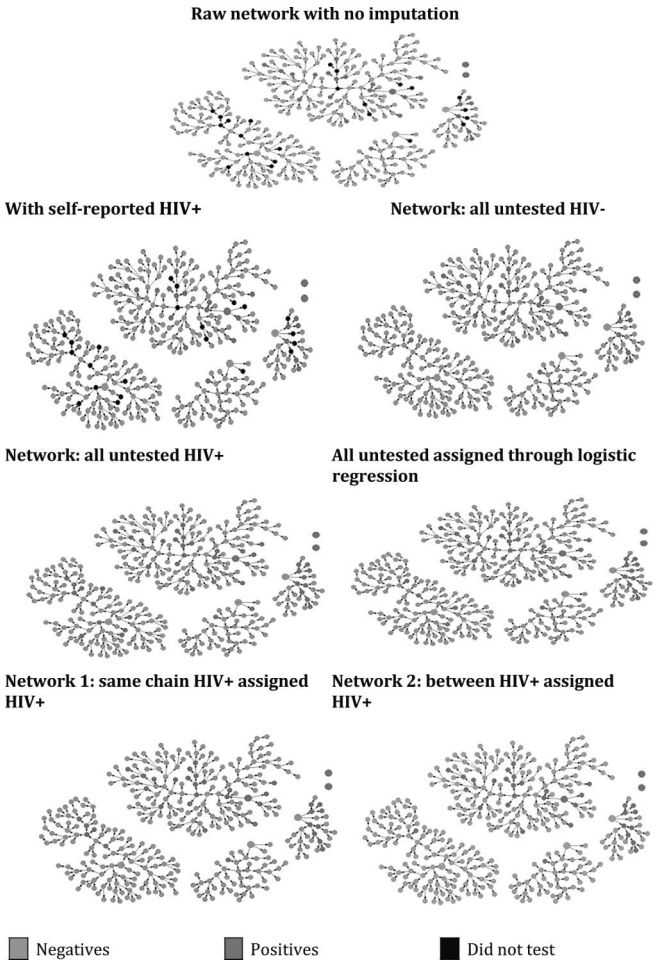

FIGURE 1. Social network of MSM for the outcome of the test HIV obtained by different allocation procedures.

Homophobia, Discrimination, and Violence

Almost half of MSM (171, 46.2%) reported having experienced some type of violence in their life, that is, were physically assaulted or discriminated against (Table 3). With respect to homophobia, 133 (70.4%) report episodes. Among those who reported episodes of discrimination because of sexual orientation (165), 40.1% reported that it occurred many times in the last 12 months and at work, school, business, and recreational areas. (Table 3).

Just over 10% reported having been physically attacked because of sexual orientation. Among the perpetrators were friends, acquaintances, partners, or unknown people. A quarter of participants reported having been forced to have sex against their will. For many, this occurred in childhood and adolescence. Friends and acquaintances were most cited. A very small percentage of participants (2.5%) reported having been arrested for having sex with another man.

DISCUSSION

This article reports a few selected variables from the first BBSS conducted among MSM in Angola. The study was not only a "proof of principle" that such surveillance could be conducted but that there would be an enthusiastic response from the affected community. Given an increasing vitriolic public debate about homosexuality in Africa, the project team considered other potential outcomes. The study presents a picture of risky sex: low condom use, multiple and concurrent partners, commercial sex, and high levels of sex with drug use. The study also reports early sexual initiation and high levels of homophobia.

At the same time, the study identified some difficulties with the treatment of missing values in RDS, creating divergent values for seropositivity, and wide CIs for findings that will make interpretation of results over time difficult.

We were able to successfully complete data collection among MSM in Luanda Province in only 34 days, much shorter than anticipated in the protocol. This success can be attributed to 2 features: a Brazilian team with more than 4 years of experience successfully conducting RDS and strong support in Angola from the INLS and the MSM community.

This population of MSM demonstrates great diversity of identities and behaviors. About half had their first sexual intercourse with another man, only 3.9% reported living with a partner, and the majority were single and lived with parents or family. A relatively small percentage identifies themselves as exclusively homosexual or gay. The identity selected by respondents most frequently was bisexual, although MSM (homens que fazem sexo com homens [HSH] in Portuguese) was also used, demonstrating how this neologism from epidemiology has penetrated the community. Most MSM report sexual desire for both men and women. In other parts of the world, such as northeast Brazil, where cultural conservatism and homophobia are higher than elsewhere in Brazil, there is also a higher proportion of MSM who say they are bisexual, as compared with other areas of the country that are more developed, such as the southeast.[35]

Some characteristics are associated with high-risk behaviors: number of partners, the diversity of partner types

TABLE 2. Number of Sexual Partners in the Last 6 Months by Type of Partner

Total No. Sexual Partners in the Last 6 Months	N	Mean	SD	Minimum	Median	Maximum
Only transwomen	52	3.77	3.50	1	3	18
Only men	100	9.24	29.25	1	3	283
Transwomen and men	33	7.30	8.46	2	4	36
Transwomen and women	56	6.05	3.94	2	5	18
Men and women	50	6.98	7.20	2	6	50
Transwomen, men, and women	35	15.71	18.56	4	11	117

TABLE 3. Homophobia, Violence, and Discrimination Among MSM

	N Observed	%	95% CI
Have you ever suffered homophobia (physically assaulted, cursed, humiliated)			
Yes	171	46.2	38.9 to 53.6
No	180	53.8	46.4 to 61.1
Total	351	100.0	—
Has someone cursed, humiliated, or made you feel bad about yourself because of your sexual orientation?			
Yes	165	44.7	37.9 to 52
No	186	55.3	48 to 62.2
Total	351	100.0	—
In the last 12 months, how often were you discriminated against because of your sexual orientation?			
Not once	6	4.3	0.9 to 8.2
Once	24	13.7	6.9 to 23.7
Rarely	68	41.9	34.4 to 57.6
Often	67	40.1	24.3 to 47.1
Total	165	100.0	—
Where did you feel discriminated against because of your sexual orientation			
Total	165	100.0	—
At your workplace	20	15.4	9.0 to 30.1
At school/university	52	28.1	17.0 to 41.2
At a religious place	7	7.1	1.2 to 13.4
At places where you trade	19	15.6	5.5 to 26.9
At leisure sites	36	22.9	13.6 to 35.0
At any health service	1	—	—
On the streets	133	70.4	57.9 to 82.2
At any other place	20	13.0	3.8 to 26.1
What other place?			
Airport	1	—	—
Community/home town	1	—	—
Home	8	—	—
Friend's house	1	—	—
Family member's house	1	—	—
Inside the house	1	—	—
At an NGO	1	—	—
Party	1	—	—
On the Internet	1	—	—
Bar	1	—	—
Beach	2	—	—
Street party	1	—	—

(regular, casual, and commercial), and sex with different genders (men, women, and transwomens). Other important associations with risk include high consumption of alcohol, and to a lesser extent, consumption of illicit drugs, among them, cannabis (marijuana).

Fear of discrimination is high; most do not disclose their sexual preference to their families. Those that do, often do so after a positive HIV test. Concern about disclosure is most likely associated with fear of discrimination; a high percentage of individuals report episodes of homophobia. An interesting episode occurred during data collection. Two brothers surprised each other at the study site unaware of each others' sexual preferences for men.

Knowledge about the main modes of HIV transmission was very high. This information coexisted with other false ideas about transmission through mosquitoes or sharing bathrooms. This co-existence is common throughout the world and creates a space for both victims and the general public to propagate blameless personal narratives, rationalizations of behavior, and prejudice. Such common "urban myths" are arguably less important than the treatment-linked findings: two-thirds of respondents do not recognize that treatment can reduce the spread of HIV; a third believes that people might be using condoms less because of treatment. Considering findings on the impact of treatment in improved quality of life, increased survival, and reduction in transmission, these new "treatment-linked" prevention targets should be specifically addressed in the development of educational materials.

Limitations

Because this population is difficult to access and only a few underpopulated venues for MSM exist in Luanda, no conventional sampling methods, such as time-location sampling, are feasible. RDS has several limitations. One concerns an ongoing debate about the design effect, and the literature has discussed design effects as high as 6.[36–38] Our sample size here was constrained by budget, but in all fairness, larger design effects would effectively curtail the use of RDS for routine surveillance almost anywhere in the world.[39,40]

Another potential limitation for RDS is the need for primary and secondary incentives and the level of these incentives. In this study, concerns were raised that the incentives were too high, and encouraged masking, and that some participants were actually not MSM. At the same time, the inability to recruit higher social status MSM may be due to incentives that were set too low. However, there are other potential reasons for nonparticipation of higher socioeconomic status (SES) individuals. It could be due to greater consequences for breaches of confidentiality or because higher SES individuals maintain relatively separate social networks and would be difficult to recruit with RDS (the problem of "bottlenecks").

RDS also has limitations for analysis. There exist ongoing discussions of the estimators that are used to provide weighted results and CIs.[39] A second issue concerns how RDS treats missing values.

Finally, this study describes several categories, "men who have sex with men," which purports to have a clear epidemiological meaning, but which is not a recognized sexual identity among most of the men we studied. The fact that this usage is conventional in epidemiology does not resolve its ambiguity. To help clarify the situation, the term was amplified to include transwomen/panina, the later being

a widely recognized category of alternative sexual identity, even if somewhat derogatory in Angolan Portuguese. To what extent this limitation affected recruitment or our ability to generalize to the population MSM cannot be ascertained.

The term travesti, literally transvestite, was used in the study as well, although transvestite is falling out of use in English-speaking countries. In the study's defense, the term was clearly understood in Angola (as in Brazil) by persons born with male genitalia who dressed or otherwise presented themselves as women. Sexuality, of course, is not a fixed biological or behavioral characteristic, and this ambiguity is amplified when hidden or marginalized sexualities are explored.

CONCLUSIONS

This project successfully concluded the first ever biological and behavioral surveillance among MSM in Angola. Because of formative research and comprehensive mapping, 900 MSM were reached for population size estimation and agreed to accept a small keychain flashlight with the emblem of Tulane University. The study estimated a population of approximately 6250 MSM in Luanda Province.

The studied population showed an infection rate that range from 3.8% to 10.5% or at least 2 times higher than the general population of Angola, where an estimated 1.9% of the adult population is HIV+.

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