

Challenges of Respondent Driven Sampling to Assess Sexual Behaviour and Estimate the Prevalence of Human Immunodeficiency Virus (HIV) and Syphilis in Men Who Have Sex with Men (MSM) in Singapore

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Abstract

There is a lack of representative samples to provide reliable and accurate seroprevalence of sexually transmitted infections (STIs) and human immunodeficiency virus (HIV) as well as behavioural information among men who have sex with men (MSM) in Singapore. We used respondent driven sampling (RDS) to recruit MSM. Participants completed a survey used by Asian Internet MSM Sex Survey (AIMSS) and were tested for HIV and syphilis. We compared the characteristics of the RDS participants with STI diagnosis against those who did not have any STI diagnosis in the past 6 months. We compared RDS participants with AIMSS participants. Of 72 MSM recruited, 1 was positive for HIV (1.3%) and 4 (5.5%) tested positive for syphilis. Median age was 30 years and majority was Chinese (69.4%). RDS participants who had any STI diagnosis reported to have more use of recreational drugs ($P = 0.006$), and lower condom use ($P = 0.054$). Comparing RDS participants ($n = 72$) with the AIMSS participants ($n = 2075$), RDS respondents had ≥ 1 male partner in the past 6 months ($P = 0.003$), more casual sex partners ($P = 0.012$) and more STI symptoms ($P = 0.019$). There was no difference in terms of HIV testing and recreational drug use. The HIV and syphilis seroprevalence rates from our study are similar to previous reports conducted in high-risk MSM. In contrast to other settings, RDS did not work well among MSM in Singapore. The public health implications of our study highlight the challenges in obtaining data for HIV surveillance in assessing prevalence and risk behaviours among MSM.

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Introduction

As of end 2011, the cumulative total of human immunodeficiency virus (HIV) cases in Singapore is 5306.¹ While the main mode of HIV transmission among Singaporeans is through sexual transmission, for the first time, men who have sex with men (MSM) who acquire HIV infection through homosexual and bisexual route now accounts for the majority of sexual transmission. From 1985 to 2004, homosexuals and bisexuals accounted for 22% of newly diagnosed individuals. There has been an increasing trend in the past 6 years, from 31.8% in 2005 to 46% in 2010 and 51% in 2011 of newly diagnosed HIV individuals who report to be either homosexual or bisexual.¹

Rationale for Respondent Driven Sampling for MSM in Singapore

Sex between males is illegal under Section 377A of the Penal Code of Singapore. It has been recognised that MSM are one of several hard-to-reach but at-risk populations in low-grade and concentrated epidemic settings. No sampling frame exists for such a population. Current estimates of HIV and sexually transmitted infection (STI) prevalence among MSM in Singapore is based on data from STI clinics in 2008 (4.6%).^{2,3} Some of these methods have provided useful information on MSM behaviour in the Singapore context. HIV prevalence surveys have been conducted on respondents recruited from bars and saunas (location-based

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sampling) frequented by MSM, but such surveys may be subject to substantial selection bias (saunas: 2.9%, bars/clubs: 2.7%).² Internet surveys have been used to obtain data on sexual attitudes and practices in the online MSM community,³ but no biological testing is possible in such surveys.

There is a lack of representative samples to provide reliable and accurate seroprevalence of STI and HIV as well as behavioural information among MSM in Singapore. The previous sampling methodologies may only access individuals whose behaviours are “visible” because of their convenience (location-based) and potentially miss those who are “hidden”. Likewise, findings from internet surveys may not be generalisable to MSM who do not use the internet. One of the sampling methodologies that have been developed in HIV research to overcome some of the above challenges is respondent driven sampling (RDS). Surveys using RDS methods have been shown to reach both hidden and visible segments and may be more representative in terms of seroprevalence and behavioural risk profile. RDS has been used successfully in many studies conducted worldwide as a relatively easy to implement and effective sampling method to gather representative data from MSM.^{4,5} It uses chain referral sampling along with measurements of each participant’s peer group and recruitment patterns to derive adjusted proportions and variance estimates.⁶⁻⁸ RDS can generate estimates that are representative of the population from which the sample was gathered.⁹

Context and Findings of Our Respondent Driven Sampling Study

We conducted a study using RDS to determine the seroprevalence of HIV infection and syphilis and its association with behavioural risk factors among MSM population in Singapore. We compared the results from our RDS study with data collected through an internet MSM survey using the same questionnaire instrument. The challenges in conducting RDS in Singapore are also discussed.

Before the study implementation, we conducted 3 consultations with key stakeholders in the MSM community to assess acceptance of RDS (appropriateness of incentives, choice of site) among MSM as well as to help identify a diversity of “seeds” among MSM subgroups.

The RDS study, named ‘Sex in the City’, was conducted from March to December 2011 at DSC (Department of STI Control) Clinic, a public STI clinic, and from June to December 2011 at Dr Jay Medical Centre, an MSM friendly general practitioner (GP) clinic. There were an initial 10 non-randomly selected MSM seeds identified in the beginning and an additional 18 seeds were added in June 2011 when the original 10 seeds were unsuccessful in recruiting other

participants. All the seeds were selected by recommendation of Action for AIDS (AFA), a non-governmental organisation specialising in HIV prevention programmes among MSM. All the seeds recommended were deemed to have a large MSM peer network, however the exact size of the network were not quantified. Each seed was asked to recruit 3 other MSM peers. Eligible participants were male, had sex (anal or oral or both) with another man in the past 5 years, 21 years or older and resident of Singapore. After verbal consent had been obtained, participants received pretest counselling and were asked to provide 15 mL of venous blood which were screened for HIV and syphilis. They were asked to complete a 20-minute self-administered computer-based survey questionnaire used by Asian Internet MSM Sex Survey (AIMSS). After completion of the survey, participants were invited to recruit 3 participants. They were given a coupon to return to the anonymous clinic located at DSC to collect their test results and secondary incentive. All information gathered during the study was anonymous and linked by a unique identification number.

Those who enrolled in the survey received S\$40 (primary incentive). Those who recruited their peers received S\$20 for each peer they successfully recruited (secondary incentive). The final target sample size was 960 after taking into account the design effect from RDS (original sample size of 640 was inflated by a factor of 1.5).¹⁰

In addition to maximising the primary and secondary incentive allowable by the ethics review board midway through the study, banner advertisements were put on 2 MSM websites and media coverage was used as efforts to increase participation in the study.

To answer our first study question, we compared the characteristics of those with an STI symptom or diagnosis to those who did not among the RDS sample.

The AIMSS is an online anonymous self-administered computer-based survey conducted between January and February 2010 as part of the MSM community assessment and evaluation in the region. The details of the questionnaire and findings from this study have been previously published.¹¹⁻¹³ We obtained the dataset specific to Singapore respondents ($n=2075$) from this study. To answer our second study question, characteristics of participants recruited through RDS were compared to participants in the AIMSS internet study (2012) to assess any difference in the 2 samples.

Over the course of 10 months, 72 MSM participated in the study. One participant tested positive for HIV (1.3%) and 4 (5.5%) had a positive syphilis test result. Only 23 (32%) returned to collect their test results. None of the RDS participants were previously known to be HIV positive. The median was 30 years of age. Most of them were Chinese (69.4%). With regard to the sexual orientation, 76.4%

identified themselves as homosexuals, 20.8% as bisexuals and 2.8% as heterosexuals.

We compared the characteristics of the RDS participants in terms of whether they have had any self-reported STI diagnosis or confirmed diagnosis (defined as either having a reactive syphilis test or HIV test), ($n = 15$) against those who did not report to have any STI symptoms or diagnosis in the past 6 months ($n = 67$). RDS participants who reported having had an STI diagnosis reported to more use of recreational drugs ($P = 0.006$), and lower condom use ($P = 0.054$). There were more high-risk sexual risk behaviour (unprotected sex) during travel outside of Singapore and more male partners though not significant ($P = 0.071$ and $P = 0.06$ respectively). As we did not reach our target sample size, we were unable to make a reasonable comparison of the survey from the RDS participants ($n = 72$) with the internet survey ($n = 2075$).

Lessons from Failure of Our Respondent Driven Sampling Design

In contrast to other settings, RDS was not easy to implement and did not work well among MSM in Singapore. The failure to reach the sample size can be due to several reasons. Aside from participating in the survey, participants also needed to provide a biologic sample. While we hoped that this would be an incentive to participate, in reality, this could have hindered participation. In Singapore, MSM already have access to anonymous test sites and majority (76.4%) of the RDS participants already know of their HIV status. It is likely that individuals who felt more comfortable with testing were more inclined to participate. HIV related stigma and discrimination remains an issue in Singapore¹⁴ and this might have affected recruitment for those who have not had a recent HIV test or for those who are known to be HIV positive.

In terms of how much the monetary incentive played a role in recruitment, we asked the participants whether they would participate in future studies using RDS if there were no monetary incentive and 57% said yes, 33% no, and 10% maybe. One reason for participating in the study was “to contribute to research” (18%). Some respondents specifically mentioned that they hoped the findings of the study could better inform and develop health services for MSM. Eighteen of the 26 (69%) participants who had recruited at least 1 peer came back to collect their secondary incentive. These findings suggest that the monetary incentives probably played a secondary and less important role in recruitment into the study.

Because of the issues relating to informing participants of their HIV test results, there was a need for those who tested positive to have direct access to experienced counsellors which influenced our study site selection. We chose a

popular site already performing anonymous HIV testing. Non-respondent feedback from peer recruiters suggests that potential recruits were uncomfortable with the location because of inaccessibility and fear that someone they know might see them around the area. The site was associated with STI treatment which potential participants don't want to be identified with.

Sex between males is illegal under Section 377A of the Penal Code of Singapore and therefore all eligible participants reporting to our study site would hence be admitting to have performed an illegal act. Anonymity was used to protect research staff and participants from legal repercussions and to reduce potential bias. While this law has been rarely enforced in Singapore, it is difficult to quantify how much this played a factor in the low recruitment in our study.

Finally, while we had a consultative phase with MSM stakeholders, conducting formative research prior to engaging in RDS study would have elucidated any barriers of the acceptability and feasibility of this sampling approach to our study.

During the consultation phase of our study, the MSM community noted increasing risks among young MSM (≤ 21 years old). We wanted to include young MSM and applied for an amendment with the ethics review board to allow inclusion of participants who are between 16 and 20 years old. The board decided against the study enrolling participants below age 21 without parental consent. Response from the board was that there was possible risk or harm to younger participants given the nature of sexual behaviour questions in the survey that could be misinterpreted as the “norm” of being MSM. The study team is of the opinion that such decisions need to be addressed if we intend to conduct meaningful studies on the most vulnerable members in the community.

Implications for Future Research into Sexual Behaviour of MSM in Singapore

Due to our small sample size, we were unable to conduct a multivariate logistic regression analysis to confirm the relationship between STI and the possible risk factors (i.e. drug use, psychiatric comorbidities, number of partners). Future research should take into consideration HIV related syndemics. Syndemic dynamics has been used to understand the factors driving HIV in high-risk populations. A syndemic refers to the concentration within a specific population of multiple co-occurring epidemics interacting and reinforcing one another and giving rise to other health problems.¹⁵ Studies have shown how other epidemics such as substance abuse and mental health can interact and drive HIV epidemic among MSM.¹⁶

The best methodology to assess prevalence of HIV among MSM remains unknown. The limitations of our study include the selection bias, social desirability bias, small sample size and ethical considerations associated with studies or surveys conducted on “stigmatised” populations such as MSM, and its representativeness of the MSM community in Singapore. The public health implications of the findings highlight the challenges in obtaining data for HIV surveillance in assessing prevalence and risk behaviours among MSM. Inevitably, this affects the design of interventions that target both the visible and hidden MSM including the youth.

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