Published in final edited form as:

Int J STD AIDS. 2013 April ; 24(4): 323–328. doi:10.1177/0956462412472791.

Expanding sexually transmitted infection screening among women and men engaging in transactional sex: the feasibility of field-based self-collection

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Summary

Routine screening is a key component of sexually transmitted infection (STI) prevention and control; however, traditional programmes often fail to effectively reach men and women in hidden communities. To reduce prevalence, we must understand the programmatic features that would encourage utilization of services among asymptomatic individuals. Using incentivized snowball sampling, 44 women and men recently engaging in transactional sex were recruited (24 women, 20 men); median age 37 years. Respondents were offered the opportunity to collect genital, oropharyngeal and rectal samples for STI testing and completed a face-to-face interview about their experience with self-obtained sampling. Interviews were analysed using qualitative methods. Participants were unaware of potential risk for STI, but found self-sampling in non-clinical settings to be acceptable and preferable to clinic-based testing. All participants collected genital specimens; 96% and 4% collected oropharyngeal and rectal specimens, respectively. The burden of disease in this population was high: 38% tested positive for at least one STI. We detected multiple concomitant infections. Incorporating field collection of self-obtained samples into STI control programmes may increase utilization among high-risk populations unlikely to access clinic-based services. High infection rates indicate that individuals engaging in transactional sex would benefit from, and be responsive to, community-based self-sampling for STI screening.

Keywords

sexually transmitted infections; diagnosis; sex workers; field collection; self-administered sampling; preferences; STI screening; transactional sex

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Competing interests: None.

Ethics approval: This study was conducted with the approval of the Indiana University Institutional Review Board.

Contributors: AMR and BVDV initiated the project. AMR and JGR collected and analyzed the data. All authors contributed to the preparation of the manuscript.

Provenance and peer review: Not commissioned; externally peer reviewed.

INTRODUCTION

The substantial evidence linking sexually transmitted infections (STI) to adverse health outcomes, especially among women, necessitates the development of novel programmes to curb rates of infection. In addition to acute infection, when left untreated STIs have been linked to pelvic inflammatory disease,¹ preterm delivery and low birth weight,^{2,3} and increased likelihood of human immunodeficiency virus (HIV) acquisition.^{4,5} While routine screening is a key component of STI prevention and control, traditional programmes often fail to effectively reach hidden communities including sex workers. The correlation between STI and HIV susceptibility is particularly relevant for individuals who trade sex because of the increased probability they will engage in sexual intercourse with multiple high-risk partners in relatively short periods of time.

While studies have explored the epidemiology of STIs among men and women engaging in transactional sex,⁶⁻⁸ limited information exists regarding their preferences for STI testing and treatment services. Implementation of field collection of specimens for STI diagnosis using self-obtained samples may increase access to care for these populations who may be unlikely to access clinic-based services.⁹⁻¹² In this manuscript, we report on strategies to encourage sexual health care among sex workers and individuals in their social and sexual networks. Given the possibility that concurrent high-risk sexual relationships may occur among this population, thereby increasing their risk of STI and related sequelae, it is important to assess features of sexual health programmes that may encourage service utilization among this group.

Self-obtained vaginal samples for STI diagnoses were not only acceptable but preferable to gynecological examination.¹³ The multisite study by Chernesky *et al.*¹⁴ reported that 94% of women were more likely to be tested in the future if self-sampling was an option. Self-obtained specimen collected from non-genital sites, such as the rectum or pharynx, are also highly acceptable. Among 301 men who have sex with men (MSM) recruited from a genitourinary clinic in the UK, 76% and 72% found self-obtained oropharyngeal and rectal swabs to be acceptable, respectively.⁹

Research has demonstrated that self-obtained samples from non-genital sites are comparable in sensitivity and specificity to those collected by a clinician.¹⁵ Given the acceptability and efficacy of these methods, incorporating field collection of self-obtained samples into STI control programmes could increase utilization among high-risk populations that may be unlikely to access clinic-based services. Further, testing of non-genital sites may play an important role in disease control. While no studies have specifically examined non-genital infections (e.g. STIs detected in the pharynx or rectum) among individuals engaging in transactional sex, data collected among other at-risk populations demonstrates an important proportion of disease is missed when only genital screening is performed. Among 441 individuals attending sexually transmitted disease (STD) or HIV clinics, over 60% and 80% of gonococcal and chlamydial infections, respectively, among MSM and over 20% of chlamydial infections in women would have been missed had clinicians solely relied on testing of genital samples.¹⁶

In this study, we examined the acceptability of STI testing outside of a clinical setting using genital and non-genital (oropharyngeal and rectal) self-obtained specimens among women engaging in transactional sex (exchanging sex for drugs and/or money) and men referred to the study by the female participants. Qualitative interviews were conducted and STI samples collected in order to assess their preferences for future sexual health services and knowledge about STI. Self-obtained samples were collected to describe the prevalence of disease among respondents.

METHODS

As part of a larger study, 24 women and 20 men who recently engaged in transactional sex were recruited utilizing incentivized peer recruitment methods. This sampling strategy has been previously described elsewhere.¹⁷ Initial recruits (seeds) were women recently arrested for prostitution identified and recruited from an urban Community Court set in the US Midwest (Indianapolis, IN). Incentivized snowball sampling was utilized (paid peer referrals) to recruit other women engaging in transactional sex and men who had paid for sex with drugs or money between December 2008 and July 2009. This adaptation of snowball sampling was based on respondent-driven sampling (RDS) which has been widely used to recruit hidden or difficult-to-reach populations.^{18–20} However, for this exploratory study, we did not use RDS analytical techniques but rather the dual incentive technique for tracking recruitment patterns. The dual incentive technique is common to RDS and includes providing compensation for participation and for peer referral. Consenting participants completed a face-to-face interview lasting approximately 60 minutes. All study procedures were reviewed and approved by the Indiana University Institutional Review Board.

The semistructured interview guide (see Table 1) was designed to elicit information about the participant's experience with the field collection of self-obtained samples, preferences for future sexual health services utilization and knowledge about STI. Follow-up probes served to identify services options that would facilitate uptake of community-based testing programmes. Two trained non-clinical facilitators conducted all interviews (1 female and 1 male) so that participant and facilitator gender were identical.

After the interview, female participants provided a self-obtained vaginal specimen for STI diagnosis using nucleic acid amplification tests (NAATs) for chlamydia (CT), gonorrhoea (GC) and *Trichomonas vaginalis* (TV). Men provided first-catch urine samples. Participants were also offered an opportunity to self-obtain oropharyngeal and rectal specimens based on their self-perceived risk of infection at these sites. Participants were provided verbal instructions regarding the self-sampling procedures and obtained their samples in a bathroom at all interview sites. Self-obtained specimens and NAATs were utilized because of the acceptability of these diagnostic methods and excellent sensitivity and specificity.^{21,22} Any participant testing positive for an STI was referred to the local public health STD clinic for no-cost treatment.

Samples were collected using the BD Culturette II (Becton, Dickinson & Company, Sparks, MD, USA). We used the Roche Amplicor (Roche Diagnostics, Indianapolis, IN, USA) assay for all CT/GC testing and a modification of the assay for detection of TV.²³ GC positives from oropharyngeal samples were confirmed with the Aptima Combo 2 (AC2) assay (Gen-Probe, San Diego, CA, USA) which targets RNA rather than DNA. The laboratory has validated use of these sample types on all of the commercially available NAATs (unpublished data) and routinely uses these assays for diagnostic purposes at the local STD clinic.

Seed participants were compensated \$20 and were offered an opportunity to recruit women and men in their peer network with a known history of incarceration, substance abuse, STIs or engaging in/utilizing transactional sex. Participants interested in serving as peer recruiters received six recruitment coupons (3 male and 3 female) with the researcher's contact information. Each coupon contained a unique participant identification number that was utilized to track recruitment chains. Peer recruiters received a \$10 incentive for each participant they recruited. Each peer-recruited participant completed a face-to-face interview, provided a self-obtained specimen for STI testing, and received a \$20 cash incentive. Female participants in the second wave of recruits were also offered an

opportunity to serve as peer-recruiters following the same procedure. We conducted additional waves of recruitment until saturation of qualitative themes was achieved.

Descriptive statistics were calculated using SPSS version 18 (SPSS Inc. Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.).²⁴ Qualitative analysis was performed using NVivo software version 9.0 (NVivo qualitative data analysis software, Version 9; QSR International Pty Ltd., Melbourne, Australia, 2010). with review of themes by three separate coders.²⁵ Procedures consisted of verbatim transcription of each interview followed by textual analysis using a method for identifying concepts shared by participants.²⁶ Transcripts were annotated utilizing a coding framework of emergent and repeating themes. During initial coding, key concepts were identified. During the second phase of analysis, focused codes were used to identify the essential and ideal characteristics of a targeted screening programme. When differences in interpretation arose, they were resolved by discussion of the three-member panel. In the final phase of analysis, participant quotes were selected to represent each theme.

RESULTS

Characteristics of the sample

Incentivized peer recruitment resulted in 36 participants (24 women and 20 men) from eight seed participants over the course of three waves of recruitment. The median age of all participants was 37 years (range 19–65 years) and race/ethnicity included Black ($n = 10$) and White ($n = 34$). Overall, participants were unaware of potential risk for STI, especially in the throat and rectum, but found self-sampling in the field to be acceptable (see Table 2).

Most participants did not know that a urine or vaginal test would not detect an oropharyngeal or rectal chlamydial, gonococcal or trichomonal infection. The majority (60.5%) believed it was possible they had been exposed to an STI in the throat yet less than half (48.8%) had ever had an oropharyngeal test. When offered the opportunity, nearly all participants (96%) elected to self-administer an oropharyngeal swab and most indicated being willing to collect these specimens in the future. Participants were less knowledgeable about rectal STIs and only 4% collected rectal specimens. Most participants indicated they were not at risk for rectal STIs (82.5%) and only one participant (2.4%) had previously received a clinician-performed rectal STI examination. One female and one male participant provided rectal specimens.

Table 3 provides the total number of prevalent STI cases detected by gender, site and organism. Nearly 40% of participants (15 women and 2 men) tested positive for at least one STI. A total of 12% of women were positive for CT, 16% for GC and 52% for TV in at least one location. Multiple female participants had concomitant infections. Four participants (16%) tested positive for both vaginal and oropharyngeal infections. Further, four female participants tested positive for more than one organism in one site. Among women with concomitant vaginal infections, we identified one woman with concurrent CT/TV and two women with CT/GC/TV. One participant had concurrent oropharyngeal infection with CT/TV. Finally, among women, there was one case of rectal GC. Of men, 10% were positive for chlamydia detected in the urine with no infections identified using non-genital samples.

Themes identified by qualitative interviews

Theme 1: Acceptability of field collection—Most women (88%) and men (90%) said they preferred collecting their own sample and all participants said they would be willing to be tested by this method in the future. Participants described self-collection of urine or vaginal specimens as easy (93%), painless (96%) and comfortable (93%). Most participants

(87%) indicated that they would be willing to recommend self-sampling to a friend indicating that self-collection was more comfortable than clinician collection. Female participants noted that having a clinician collect a sample was awkward and embarrassing. Participants repeatedly stated that self-sampling was preferable to clinician-obtained samples because it afforded more privacy (see Table 4, Theme 1 Acceptability of field collection).

Participants in this high-prevalence cohort endorsed sampling outside of a clinic (90%) for reasons such as convenience, privacy and minimizing stigma. Participants indicated being screened for STIs outside of a clinic setting would provide a more feasible option for accessing services. Further, transportation, cost, traditional clinic hours of operation and long wait times at the clinic were all referenced by participants as barriers to care. Some participants noted that because most STIs are asymptomatic, individuals have no cues to prompt them to seek services, even during acute infection. These participants asserted that field collection would offer asymptomatic individuals a method for accessing testing without having to negotiate systems of care.

Theme 2: Preferences for care—Participants indicated that anonymity was extremely important and strongly endorsed options that allowed them to refrain from accessing services at the STD clinic (see Table 4, Theme 2: Preferences for care). The stigma associated with having an STI, or being labelled as infected-by-proxy for merely being at the STI clinic, was repeatedly described by participants as a significant barrier to care. Correspondingly, options that allowed participants to remain anonymous and avoid the clinic altogether were by far the most acceptable to this sample. Besides anonymity, convenience and rapid service provision were the most referenced feature an ideal programme.

However, continued contact with a medical professional was seen by some participants as important component of assuring result accuracy. Participants also suggested mobile outreach programmes in high-risk neighbourhoods as well as test-and-treat delivery service that distribute test kits and results on and as needed. Participants suggested that self-sampling test kits should be sold or be made available in high-crime and drug neighbourhoods at hours convenient to street-based sex workers who work overnight. With regard to receiving the results of their STI screen, most participants preferred results to be delivered via the telephone as opposed to in-person at the clinic or by mail. They preferred a telephone call because they believed they would have more rapid access to their results, mistrusted the mail as a way to receive private, health information, and were unlikely to access electronic methods such as email.

DISCUSSION

This formative research project assessed factors relating to the acceptability of field collection of self-obtained specimens among a study sample of high-risk women and men. Results from this work provide unique insights for incorporating field-based self-obtained specimens into community-based components of STI control programmes. Key findings included high acceptability of self-obtained samples including genital and oropharyngeal swabs; less acceptance of rectal sampling and a fairly low level of understanding related to oropharyngeal and rectal infections.

Congruent with the findings of other acceptability studies, this sample overwhelmingly endorsed community-based self-obtained sampling.^{9,10,27–29} The STI prevalence rate in this sample was 37%, and, among women, we detected multiple concomitant infections with multiple organisms. Less than half of participants were aware that the throat and rectum

were susceptible to STIs and even fewer recognized that only a site-specific test would diagnose these infections. An important component of any intervention targeting high-risk populations should include patient education related to site-specific STIs.

In this sample, over 16% of the female participants tested positive for an oropharyngeal infection including *T. vaginalis*. We know of no evaluations of the prevalence of oral trichomonas infection. However, the mucosal environment is likely permissive for *T. vaginalis* and given the exaggerated risk of these women, we were not surprised by the high positivity rate. Additional studies of this infection in the throat are certainly warranted to confirm our observations. Moreover, our data revealed a hesitation to utilize rectal testing among a high-prevalence population. This implies that this is a key target for educational intervention given data suggesting substantial proportion of infections may be missed in the absence of non-genital testing if they are engaging in anal sex.^{15,16}

The majority of recent studies of STI burden among women exchanging sex for drugs or money in the United States occur in major metropolitan cities most likely due to the disproportionate prevalence of HIV in these areas.^{30,31} While HIV prevalence in Marion County (IN) is generally low (0.41%)³² this population may still be at an increased risk for HIV acquisition because of their high-risk sexual practices. While we did not test for HIV, the prevalence of STI among our sample is similar to rates reported in larger US cities^{30,31} indicating this population may benefit from increased access to STI screening and treatment as a mechanism for HIV control.

In order to effectively reduce the burden of STI, it is essential to identify and treat cases among asymptomatic individuals who are, in the absence of any cues, unlikely to take measures to reduce STI transmission. The findings of this study parallel our recent work and that of others, demonstrating non-traditional mechanisms for reaching individuals at high-behavioural risk for infection.^{9–11,33,34} In addition to the ease and physical comfort of self-collection as described by study participants, both men and women discussed the value of having a testing option that was medically thorough but minimally stigmatizing. Individuals emphasized that clinic-based experiences often lacked a level of confidentiality that could be provided with testing in more familiar locations (e.g. personal home and neighbourhood venue). This privacy was viewed both in terms of not being linked directly with an STD clinic by others, as well as the individual privacy associated with collection of a self-sample compared with samples obtained by a practitioner. However, participants simultaneously indicated the necessity of ensuring that screening occurring outside of a provider's office could still be verified as being comprehensive and legitimate. As such, any programme implementing field collection of self-obtained samples should consider the resources needed to provide clients comprehensive access to information, testing and treatment.

While not the main focus of this study, in addition to STI screening, participants suggested a general reluctance to interact with traditional medical settings. The STI examined here are only one of the health risks to which this population is vulnerable (e.g. HIV, intimate partner violence, unintended pregnancy and mental health concerns). These data highlight an urgent need for improved access to primary care that would be acceptable for this group. Further research should specifically examine existing barriers to primary care and consider novel approaches for increasing linkages to care among those engaging in transactional sex.

These data should be considered in terms of limits inherent in the study design. This exploratory study explored self-sampling in a specific population of men and women in a single geographic locale, and therefore is not representative. While research participants were recruited utilizing a modified RDS approach, we acknowledge that a subsample of men and women who engage in transactional sex may have been overlooked, including those

who have social and sexual networks completely outside of those that we were able to tap into. The data were intended as qualitative examples of the range of issues that should be considered in the successful implementation of a successful STI control programme within this population. In addition, demographic characteristics of this sample compared with similar populations in other cities may differ, hence impacting willingness to seek traditional medical care. As such, our findings may not be generalizable among individuals engaging in transactional sex that are of different races, use different substances or live in different geographic regions.

Existing research on STI screening preferences among individuals engaging in transactional sex is limited. Future studies will need to assess additional benefits and barriers associated with reaching this population. However, our data suggest that these women and men find self-sampling to be an appropriate supplement to existing clinic-based testing methods. The high screening acceptance rates and dramatic rates of infection suggest that individuals engaging in transactional sex would benefit from, and would be responsive to, community-based self-sampling.

Acknowledgments

The authors would like to thank the Indianapolis Community Court and the Bell Flower Clinic for their invaluable support in conducting this study.

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Table 1

Sample items from the semistructured interview

Domain	Exemplar item
Experience with field collection of self-obtained samples	<p>`How would you describe your experience of collecting this sample to your friends?' `Would you recommend this type of sample collection to friends?'</p> <p>`Tell me about the last time you were tested for an STI. How did collecting your own specimen in the field compare to that experience?'</p>
Preferences for future sexual health services	<p>`Tell me about the last time you were tested for an STI. How did collecting your own specimen in a non-clinical setting compare to that experience?'</p> <p>`Next time you are tested, would you rather collect your own sample like you just did or have a clinician collect it for you?'</p> <p>`In the future, if you could have any combination of choices for collecting samples, in any setting, what would be ideal for you?'</p>
Knowledge about STI	<p>`Tell me what you know about STI?'</p> <p>`Did you know that the throat [or rectum] can become infected with STI?'</p> <p>`Did you know that if you have an infection in your throat [or rectum], a blood, urine or vaginal sample would not detect it?'</p>

STI = sexually transmitted infection

Table 2

Knowledge of STI, self-perceived risk of infection and willingness to provide self-obtained sample by site ($N = 44$)

	Provided self-obtained field sample N (%)	Willingness to sample in future N (%)	Susceptibility to STI possible N (%)	Recognized site-specific test fail to detect all infections N (%)	Self-reported risk of STI by site N (%)
Rectum	2 (4.5)	18 (40.1)	13 (29.5)	18 (40.1)	7 (15.9)
Throat	22 (50.0)	31 (70.1)	17 (38.6)	23 (52.2)	23 (52.2)
Urethra/vagina	44 (100)	44 (100)	N/A	N/A	N/A

STI = sexually transmitted infection

Table 3

Prevalent STI by gender, site and organism

Organism	Women (N = 24)			Men (N = 20)
	Oropharyngeal infections N (%)	Vaginal infections N (%)	Rectal infections N (%)	Urethral infections N (%)
<i>C. trachomatis</i>	1 (4.2)	3 (12.5)	–	2 (10.5)
<i>N. gonorrhoeae</i>	1 (4.2)	4 (16.7)	1 (4.2)	–
<i>T. vaginalis</i>	2 (8.3)	13 (55.1)	–	–
>1 STI	1 (4.2)	3 (12.5)	–	–

STI = sexually transmitted infection

Table 4**Key themes**

	Illustrative quotes	Speaker characteristics	
Theme 1. Acceptability of field collection			
Privacy	‘More comfortable than with somebody else doing it because it's more private. You don't have to show your privates, you don't have to put your legs open in front of anyone. You go the bathroom and do it yourself.'	35 years	Black woman
Location	‘If I could do it at home, man, I'd do it at home if they put out some kits. If they made kits to test for STD at home, yeah, I most definitely would do it at home because it's easier to do than driving to the clinic with three kids in the car and then dragging them in the clinic'	19 years	White woman
Convenience	‘With this, you don't have to sit and wait on everybody else to do it all. You can sit there [at the clinic] for 2–3 hours, wasting your day away. Here, you can get it done and you can be on your way.'	23 years	White man
Attractive option for asymptomatic individuals	“People are not gonna spend money to come all the way down here unless they know they have something. But if they don't got no symptoms they're not gonna know they have it. [If field-collection kits are available] they're gonna be checking their ass I guarantee.”	47 years	White woman
Theme 2: Preferences for care			
Reducing stigma	‘I'd do it at my house if I could... You don't have to see anybody's face, I'm still on that. Don't nobody know about your business. They can't say I've seen that girl going to the STD clinic or something like that.'	25 years	Black woman
Promoting discretion	‘I'd like to get tested like how they do pregnancy tests. If you gotta home, then there. If you don't have a home, at a gas station in your own privacy. Nobody wants anybody to know they got something they can catch because everybody'd be looking at you like you're nasty. And nobody wants anybody to think that they're nasty.'	47 years	White woman
Contact with clinicians	‘I would prefer a doctor test at home because you get the best of both worlds. It's private, you don't have to wait in line, and it would be done right.'	48 years	Black man
Individualized services	‘If I could just call you at the clinic and say, 'Hey I had a fucked up experience with a girl the other day and I need you to come.' It'd be real convenient; you just come to the house. Yeah, especially if they said, you know, in 4 days you could come back and get your results, you know what I mean? I call, you come over, I spend the 15 minutes to fill out paperwork and take the urine and you get back with the person in 2–3 days let them know if they got something or not. That'd be just fine.'	39 years	Black man
Outreach	‘If you could pick up kits at night like at a liquor store or convenience store or gas station that's open late at night because, [sex workers] go there to buy Brillo pads and their crack pipes. Or, hey the dollar store where all the girls go to get their cheap deodorant and toothpaste and stuff because they can't afford anything.'	47 years	White woman