A mixed methods approach to assess the likelihood of testing for STI using self-collected samples among behaviourally bisexual women

Vanessa Schick[1], Barbara Van Der Pol[2], Brian Dodge[3], Aleta Baldwin[3], J Dennis Fortenberry[4]

[1]Division of Management, Policy, and Community Health, University of Texas Health Science Center at Houston, Houston, Texas, USA

[2]Division of Infectious Diseases, University of Alabama at Birmingham, Birmingham, Alabama, USA

[3]Indiana University—Bloomington, Center for Sexual Health Promotion, Bloomington, Indiana, USA

[4]Division of Adolescent Medicine, Indiana University School of Medicine, Indianapolis, Indiana, USA

Correspondence to Dr Vanessa R Schick, The University of Texas Health Science Center at Houston, School of Public Health, 1200 Pressler Street, Rm E-917, Houston, TX 77030, USA; Vanessa.Schick@uth.tmc.edu

Abstract

Objectives: Behaviourally bisexual women (women who have sex with women and men (WSWM)) are more likely to report a history of sexually transmitted infections (STI) than women who have sex exclusively with men or exclusively with women. Barriers to care may prohibit WSWM from seeking STI testing. The present study investigated participant willingness to self-collect oral, vaginal and anal samples for STI testing.

Methods: Eighty WSWM were recruited from two midwestern locations. After completing an online questionnaire, a subset of the participants were interviewed (n=54) and provided the option to self-collect oral, vaginal and/or anal samples to screen for Chlamydia trachomatis, Neisseria gonorrhoeae and Trichomonas vaginalis.

Results: Over two-thirds (67.5%, n=54) of the participants completed the baseline scheduled and attended the interview. The majority of these participants provided vaginal (87.0%, n=47), oral (85.2%, n=46) and/or anal (61.1%, n=33) samples. Participants with a history of anal play were significantly more likely to provide an anal sample. C. trachomatis infection was identified in the samples of 6.8% (n=3) of the participants including 4.5% (n=2) of the vaginal samples and 3.3% (n=1) of the anal samples. None of the samples were positive for N. gonorrhoeae or T. vaginalis. Participants who reported a recent history of anal sexual behaviour with a male partner were significantly more likely to self-collect an anal sample.

Conclusions: Given the comparatively high STI rates among WSWM, self-sampling in non-traditional settings may present a unique opportunity to provide needed care to this underserved population of women.

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Regardless of whether compared by identity or behaviour, multiple nationally representative studies have found that women who identify as bisexual and/or who are behaviourally bisexual, that is, engage in sexual behaviour with women and men (WSWM)), are more likely to report a history of sexually transmitted infections (STI) than women who have sex exclusively with women (WSW) and women who have sex exclusively with men (WSM).1–5 Mercer and colleagues found that women with both male and female partners were nearly five times more likely than women with exclusively male or female partners to report an STI diagnosis within the past 5 years.4 Other studies with biomarkers show findings similar to those relying on self-reported STI diagnosis with a higher percentage of WSWM testing positive for chlamydia,6 ,7 gonorrhoeae,6 ,7 trichomoniasis7 and HPV8 than their counterparts. Taken together, these findings suggest that prevalence rates of STIs among WSWM are higher than those found in populations of WSM or WSW.

As a result, WSWM are more likely to perceive themselves to be at risk for STIs than WSM4 ,9 and are more likely to have a history of gynaecological care/HIV testing than their counterparts.4 ,10 The relatively high rate of STI testing among WSWM suggests that they are motivated to seek preventative care despite the fact that they are more likely to be underinsured and less likely to report a primary care physician than WSW or WSM.11 Additional barriers to care faced by WSWM, particularly due to the stigma around bisexual behaviour and/or identity disclosure, may also distort STI-related care. In one study, over one-third of women felt that disclosure of bisexual identity to a healthcare provider would hinder their care.12 In another, bisexually identified women were less likely than lesbian-identified patients to disclose same-sex partners to their physician.13 Disclosure and discussion of sexual behaviour specifically may have important testing implications since the behavioural repertoires of WSWM are often more diverse than those of other groups of women.14 For instance, a sizable number of WSWM report sexual behaviour involving the anus and/or the anus of their partner. Therefore, in addition to testing for vaginal/cervical infections, testing of other anatomical sites (eg, the anus) is often warranted for women engaging in any receptive anal sexual behaviour.

Given the issues with capturing accurate information on STI among WSWM, efforts should be made to expand testing possibilities. The diagnosis of STI using self-obtained samples has proven to be an acceptable method among similarly marginalised groups including men who have sex with men and women (MSWM), men who have sex with men (MSM), and women who engage in transactional sex.15–18 However, the usefulness of STI testing among WSWM has not been assessed in a non-clinical sample of sexual minority women. Additionally, while the acceptability of vaginal self-sampling is well documented,19–21 little data exists on the acceptability of anal self-sampling among women. The goals of the present study were, therefore, to evaluate the uptake rates of oral, vaginal and anal self-sampling among WSWM and to assess Chlamydia trachomatis, Trichomonas vaginalis and Neisseria gonorrhoeae positivity rates among participants who provided samples. Furthermore, given the reported diversity of the sexual repertoires of WSWM,14 we posited that WSWM may be more comfortable with their bodies and, therefore, willing to collect and provide samples for STI testing. In order to explore this theory, we assessed the relationship between self-sampling uptake and history of sexual behaviour.

Methods

Participant recruitment and data collection

Women living within driving distance of two metropolitan areas in midwestern USA were recruited during a period of approximately 6 months beginning in June 2012 to participate in the Women in Indiana: Sexual Health and Experience Study (WISHES). The two locations were within driving distance of one another and included one midsized city of over 75 000 residents (Bloomington, Indiana, USA) and one larger city of over 750 000 (Indianapolis, Indiana, USA).22 Participants were recruited via paper-based flyers (20.0%, n=16) and web-based postings (43.8%, n=35) in LGBT-friendly spaces, LISTSERVS/websites targeting women of diverse sexual backgrounds, and spaces unrelated to sex/sexuality (eg, bus stops, university online classified advertisements). Participants were also encouraged to refer other individuals who met the eligibility criteria into the study (18.8%, n=15).

Cisgender women (individuals born female and living as a woman) aged 18 years or over, who reported genital contact with a cisgender man and cisgender woman in the past year were eligible to participate. All participants were also required to confirm that they were comfortable discussing sexual topics with a researcher and had a current email and mailing address. Eligibility data were not maintained in order to protect the privacy of the potential participants. Consent was obtained prior to capturing eligibility data through a web-based survey and again once the participant's eligibility was determined. After signing the online consent form, participants were directed to an online survey containing questions about their sociodemographic characteristics (see table 1), STI and history of sexual behaviour. The online survey took between 10 and 20 min. Participants were asked to provide contact information and their preferred method of contact in order to schedule the in-person interview. Participants were linked to their survey data using a unique ID and participant-chosen pseudonym. The in-person interview lasted between approximately 1 and 3 h, and was conducted at a location of the participant's choosing with the majority of participants opting to engage in the interview in the office of the interviewer. It began with a semistructured interview about their sexual identity and community connection. This was followed by completion of a timeline follow-back/event history calendar designed for the purpose of this study entitled the SEQUENCE© calendar that allowed the interviewer to enter the participant's sexual and relationship partner history into the database with review and input from the participant (Schick V et al, unpublished). Following completion of the interview, participants received a US$50 gift card. They were provided the gift card before they were offered the opportunity to provide a sample in order to ensure that the participants did not mistakenly believe that the compensation was contingent upon providing a sample. The study and all procedures were reviewed and approved by the Indiana University Institutional Review Board.

Main outcome measures

As part of the online baseline survey, participants were asked whether (1) they had been screened for several STIs (eg, 'Have you ever been tested for chlamydia?' This test is typically conducted during a gynaecological exam but may also be done using a urine test.); (2) whether they had been diagnosed with an STI (eg, 'Have you been diagnosed with chlamydia by a healthcare provider?").

Participants were then asked to report the most recent time they engaged in a series of behaviours ('Never', 'Within the past year', 'More than a year ago'). These items were created based on previous survey items assessing sexual behaviour between women23 that were adapted from nationally representative sexual behaviour data.24 Questions on sexual behaviour were asked both in the baseline and during the SEQUENCE© calendar interview. Several behaviours were collapsed for simplicity in the present paper (eg, digital-anal touching/insertion includes anal rubbing, anal fingering and anal fisting). Several behaviours (eg, kissing, breast play, digital-genital stimulation) are not included in the present paper due to a lack of variability in the percentage of participants who positively endorsed the items.

Self-collection of anal, oral and vaginal samples for STI diagnostics

Upon completion of the interview, participants were asked if they would like to receive free testing for C. trachomatis, T. vaginalis and N. gonorrhoeae. Participants who opted in were given an opaque bag including a kit containing three Dacron swabs with varying cap colours corresponding to the vaginal, anal and oral swabs. All participants were provided the opportunity to sample all anatomic sites regardless of their sexual behaviour history. As with similar studies, participants were directed to a bathroom with instructions detailing how to self-collect the samples.15 Instructions were adapted from similar research in which vaginal, oral and/or anal samples were self-obtained by adolescent women25 and MSWM.15 Participants returned the specimens with their preferred method of contact for notification. The kit was then transferred to an infectious disease laboratory where testing was done using DNA-based technology (cobas CT/NG Assay, Roche Diagnostics, Indianapolis, USA). Participants who

tested positive were notified via their preferred method of contact. This was followed by an email to confirm their diagnosis that was available through a link that directed them to a HIPAA-secured website that required a password in order to gain access. They were instructed to bring the email with them to one of several local healthcare providers for treatment.

Data analysis

Demographic characteristics, lifetime self-reported STI diagnoses, samples provided and diagnosis are all reported using descriptive statistics. Bivariate relationships between sociodemographic characteristics and self-reported testing was assessed using the likelihood ratio statistic due to the number of categories and small sample size. Finally, the relationship between sexual behaviour and the likelihood of providing oral, vaginal and anal samples was assessed using the Fisher's exact test due to the limited sample size and 2×2 comparisons.

Results

All participants (n=80) were contacted after completion of the baseline survey at least once with over two-thirds (67.5%, n=54) scheduling and attending the interview. Sociodemographic characteristics, STI testing and diagnostic history of participants interviewed did not significantly differ from those who completed the survey but were not interviewed ($p>0.05$). Fifty-four participants engaged in the interview. Participants ranged in age from 18 to 46 years (Mean=26.13, SD=7.26). The largest percentage of participants were identified as bisexual or heterosexual with a smaller percentage identified as lesbian/gay. The majority of the participants reported that they were not currently in a monogamous relationship (68.52%, n=37). There were no significant differences between participants who provided vaginal, oral or anal samples on any of the sociodemographic characteristics (see table 1).

The majority of the participants who were offered the opportunity to self-collect samples for STI testing provided a vaginal (87.0%, n=47), oral (85.2%, n=46) and anal (61.1%, n=33) sample (see table 2). Fewer than 15% of the participants (13.0%, n=7) provided no samples. Most participants who did not provide samples indicated that they did not perceive a need because of recent testing. A smaller subset indicated discomfort with the testing process or testing location (eg, a public bathroom). Almost all participants who provided at least one swab specimen (87.0%, n=47) provided two (27.7%, n=13) or all three swabs (70.2%, n=33). Of those participants who provided the swabs, 12.8% (n=6) reported having never been screened for STIs and 6.4% (n=3) reported being unsure whether they had ever been tested.

The provision of vaginal and oral samples was significantly related to receiving anal touching/insertion from a male partner ($p<0.05$) (see table 2). Anal touching/insertion was also significantly related to providing an anal sample ($p<0.005$). Additionally, penile–anal intercourse ($p<0.05$), giving anal touching to a male partner ($p<0.05$) and giving ($p<0.05$) or receiving ($p<0.05$) oral–anal contact with a male partner was related to providing an anal sample.

None of the oral, vaginal and anal samples were positive for N. gonorrhoeae or T. vaginalis. C. trachomatis infection was identified in the samples of 6.8% (n=3) the participants. None of the oral samples were positive for C. trachomatis. Close to 5% (4.5%, n=2) of the vaginal samples and 3.3% (n=1) of the anal samples were positive for C. trachomatis, results that would have been missed if only genital screen was provided. No participants tested positive for C. trachomatis in more than one anatomic site (ie, all participants were unique). All participants diagnosed with C. trachomatis reported having previously been tested. Two of the three (66.7%) participants reported a previous diagnosis and treatment of chlamydia within the past year.

Discussion

This study adds to the growing body of literature on STIs among WSWM,[1–3 ,6 ,8 ,10 ,26] with innovations in terms of both non-clinical sampling and self-collected specimens for STI testing. The majority of participants in the present study opted to provide oral and vaginal samples, a finding consistent with previous research suggesting that WSWM are motivated to seek preventative care.[10] The vaginal self-sampling uptake rate of participants in the present study was over twice the uptake rate found in several studies of women in the general population.[19–21] A number of the participants who provided samples reported having never been tested, indicating that self-collection may be a mechanism for increasing testing uptake. Given that WSWM may not disclose their sexual orientation/behaviour history to their healthcare provider,[12 ,13] the option to self-collect samples may further encourage testing for those wishing to protect their privacy due to concerns about embarrassment, cost, sexuality-related stigma or perceived discrimination. Self-collected samples may also be collected via mail, an option that may be beneficial for women who have regular sexual partners and are mindful of their sexual health maintenance but are apprehensive about making regular visits to their healthcare provider. Data supporting the effectiveness of home-based testing for increasing testing uptake, and use of home-based testing by women suggests this as an attractive option for WSWM.[27–30]

Although research on the acceptability of anal self-sampling among women is limited, the percentage of participants who provided anal samples (61%) was only slightly lower than the uptake rate in a similar study of MSWM (77%)[15] and was considerably higher than women with a recent history of transactional sex (4%),[18] suggesting that anal self-sampling was an acceptable method for STI testing among WSWM. This is particularly important since many women may not understand that vaginal testing alone may not identify anal STI. Although only one anal sample tested positive for chlamydia, the corresponding vaginal sample of the participant was not positive. Therefore, if an anal sample had not been collected, the participant would have gone undiagnosed. Engaging in anal sexual behaviours with a male (but not female) partner were the only sexual behaviours that predicted self-sampling, indicating that participants may be assessing their potential for risk and opting to provide a sample based upon that

assessment. Alternatively, participants who engage in sexual behaviours that involve the anus may be more comfortable with self-sampling, particularly of their anus. Nevertheless, the relative proportion of anal self-sampling to vaginal and oral suggests that methods to improve anal sampling should continue to be explored.

Unlike previous research, the present study assessed STI among a community sample of WSWM using self-report data alongside STI rates attained through self-sampling. Approximately 7% of the participants' samples tested positive for chlamydia. This rate is over three times the 2.2% average chlamydia rate among female participants aged 14–39 years attained through testing in the National Health and Nutrition Examination Survey.31 Despite the fact that the present study contained a community sample, the rate was similar to the average prevalence rate of chlamydia found in clinics (8.3%) where women often seek testing as a result of symptoms, referral by an infected partner or high-risk sexual behaviour.32 The comparatively high STI rates coupled with the self-sampling uptake rates points to the potential for home-based self-sampling among sexual minority women.

Limitations, implications and future directions

The triangulated collection of data using both self-report and biological specimens is a strength of this study. Still, self-report measures remain subject to bias if the participants do not accurately report data due to a lack of understanding or intentional under-reporting. The participants who were offered the self-sampling option were limited to those who attended an in-person interview, and the overall sample was relatively homogenous in terms of race/ethnicity and education. Although there were no sociodemographic, testing or STI differences between those participants who did and did not attend the interview, it is possible that those who were interviewed were more comfortable with sexual topics and, therefore, perhaps more likely to provide a sample for STI testing. Finally, in the current study, the act of providing a sample was considered evidence that the sampling method was acceptable. Future research

should continue to explore benefits of self-sampling among other populations who may feel apprehensive about traditional collection methods (eg, transgender individuals, individuals with a history of sexual assault). Furthermore, this data speaks to the importance of refining intake assessments of sexual behaviour among diverse populations who may be hesitant to volunteer detailed information related to their sexual behaviour. Conventional assessments of sexual behaviour often assume vaginal penetration alone, and fail to capture other behaviours that may result in STIs in other anatomical locations. Without this information, the patient may not receive the necessary site-specific testing and the STI may go undiagnosed. Increasing awareness of the importance of site-specific screening may encourage patients to request and receive testing that better reflects the diversity of their sexual lives.

Conclusions

The majority of participants self-collected oral, vaginal and anal samples when they were offered free STI testing. Providing WSWM with the opportunity to self-collect samples for STI testing has the potential to reduce burdens to care unique to this population (eg, fear of discrimination, limited insurance11), thereby increasing testing and treatment among an underserved and often invisible population of women.

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Footnotes

Collaborators: Caitlin V Neal; Laina Y Bay-Cheng; Infectious Disease Laboratory at Indiana University School of Medicine including James A Williams, Laura J Hires, Ashley N Halter and Ann M Le Monte.

Contributors: Conception or design of the work, or the acquisition, analysis, or interpretation of data for the work: VS, JDF, BVDP, BD, CN, JAW, LJH, ANH, AMLM, LYBC, AB. Drafting the work or revising it critically for important intellectual content, final approval of the version to be published, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: VS, JDF, BVDP, BD, AB.

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Table 1

Sociodemographic characteristics of participants (n=54)

Characteristics	Sample provided*					
			No		Yes	
	n	(%)	n	(%)	n	(%)
Age (years)						
18–24	28	(51.85)	5	(17.86)	23	(82.14)
25–29	14	(25.93)	1	(7.14)	13	(92.86)
30–39	7	(12.96)	0	(0.00)	7	(100.00)
40+	5	(9.26)	1	(20.00)	4	(80.00)
Education						
High school or equivalent	6	(11.11)	0	(0.00)	6	(100.00)
Some college or associates degree	25	(46.30)	3	(12.00)	22	(88.00)
Bachelor's degree	16	(29.63)	2	(12.50)	14	(87.50)
Graduate degree (master's or doctoral)	6	(11.11)	1	(16.67)	5	(83.33)
Other	1	(1.85)	–	–	–	–
Race/ethnicity						
White/Non-Hispanic	45	(83.33)	5	(11.11)	40	(88.89)
Black/Non-Hispanic	7	(12.96)	1	(14.29)	6	(85.71)
Other/Non-Hispanic	2	(3.70)	1	(50.00)	1	(50.00)
Sexual orientation						
Bisexual	24	(44.44)	4	(16.67)	20	(83.33)
Lesbian/gay/homosexual	3	(5.56)	1	(33.33)	2	(66.67)
Heterosexual/straight	14	(25.93)	1	(7.14)	13	(92.86)
Other	13	(24.07)	1	(7.69)	12	(92.31)
Current relationship status						
In a monogamous relationship for over 1 year	7	(12.96)	1	(14.29)	6	(85.71)
In a monogamous relationship for under 1 year	10	(18.52)	2	(20.00)	8	(80.00)
Not in a monogamous relationship	37	(68.52)	4	(10.81)	33	(89.19)

- *There were no significant sociodemographic differences between participants who did and did not provide samples.

Table 2. Oral, vaginal and anal samples provided by sexual behavior

Reported behaviour (past year)	n (%) provided a sample											
	Oral			Vaginal			Anal					
	46 (85.2)			47 (87.0)			33 (61.1)					
	Behaviour	No behaviour	p Value	Behaviour	No behaviour	p Value	Behaviour		No behaviour		p Value	
Penile–vaginal intercourse	42 (85.71)	4 (80.00)	0.57	43 (87.76)	4 (80.00)	0.52	31 (63.27)		2 (40.00)		0.37	
Penile–anal intercourse	18 (94.74)	28 (80.00)	0.24	18 (94.74)	29 (82.86)	0.40	16 (84.21)		17 (48.57)		0.02*	
Genital-to-genital rubbing												
Female	30 (88.24)	16 (80.00)	0.45	31 (91.18)	16 (80.00)	0.40	23 (67.65)		10 (50.00)		0.25	
Male	39 (82.98)	7 (100.00)	0.58	40 (85.11)	7 (100.00)	0.58	28 (59.57)		5 (71.43)		0.69	
Digital–anal												
Received from female	13 (92.86)	33 (82.50)	0.66	34 (85.00)	13 (92.86)	0.66	9 (64.29)		24 (60.00)		0.52	
Gave to a female	16 (94.12)	30 (81.08)	0.41	16 (94.12)	31 (83.78)	0.41	21 (56.76)		12 (70.59)		0.38	
Received from male	27 (96.43)	19 (73.08)	0.02*	27 (96.43)	20 (76.92)	0.05*	23 (82.14)		10 (38.46)		0.002***	
Gave to male	19 (95.00)	27 (79.41)	0.23	19 (95.00)	28 (82.35)	0.24	16 (80.00)		17 (50.00)		0.04*	
Oral–anal												
Received from female	10 (83.33)	35 (85.37)	0.72	10 (83.33)	36 (87.80)	0.65	8 (66.67)		25 (60.98)		0.54	
Gave to female	8 (88.89)	37 (84.09)	0.33	8 (88.89)	38 (86.36)	0.58	7 (77.78)		26 (59.09)		0.23	
Received from male	16 (100.00)	30 (81.08)	0.09	16 (100.00)	31 (83.78)	0.16	14 (87.50)		19 (51.35)		0.02*	
Gave to male	11 (100.00)	35 (83.33)	0.32	11 (100.00)	36 (85.71)	0.32	10 (90.91)		23 (54.76)		0.04*	
Oral–genital												
Received from female	37 (84.09)	9 (90.00)	0.54	38 (86.36)	9 (90.00)	0.62	27 (61.36)		6 (60.00)		0.60	
Gave to female	40 (83.33)	6 (100.00)	0.58	41 (85.42)	6 (100.00)	0.42	28 (58.33)		5 (83.33)		0.39	
Received from male	43 (86.00)	3 (75.00)	0.48	44 (88.00)	3 (75.00)	0.44	30 (60.00)		3 (75.00)		0.49	
Gave to male	42 (85.71)	4 (80.00)	0.57	43 (87.76)	4 (80.00)	0.52	31 (63.27)		2 (40.00)		0.37	

- *p<0.05, **p<0.01, ***p<0.005, ****p<0.001.