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High Prevalence of Rectal Gonorrhea and Chlamydia Infection in Women Attending a Sexually Transmitted Disease Clinic

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Abstract

Background: Testing women for urogenital *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) is common in sexually transmitted disease (STD) clinics. However, women may not be routinely tested for *rectal* GC/CT. This may lead to missed infections in women reporting anal intercourse (AI).
Methods: This was a retrospective review of all women who underwent rectal GC/CT testing from August 2012 to June 2013 at an STD clinic in Columbus, Ohio. All women who reported AI in the last year had a rectal swab collected for GC/CT nucleic acid amplification testing ($n = 331$). Using log-binomial regression models, we computed unadjusted and adjusted associations for demographic and behavioral factors associated with rectal GC/CT infection.
Results: Participants ($n = 331$) were 47% African-American, with median age of 29 years. Prevalence of rectal GC was 6%, rectal CT was 13%, and either rectal infection was 19%. Prevalence of urogenital GC and CT was 7% and 13% respectively. Among women with rectal GC, 14% tested negative for urogenital GC. Similarly, 14% of women with rectal CT tested negative for urogenital CT. In unadjusted analyses, there was increased rectal GC prevalence among women reporting sex in the last year with an injection drug user, with a person exchanging sex for drugs or money, with anonymous partners, and while intoxicated/high on alcohol or illicit drugs. After multivariable adjustment, no significant associations persisted, but a trend of increased rectal GC prevalence was observed for women < 26 years of age ($p = 0.06$) and those reporting sex while intoxicated/high on alcohol or drugs ($p = 0.05$). For rectal CT, only age < 26 years was associated with prevalent infection in unadjusted models; this association strengthened after multivariable adjustment (prevalence ratio: 6.03; 95% confidence interval: 2.29–15.90).
Conclusion: Nearly one in five women who reported AI in the last year had rectal GC or CT infection. Urogenital testing alone would have missed 14% of rectal infections. Standardized guidelines would increase rectal GC/CT testing in women and help detect missed infections.

Introduction

The greatest burden of sexually transmitted infections (STIs) due to *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) in the United States occur in young women aged 14–24 years.[1] Urogenital infections with GC and CT have been associated with reproductive tract complications like pelvic inflammatory disease, tubal infertility, ectopic pregnancy, chronic pelvic pain, and perinatal transmission.[1–3] Women who engage in unprotected anal intercourse (AI) are at risk for acquiring *rectal* GC/CT infections. While testing for urogenital GC/CT is nearly universal in sexually transmitted disease (STD) clinics, testing for rectal GC/CT among women is not as common.[4]

Rectal GC/CT testing has mainly been targeted at men who have sex with men (MSM). Guidelines from the Centers for Disease Control and Prevention (CDC) recommend annual testing for rectal GC/CT in all sexually active MSM who report receptive AI within the previous 12 months, and more frequently (every 3–6 months) in those at higher risk (i.e., multiple or anonymous sex partners, sex with methamphetamine use, or having a sex partner that engages in any of the previous activities).[5] The CDC currently recommends that all sexually active women 25 years and younger, and those 26

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years and older who have specific risk factors (e.g., new or multiple sex partners), be tested annually for urogenital CT infection.[5] The CDC and U.S. Preventive Services Task Force also recommend that all sexually active women who are at risk for GC (e.g., previous GC infection, other STIs, new or multiple sex partners, and inconsistent condom use; commercial sex work and drug use; those in certain demographic groups; and those living in communities with high prevalence of disease) be tested annually for urogenital GC infection.[5,6] However, there are currently no standardized guidelines for rectal GC/CT testing in women, including among those who routinely engage in AI.[5,7–10] A 2009 study found that up 23% of women attending public STD clinics reported AI with their most recent sex partner, and only 26% reported using a condom during that experience.[11] Contrary to MSM, data on the prevalence and factors associated with rectal GC/CT infection in women is not as robust.[12] Reported prevalence estimates range from 0.64% to 19.2% for rectal GC and 2% to 54.3% for rectal CT.[4,7–10,13–20]

While concordance between the results of urogenital and rectal GC/CT testing in women is generally strong, a growing number of studies demonstrate that some women who test positive for rectal infections are simultaneously negative at urogenital sites.[4,8,10,15,18–20] These findings raise the concern that failure to screen women for rectal GC/CT could result in missed and untreated infections. Untreated rectal infections could then be transmitted to male partners, who could subsequently transmit a urogenital infection to the female partner, leaving her susceptible to the long-term reproductive tract complications.[2,3,9,10,20] Furthermore, prevalent rectal GC/CT infections may also increase the risk of human immunodeficiency virus (HIV) acquisition through AI.[21]

The goals of the present study were to determine the prevalence of rectal GC and rectal CT infection among female patients seen at a large, urban STD clinic and who reported any AI in the previous 12 months. We also characterized the behavioral, demographic, and clinical factors that correlated with rectal GC and rectal CT infection in this population of female STD clinic attendees.

Materials and Methods

Study design, setting and population

We conducted a retrospective review of all medical charts of female patients presenting for care at a public, and urban STD clinic in Columbus, Ohio, between August 2012 and June 2013. Using clinic billing records, we obtained a list of all women who underwent testing for rectal GC and CT infection during the study period. No exclusion criteria were applied.

Demographic and sexual behavior data

At registration, all clinic patients self-administer a paper Sexual Health Assessment that captures demographic and sexual behavior information from the previous 12 months. The paper Sexual Health Assessment is scanned and uploaded into every patient's electronic health record. For this analysis, race/ethnicity was coded as any ethnic minority group versus white. Participants self-reported their race/ethnicity and could select as many categories as desired. Guided by the age threshold specified by CDC for urogenital CT screening in women, we dichotomized age as 25 years and younger vs. 26 and older.[5] Level of education was coded as less than a high school degree (or GED equivalent) versus high school degree or higher. Marital status was coded as unmarried versus all other partnership classifications.

Behavioral variables captured on the Sexual Health Assessment referred to all sexual and drug use practices over the previous 12 months, including the number and sex of all sexual partners (same sex or opposite sex); vaginal or anal sex unprotected by a condom; sex with a person who exchanges sex for drugs or money; sex with known HIV-positive partners or with partners of unknown HIV status; sex with anonymous partners; sex while intoxicated/high on alcohol or illicit drugs; sex with a partner who injects drugs; use of injection drugs; and sharing injection drug equipment.

STI testing

Per clinic protocol, one rectal swab was collected by a provider from each female patient who reported ever engaging in any AI within the 12 months prior to her clinic visit. Swabs were analyzed using nucleic acid amplification testing (NAAT) (APTIMA Combo 2 Assay with TIGRIS DTS, Gen-Probe, San Diego, CA).[22] All women were also tested for urogenital GC and CT infection by NAAT on urine specimens. Syphilis infection was assessed by serum rapid plasma reagin (RPR) testing with confirmation by fluorescent treponemal antibody absorbed assay (FTA-ABS) or *Treponema pallidum* passive particle agglutination assay. Rapid HIV testing was performed on plasma samples (OraQuick, OraSure Technologies, Inc., Bethlehem, PA, or Uni-Gold, Trinity Biotech, Bray, Ireland).

Data extraction

Demographic and sexual behavior data from the Sexual Health Assessment and clinical data (including the results of all STI testing performed at the visit) were extracted from individual patient electronic health records into a de-identified database for the current analysis.

Statistical analysis

Data analysis was performed using Stata 13 (College Station, TX). We computed the prevalence of rectal GC, rectal CT, and rectal GC or CT infection for women included in the study and examined associations between rectal and urogenital infections with the same pathogen. We next examined associations between several demographic and behavioral factors and rectal GC, rectal CT, and rectal GC or CT infection. Using log-binomial regression models, we computed unadjusted prevalence ratios (PRs) quantifying the separate associations between participant characteristics and rectal GC, rectal CT, and rectal GC or CT infection. We used generalized estimating equations to account for repeated observations in the small number of women who returned for more than one visit during the study period. *A priori* we planned that any variable with $p < 0.20$ in any unadjusted model for any of the three outcomes would be included in all multivariable models. Some unadjusted estimates, however, met this threshold but were unstable with very wide confidence intervals (CIs). To accommodate this, the adjusted models include all participant-level factors meeting the *p*-value threshold, as well as a composite variable

Table 1. Characteristics of 331 Women Undergoing Rectal *Neisseria gonorrhoeae* and *Chlamydia trachomatis* Screening, Columbus, Ohio, August 2012–June 2013

Characteristic	N = *331*	*(%)**
Race/ethnicity		
Black	174	(47)
White	145	(39)
Hispanic	20	(5)
Asian	3	(<1)
Native American	11	(3)
Other	17	(5)
Education		
Did not finish high school	55	(16)
High school or GED	93	(27)
Some college	121	(35)
College graduate	46	(13)
Missing	31	(9)
Marital status		
Unmarried/single	211	(64)
Married	25	(8)
Civil union	31	(9)
Separated/divorced	47	(14)
Widowed	4	(1)
Missing	13	(4)
In the previous year, have you had…		
Sex with a man?		
Yes	265	(80)
No	14	(4)
Unknown	22	(7)
Missing	30	(9)
Sex with a woman?		
Yes	21	(6)
No	266	(80)
Unknown	15	(4)
Missing	29	(9)
Sex with a man and woman?		
Yes	14	(4)
No	283	(85)
Unknown	5	(1)
Missing	29	(9)
Sex with a man who has sex with men?		
Yes	6	(2)
No	289	(87)
Missing	36	(11)
Sex with an injection drug user?		
Yes	7	(2)
No	288	(87)
Missing	36	(11)
Sex with a person who exchanges sex for drugs or money?		
Yes	14	(4)
No	211	(64)
Unknown	1	(<1)
Missing	105	(32)
Sex without a condom?		
Yes	280	(84)
No	14	(4)
Missing	39	(12)
Sex with known HIV+ partners		
Yes	1	(<1)
No	294	(88)
Missing	38	(11)
Sex with partners of unknown HIV status		
Yes	87	(26)
No	153	(46)
Unknown	2	(1)
Missing	92	(27)
Sex with an anonymous partner?		
Yes	48	(14)
No	183	(55)
Missing	102	(31)
Sex while intoxicated/high on alcohol or illicit drugs?		
Yes	151	(45)
No	104	(31)
Missing	78	(23)
Used injection drugs		
Yes	10	(3)
No	215	(65)
Missing	108	(32)
Shared drug equipment		
Yes	10	(3)
No	223	(66)
Missing	107	(31)
	Median	IQR
Age, years	29	23–25
Male sex partners, previous12 months	2	1–3

*Some categories sum to >100% because of rounding.
IQR, interquartile range; GED, General Educational Development tests; HIV, human immunodeficiency virus.

capturing any sex with high-risk partners, including partners who exchange sex for drugs or money, are HIV positive, have unknown HIV status, are anonymous, or who use injection drugs. We also adjusted for age and race/ethnicity in all multivariable models.

Sensitivity analysis

This study includes all women who underwent rectal STI testing during the study period, based on clinic billing records. However, 14 women (4%) self-reported no vaginal or anal sex with men in the past year on their Sexual Health Assessment. As stated earlier, per clinic protocol, only women who report any AI in the past 12 months undergo rectal GC/CT testing. We surmise that in these 14 cases, when speaking privately with the woman, the clinician may have determined that the patient did indeed have some risk of rectal infection. To understand this discrepancy, we performed a post-hoc sensitivity analysis by removing these 14 women from the analysis population and rerunning the multivariable models described above.

Ethical review

This retrospective chart review was approved by the Ohio State University Institutional Review Board (OSU IRB). Participants did not provide informed consent; the OSU IRB granted a waiver of the consent process per U.S. Department of Health and Human Services guidelines.

Results

In total, 331 women underwent testing for rectal GC/CT infection at 341 clinic visits during the study period: 322 women attended one visit, 8 women attended two visits, and one woman attended three visits.

Participant characteristics

Nearly half (47%) of all participants were African American, 39% were white, and 5% reported Hispanic ethnicity (Table 1). Sixteen percent had not completed high school. The median age of participants was 29 years (interquartile range [IQR]: 23–35 years). In the previous 12 months, 80% reported sex with a man, 6% reported sex with a woman, 84% reported any unprotected sex, 26% reported sex with a person of unknown HIV status, 14% reported sex with an anonymous partner, and 45% reported having sex while intoxicated/high on alcohol or illicit drugs. The median number of male sex partners in the previous 12 months was 2 (IQR: 1–3 partners) (Table 1). Five women had reactive RPRs, and two of these were confirmed by FTA-ABS to have syphilis. None of the women tested positive for HIV.

Prevalence of rectal STIs

At the 341 visits where rectal GC testing occurred, 22 women (6%; 95% CI: 4%–9%) tested positive, 317 tested negative, test results for 1 were indeterminate, and one test result was missing. At the 341 visits where rectal CT testing occurred, 46 women (13%; 95% CI: 10%–17%) tested positive and 295 tested negative. There were no indeterminate or missing rectal CT test results. Sixty-four women tested positive for rectal GC or CT infection, yielding an overall prevalence of 19% (95% CI: 15%–23%). Twenty of 22 women with rectal GC (91%) and 45 of 46 women with rectal CT (98%) reported no symptoms of rectal infection. Among the few symptomatic women with rectal GC or CT, the only reported symptom was rectal pain.

Concordance between urogenital and rectal STIs

The prevalence of urogenital infections was similar to the prevalence of rectal infections: 24 women (7%; 95% CI: 4%–10%) were positive for urogenital GC and 43 women (13%; 95% CI: 9%–16%) were positive for urogenital CT infection. Symptomatic infection was reported by 58% of women with urogenital GC and 56% of women with urogenital CT. The Pearson correlation coefficient between rectal and urogenital infections was strong: 0.79 for GC and 0.85 for CT (Table 2). However, three women who had rectal GC infection were negative for urogenital GC, indicating that 14% of the positive rectal GC cases would have been missed if only urogenital GC testing had been performed. Similarly, 14% (6 women) of the positive rectal CT cases would have been missed if only urogenital CT testing had been performed.

Unadjusted associations between participant demographic and behavioral characteristics and prevalent rectal STIs

We assessed unadjusted associations between participant characteristics and rectal GC, rectal CT and either rectal GC or CT infection (Table 3). Several sexual behaviors in the previous 12 months emerged as significant factors associated with prevalent rectal GC infection in unadjusted analyses, including sex with an injection drug user (PR: 6.99; 95% CI: 1.25–38.96), sex with a person who exchanges sex for drugs or money (PR: 6.81; 95% CI: 1.86–24.97), sex with an anonymous partner (PR: 3.08; 95% CI: 1.08–8.81), and sex while intoxicated/high on alcohol or illicit drugs (PR: 5.99; 95% CI: 1.34–26.69). Only age younger than 26 years was significantly associated with prevalent rectal CT infection in unadjusted analyses (PR: 4.94; 95% CI: 2.53–9.62).

Table 2. Cross-Tabulation Between Rectal and Urogenital *Neisseria gonorrhoeae*/*Chlamydia trachomatis* Infections Among Women Undergoing Rectal GC and CT Screening, Columbus, Ohio, August 2012–June 2013

	Rectal	
Gonorrhea	*n* (%)	*n* (%)
	Positive	Negative
Urogenital		
Positive	18 (86)	6 (2)
Negative	3 (14)	305 (98)
Chlamydia		
	Rectal	
	n (%)	*n* (%)
	Positive	Negative
Urogenital		
Positive	38 (86)	5 (2)
Negative	6 (14)	285 (98)

Seven women who were tested for rectal *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) did not have urogenital testing done, so the total *n* for Table 2 is lower than for site-specific prevalences.

Adjusted associations between participant demographic and behavioral characteristics and prevalent rectal STIs

In multivariable analyses, the strong associations observed in unadjusted analyses were attenuated (Table 4). No variables remained significantly associated with prevalent rectal GC infection, although a trend of increased rectal GC prevalence was suggested for both younger women ($p = 0.06$) and those reporting sex while intoxicated/high on alcohol or illicit drugs ($p = 0.05$). Similar to the unadjusted estimates, only younger age (< 26 years, vs. 26 and older) was significantly predictive of prevalent rectal CT infection (PR: 6.03; 95% CI: 2.29–15.90). In the sensitivity analysis excluding the 14 women who self-reported no sex with men in the last 12 months on their Sexual Health Assessment form (Table 5), the magnitude and confidence intervals for some effect estimates changed somewhat but our overall findings remained the same.

Discussion

The primary goal for testing and treating GC/CT infections in women is to prevent reproductive tract complications (e.g.,

Table 3. Unadjusted Associations Between Participant Characteristics and Rectal GC and CT Infections, Columbus, Ohio, August 2012–June 2013

	Rectal GC			*Rectal CT*			*Rectal GC or CT*		
Characteristic	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p
Age <26 years	1.64	(0.69–3.91)	0.27	4.94	(2.53–9.62)	<0.001	4.25	(2.40–7.51)	<0.001
Racial/ethnic minority	0.88	(0.37–2.10)	0.78	1.07	(0.57–2.03)	0.81	1.03	(0.56–1.79)	0.91
Less than HS education	1.57	(0.55–4.45)	0.40	1.54	(0.71–3.34)	0.27	1.61	(0.81–3.18)	0.17
Unmarried	1.24	(0.49–3.14)	0.65	1.52	(0.76–3.03)	0.23	1.43	(0.79–2.59)	0.24
Sex with men	0.80	(0.11–5.64)	0.83	0.99	(0.21–4.67)	0.99	0.84	(0.25–2.81)	0.78
Sex with women	0.75	(0.09–5.99)	0.79	0.68	(0.15–3.06)	0.61	0.73	(0.20–2.59)	0.62
Sex with men/women	1.06	(0.15–7.53)	0.95	1.64	(0.43–6.26)	0.47	1.57	(0.51–4.81)	0.43
Sex with injection drug user	6.99	(1.25–38.96)	0.03	1.13	(0.13–9.75)	0.91	1.89	(0.36–10.04)	0.46
Sex with person who exchanges sex for drugs or money	6.81	(1.86–24.97)	0.01	0.62	(0.08–4.98)	0.65	2.10	(0.62–7.09)	0.23
Sex without a condom	0.41	(0.09–1.98)	0.27	2.12	(0.27–16.66)	0.47	0.89	(0.24–3.27)	0.86
Sex with partner of unknown HIV status	2.01	(0.74–5.40)	0.17	1.27	(0.58–2.79)	0.55	1.31	(0.67–2.57)	0.42
Sex with anonymous partner	3.08	(1.08–8.81)	0.04	1.11	(0.42–2.93)	0.84	1.49	(0.68–3.28)	0.32
Sex while intoxicated/high on alcohol or illicit drugs	5.99	(1.34–26.69)	0.02	2.10	(0.94–4.71)	0.07	2.83	(1.37–5.85)	0.01
Used injection drugs	2.62	(0.53–13.01)	0.24	1.42	(0.30–6.76)	0.66	1.44	(0.38–5.44)	0.59
Shared drug equipment	3.99	(0.77–20.79)	0.10	2.15	(0.43–10.82)	0.35	2.30	(0.56–9.34)	0.25

CI, confidence interval; HS, high school; PR, prevalence ratio.

pelvic inflammatory disease, infertility, etc.), hence GC/CT testing efforts have traditionally focused on urogenital sites (vaginal, endocervical, and urethral).[5,6] Consequently, rectal GC/CT infections do not garner the same public health attention in women as they do in MSM.[5,10,12] Yet, among women reporting any AI in the previous 12 months, we report a high prevalence of rectal GC (6%), rectal CT (13%), and either rectal GC or CT (19%) infections; these estimates are similar to a growing number of published studies.[4,7–10,13–20] The vast majority of the women who were infected with either rectal GC (91%) or rectal CT (98%) reported no symptoms of rectal infection. Similar high rates of asymptomatic rectal GC/CT infection have been previously reported in women and MSM.[4,7–9,12,15–19,23]

Similar to other studies, our findings demonstrate that rectal GC/CT infection does occur in women without concomitant urogenital infection. For example, in three earlier studies, urogenital testing alone using NAAT would have missed 35%, 19%, and 16% of rectal GC and 6%, 25%, and 23% of rectal CT infections in women, respectively.[8,10,15] In our study, urogenital testing alone would have missed 14% of rectal GC and 14% of rectal CT infections. Missed and untreated rectal infections in women who practice AI could not only lead to ongoing transmission to male sex partners, but could potentially increase the risk of subsequent urogenital reinfection in the woman and associated long-term reproductive tract complications.[2,3,9,10,20]

We determined several factors that were associated with prevalent rectal GC infection in unadjusted analyses, including having sex in the last 12 months with an injection drug user, a person who exchanges sex for drugs or money, an anonymous partner, or while intoxicated/high on alcohol or illicit drugs. These findings were robust to sensitivity analyses excluding women who reported no sex with men in the last 12 months. While none of these behaviors remained significantly associated with rectal GC in multivariable analysis, we observed trends of increased rectal GC prevalence among women younger than 26 years and women reporting sex while intoxicated/high on alcohol or illicit drugs. For rectal CT, only age <26 years was significantly associated with prevalent infection in both unadjusted and adjusted analysis. Our findings agree with those of earlier

Table 4. Adjusted Associations Between Participant Characteristics and Rectal GC and CT Infections, Columbus, Ohio, August 2012–June 2013

	Rectal GC			*Rectal CT*			*Rectal GC or CT*		
Characteristic	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p
Age <26 years	2.76	(0.96–7.99)	0.06	6.03	(2.29–15.90)	<0.01	5.01	(2.29–10.96)	<0.01
Racial/ethnic minority	0.78	(0.25–2.39)	0.67	1.79	(0.68–4.68)	0.24	1.29	(0.59–2.81)	0.52
Less than HS education	0.54	(0.09–3.07)	0.49	0.84	(0.23–3.04)	0.79	0.81	(0.29–2.28)	0.69
Sex with high risk partner*	2.16	(0.70–6.69)	0.18	0.89	(0.26–3.06)	0.86	1.12	(0.44–2.88)	0.81
Sex while intoxicated/high on alcohol or illicit drugs	4.38	(0.98–19.57)	0.05	1.31	(0.52–3.28)	0.57	2.00	(0.89–4.48)	0.09
Shared drug equipment	2.77	(0.48–16.03)	0.26	5.65	(0.69–46.25)	0.11	3.60	(0.64–20.28)	0.15

*Partners who exchange sex for drugs or money, are HIV positive, have unknown HIV status, are anonymous, or who use injection drugs.

Table 5. Sensitivity Analysis: Adjusted Associations Between Participant Characteristics and Rectal GC and CT Infections, After Exclusion of Women Who Report No Sex with Men in the Last 12 Months

	Rectal GC			*Rectal CT*			*Rectal GC or CT*		
Characteristic	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p	*PR*	*(95% CI)*	p
Age <26 years	2.51	(0.84–7.44)	0.10	6.11	(2.28–16.41)	<0.01	4.85	(2.18–10.76)	<0.01
Racial/ethnic minority	0.92	(0.28–3.01)	0.90	1.60	(0.61–4.22)	0.34	1.31	(0.58–2.96)	0.51
Less than HS education	0.62	(0.11–3.46)	0.58	0.59	(0.13–2.66)	0.50	0.67	(0.22–2.09)	0.50
Sex with high risk partner*	1.68	(0.52–5.40)	0.38	0.98	(0.28–3.40)	0.98	1.01	(0.38–2.69)	0.99
Sex while intoxicated/high on alcohol or illicit drugs	4.14	(0.90–19.11)	0.07	1.20	(0.47–3.09)	0.70	1.85	(0.81–4.20)	0.14
Shared drug equipment	3.18	(0.54–18.91)	0.20	5.44	(0.70–42.35)	0.11	3.92	(0.72–21.43)	0.12

*Partners who exchange sex for drugs or money, are HIV positive, have unknown HIV status, are anonymous, or who use injections drugs.

studies that documented associations between younger age and rectal GC/CT infection in women.[7,8,10]

Emerging data suggest increased failure rates with oral azithromycin compared to doxycycline when used for the treatment of rectal CT infections.[24–27] Suboptimal treatment efficacy with azithromycin against rectal infections could have important implications for women who may be infected with CT at both urogenital and rectal sites, especially if the latter go unrecognized due to absent testing. If treated with azithromycin, these women could potentially have successful clearance of the urogenital infection, but not necessarily the rectal infection. Knowing whether rectal CT infection is present or absent could ultimately help guide clinicians in formulating their treatment recommendations in favor of doxycycline over azithromycin. Furthermore, in the era of emerging antimicrobial resistance among GC isolates, knowing all anatomical sites at which women could be infected could have important public health implications, especially if site-specific test of cure is required following treatment.[28]

A previous study of MSM reported that rectal GC/CT infections may enhance HIV acquisition and transmission among individuals who practice AI. In that study, two or more episodes of rectal GC/CT infection in the previous 2 years were associated with an 8-fold increased risk of incident HIV.[21] Whether this association also exists in high-risk women practicing AI has not been investigated, but if synergy between rectal GC/CT and HIV transmission exists in MSM[21], it may also apply to women reporting AI.

Our study has important limitations. First, the study is by design a retrospective review of clinic records and therefore provides only cross-sectional prevalence data. Second, there is the possibility that false positive rectal GC/CT results may be due to cross contamination with urogenital secretions during sample collection, especially for samples tested by NAAT and if rectal samples are obtained without the use of a proctoscope.[6,10,16,29–31] The risk of cross contamination is a challenge for all studies that characterize rectal GC/CT infection in women. Nevertheless, in our study, 14% of women with rectal GC did not have urogenital GC and 14% of women with rectal CT did not have urogenital CT. We believe that cross contamination cannot be wholly responsible for the high prevalence of rectal infections identified in this study. Third, urogenital testing for GC/CT infection was performed on urine specimens using NAAT. Urine specimens have lower sensitivity than vaginal and endocervical specimens.[32–34] Hence, false negative results for urogenital infection could lead to an overestimate in the number of women who are positive only for rectal infection. Fourth, utilizing clinic billing records to identify patients for the retrospective review may raise a concern about selection bias. However, the potential for selection bias is greatly reduced in our study because all patients seen at the sexual health clinic, even uninsured patients who receive no-cost services, have a billing record. Full STI screening and treatment services are offered to all patients regardless of their ability to pay.

Finally, our study only included women who reported AI within the previous 12 months. Although this self-reported behavior seems logical as a testing criterion, we note that a 2010 study found no association between reported AI and rectal CT infection, and only half of women with rectal GC infection reported engaging in AI.[9] Another study reported that among a cohort of 97 women with urogenital CT infection, of whom 77% also had rectal CT infection, only 26% reported engaging in AI. Rectal testing based on reported history of AI alone would have missed up to 76% of rectal CT infections in that study.[16] A third study recently demonstrated that testing high-risk women for rectal GC/CT infection based only on symptoms and reported sexual behavior was only 47% sensitive.[17] These findings, like many other studies of sensitive or stigmatized behavior, raise concerns about the utility of relying on self-reported behavioral information.[9,16,17] In our study, women who did not report AI in the previous 12 months were not tested for rectal GC/CT, which likely led to exclusion of some women with rectal infections from our analysis.

The impact of routine rectal GC/CT testing on short- and long-term health outcomes in women, especially those at high risk for reproductive tract complications and HIV infection, is currently unclear. However, it is becoming clear that there is a growing body of evidence pointing to the fact that many GC/CT infections in women are likely being missed in the absence of rectal testing. Therefore, we suggest that providers educate high-risk women, regardless of self-reported behaviors, about the risk of acquisition of rectal GC/CT infections. We also believe that studies that address the outcomes of rectal GC/CT infections in women are needed, along with standardized screening guidelines to help detect infections that are currently missed.

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Author Disclosure Statement

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