

Beyond Assumptions of Negligible Risk: Sexually Transmitted Diseases and Women Who Have Sex With Women

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Although the AIDS epidemic has catalyzed research on disease transmission through anal and vaginal intercourse, few studies have addressed transmission between women.¹ Even fewer studies have examined female-to-female risk of sexually transmitted diseases (STDs) that may be transmitted more readily than HIV. While an early study produced no evidence of current infection with gonorrhea, chlamydia, syphilis, or cervical herpes among 148 lesbians,² subsequent reports have identified several STDs as transmissible through same-sex female contact, including herpes,³ trichomoniasis,^{4,5} human papillomavirus,^{6,7} and HIV.^{8,9} These reports have identified only transmissibility; additional research is required to elucidate the magnitude of risk of STD transmission through female–female sexual contact.

An estimated 6.7% of American women have engaged in same-sex sexual behavior after the age of 15 years, and 3.6% have engaged in such behavior within the preceding 5 years.¹⁰ While recent research emphasizes the need to consider risk from male partners regardless of sexual orientation identity,¹¹ disagreement exists among clinicians and public health workers over assessment of disease transmission risk resulting from female–female contact and which behavioral precautions and testing measures should be considered. Insufficient research has been done to estimate the risks for non-HIV STDs. Nevertheless, a perception exists that women who have sex with women (WSW), or even lesbians as an identity group, are at low or no risk for STDs. Among 1925 women participating in the National Lesbian Health Care Survey, less than a quarter reported that they worried about contracting STDs.¹²

In addition to this perception that they are at low risk, other factors may result in a lower likelihood that lesbians and other WSW will

Objectives. This study evaluated the association of female–female sexual behavior with sexually transmitted diseases (STDs).

Methods. Female participants (n = 286) were recruited from the Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival. Logistic regression was used to examine the association between female–female sexual behavior and STDs.

Results. Women in all partner history groups, including 13% of women with only female partners, reported a history of STD. Increased sexual exposures with women predicted an increase in the likelihood of STDs after known risk factors had been controlled. Neither number of female partners nor number of exposures was associated with obtaining regular STD testing.

Conclusions. The risk of STDs through female–female sexual exposure is not negligible. Nevertheless, patterns of STD testing do not reflect this risk. (*Am J Public Health.* 2001;91:1282–1286)

obtain STD testing. As a result of negative experiences and expectations, lesbians are less likely to use health care resources, particularly preventive health care.¹³ This is relevant not only to acknowledging the unmet health care needs of this population but also to interpreting research that frequently relies on self-report data containing undiagnosed asymptomatic cases, resulting in underestimates of disease.

The difficulties in defining and studying “hidden” populations such as WSW have been well documented.^{14–17} Studies have involved samples from clinics,^{18,19} women’s music festivals,³ a lesbian softball league,²⁰ multiple public venues,²¹ and magazine readerships.¹¹ While all such studies contribute valuable information in an understudied area, inferences apply only to specific source populations.

The current study built on a small but growing body of research by estimating associations between female–female sexual behaviors and STDs after control for female–male sexual behavior and other variables independently associated with STDs. Unlike most previous studies in this area, this study examined individual-level data gathered in a community setting with a

method designed to reduce bias. We also estimated associations with regular STD testing to provide information that may be useful in prevention efforts and in understanding how bias might affect results in studies of WSW.

METHODS

Design

We sought to estimate the predictive value of sexual exposure from female partners in a sample of women self-identifying as lesbian, bisexual, and heterosexual, the majority of whom reported a history of both male and female sexual partners. The magnitude of the association between female–female risk factors and outcome variables can be estimated when known risk factors and confounding variables, including male–female risk factors, are controlled.

When one is considering risks from sexual exposure, several factors are relevant. Number of partners represents the probability of contact with an infected partner. A measure of exposure provides additional information, in that increasing numbers of sexual exposures with infected partners increase the probability of disease transmis-

sion. Specific sexual practices are also relevant; for example, using latex barriers or engaging in lower risk sexual behaviors reduces the probability of transmission from an infected partner.

Sample

All subjects were recruited from the Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival, held in June 1997. With an estimated attendance of 100 000, the festival represented a diverse cross section of the Minneapolis–St. Paul community. The 2-day free event offered easy access, child-friendly events, extensive disability accessibility, and a minimal focus on alcohol; these conditions provided a population with a diversity of risk for STDs.

Subjects were recruited from all areas of the festival site by trained female volunteers. To minimize selection bias, recruiters used tables containing a randomly generated list of the numbers 1 through 4 and approached the woman whose order matched the next number on the table. For example, if the number was 3, the recruiter chose the third woman to walk past her. Selection criteria were as follows: minimum age of 18 years, female, and a resident of the 7-county Twin Cities metropolitan area.

Of 611 women approached, 292 (48%) immediately agreed to participate, 228 (37%) refused, and 91 (15%) accepted a pass with the option of completing the survey later during the event. It was emphasized that the pass was for the use of that potential subject only. Of the 91 women accepting a pass, 39 (43%) returned to participate. A total of 331 questionnaires (response rate: 54%) were completed. Subsequently, 45 women were eliminated from consideration because they failed to meet inclusion criteria; in nearly all of these cases, women were not eligible because they did not reside in the Twin Cities metropolitan area.

Subjects completed the questionnaire in a tent that provided a comfortable and private environment or at the location where they were recruited. Oral informed consent was obtained to preserve anonymity. Methods for recruitment and consent were approved by the Institutional Review Board of the University of Minnesota.

Measures

Subjects reported lifetime totals in terms of both male and female sexual partners; transgender sexual partners were classified by anatomic sex rather than gender identity. Subjects estimated their average monthly sexual frequency with female partners as well as total lifetime months spent in sexual relationships with women; these values were multiplied to derive an estimate of lifetime sexual exposure through female contact. An identical process was used in assessing male sexual partners.

A dichotomous variable was derived to indicate higher risk sexual contact with men, defined as unprotected vaginal or anal intercourse in “about half” or more of the subject’s sexual exposures with male partners. No comparable variable was calculated for female partners, because inadequate information is available as to what constellation of behaviors might constitute “higher risk.”

A continuous variable was derived for lifetime months of binge drinking. This behavior was defined as regularly (at least once per week) consuming 5 or more drinks on the same day.

Subjects indicated whether they had ever been diagnosed with the following STDs: HIV, hepatitis B virus, gonorrhea, syphilis, chlamydia, genital warts, genital herpes, and trichomoniasis. Pelvic inflammatory disease was also included, because it generally results from untreated chlamydia or gonorrhea. A dichotomous summary variable was created to indicate lifetime diagnosis of any STD. Subjects also indicated frequency of STD testing, with regular testing defined as at least once per year.

Analysis

Percentages were calculated for subject demographic characteristics. Sex of sexual partners was cross tabulated with current sexual orientation identity to examine congruence.

Lifetime prevalence rates in regard to individual STDs and diagnosis of any STD were estimated. Logistic regression (for continuous predictor variables) and contingency table (for dichotomous predictor variables) analyses were used in estimating bivariate associations between study variables and STDs. Crude odds ratios (ORs) and associated test-based

95% confidence intervals (CIs) were calculated for all bivariate associations.

Multiple logistic regression was then used to model predictors of STDs. Independent variables were retained in the model if they were statistically significant at $P=.05$. Variables that confounded associations within the model were also retained. Confounding was defined as a predictor variable producing a greater than 10% change in the natural log of the odds ratio for another predictor variable. Identical methods were used to estimate associations with obtaining regular STD testing.

RESULTS

Sample demographics are presented in Table 1. The age range was 18 to 83 years, with a median age of 31 years. The ethnic identity of the sample reflected population demographics in the Twin Cities metropolitan area. Women in the sample were well educated, and 69% self-identified as lesbian. A history of both male and female sexual partners was reported by 69%.

That a majority of the sample self-identified as lesbian and a majority also indicated a history of both male and female sexual partners indicates that sexual orientation identity and sexual partner history were not neatly congruent. Among lesbians, 74% reported a history of both male and female sexual partners, while 24% reported only female partners. Ninety percent of bisexual women reported a history of both male and female sexual partners, and 8% reported only male partners.

While all women who reported only female partners self-identified as lesbian, the relationship between sexual orientation identity and sexual partner history was not as clear for women with other partner histories. Women in this sample who reported only male sexual partners appeared in all orientation groups, as did women who reported both male and female sexual partners and women who reported no sexual partners.

Frequencies of specific STDs were calculated. Twenty-one percent of subjects (95% CI= 16%, 26%) reported ever having been diagnosed with an STD. No subjects reported HIV or syphilis, both low-prevalence diseases

TABLE 1—Sample Demographics: Women Attending the 1997 Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival

	Sample (n = 286), No. (%)
Age group, y	
18–24	58 (20)
25–34	120 (42)
35–44	78 (27)
45–54	25 (9)
≥55	5 (2)
Ethnic identity ^a	
African/African American	6 (2)
White/European American	248 (87)
Latina/Chicana	5 (2)
Native American	4 (1)
Asian/Pacific Islander	10 (4)
Other/multiethnic	11 (4)
Education	
Less than high school	5 (2)
High school or general equivalency diploma	13 (5)
Some college/technical school	74 (26)
Technical school degree	16 (6)
Bachelor's degree	80 (28)
Some graduate/ professional school	38 (13)
Graduate/professional school degree	60 (21)
Sexual orientation identity	
Lesbian	198 (69)
Bisexual	48 (17)
Heterosexual	33 (12)
Unsure/questioning	5 (2)
Other	2 (1)
Gender of sexual partners, lifetime ^b	
Male only	33 (12)
Female only	47 (17)
Male and female	191 (69)
No partners	7 (2)

^an = 284, 2 observations missing.

^bn = 278, 8 observations missing.

in this geographic area. Frequencies for other STDs were as follows: hepatitis B, 1%; gonorrhea, 2%; chlamydia, 6%; genital warts, 8%; genital herpes, 5%; trichomoniasis, 6%; and pelvic inflammatory disease, 5%. Eighteen percent of the women reported regular STD testing.

TABLE 2—Crude and Adjusted Associations With Lifetime Report of Any Sexually Transmitted Disease: Women Attending the 1997 Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival

Measure	Crude OR (95% CI)	Adjusted OR (95% CI)
Age, per year	1.05 (1.01, 1.09)	...
Education, per level	1.15 (0.96, 1.40)	...
Months of binge drinking (per 12 months)	1.05 (0.97, 1.14)	...
Ever traded sex for money or drugs	2.21 (0.51, 9.61)	...
Risky behavior with men	2.51 (1.32, 4.80)	...
Lifetime no. of female partners	1.00 (0.98, 1.01)	...
Lifetime female sexual exposures (per 500 exposures)	1.07 (0.93, 1.24)	1.20 (1.02, 1.41)
Lifetime no. of male partners	1.09 (1.05, 1.13)	1.07 (1.03, 1.12)
Lifetime male sexual exposures (per 500 exposures)	1.30 (1.11, 1.52)	1.14 (0.98, 1.33)

Note. Lifetime report of sexually transmitted disease was defined as any report of HIV, hepatitis B virus, gonorrhea, syphilis, chlamydia, trichomoniasis, genital warts, genital herpes, or pelvic inflammatory disease. OR = odds ratio; CI = confidence interval.

Of the subgroup of women who reported only female sexual partners, 13% (95% CI = 2%, 23%) reported a history of STDs. STDs reported by this group included chlamydia, genital warts, trichomoniasis, and pelvic inflammatory disease. Among women self-identifying as lesbians, 15% (95% CI = 10%, 20%) reported ever having been diagnosed with an STD.

Bivariate analyses of associations between study variables and lifetime report of any STD, along with final logistic regression results, are presented in Table 2. In the multiple logistic regression model, only lifetime number of female sexual exposures and lifetime number of male sexual partners were independently predictive of STDs. After control for other variables in the model, there was a 20% increased likelihood of reported STDs per 500 sexual exposures with female partners (OR = 1.20, 95% CI = 1.02, 1.41) and a 7% increased likelihood per male partner (OR = 1.07, 95% CI = 1.03, 1.12). Number of female exposures ranged from 0 to 6120.

Although not independently predictive, lifetime number of male sexual exposures was retained in the model because it negatively confounded the association between lifetime number of female sexual exposures and STDs. Inclusion of lifetime number of male sexual exposures resulted in a 33% increase in the natural log of the odds ratio for this association.

Finally, bivariate associations with reports of regular STD testing were estimated. These data are presented in Table 3, along with adjusted associations from the final multiple logistic regression model. After control for other variables in the final model, there was a 3% increased likelihood of obtaining regular testing per male partner (OR = 1.03, 95% CI = 1.00, 1.06) and a 28% increased likelihood per 500 male sexual exposures (OR = 1.28, 95% CI = 1.08, 1.50), but there was an 8% decreased likelihood per year of age (OR = 0.92, 95% CI = 0.87, 0.97). The range of exposures with male partners varied from 0 to 9720. The lesbian identity variable, while not meeting the a priori criterion for significance ($P = .05$) for retention in the final model, suggested an association when included in this model (OR = 0.47; $P = .09$).

DISCUSSION

Women who report sexual relations only with other women do become infected with STDs. The group in this study reported a 13% lifetime prevalence of STDs, a rate clearly not representative of “no risk.” In addition, only 4 of these 39 women reported regular testing for STDs; thus, this group may have included a disproportionately large number of cases of undiagnosed STDs.

In the overall sample, frequency of female–female sexual exposure was independ-

TABLE 3—Crude and Adjusted Associations With Regular (at Least Yearly) Sexually Transmitted Disease Testing: Women Attending the 1997 Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival

Measure	Crude OR (95% CI)	Adjusted OR (95% CI)
Education, per level	0.82 (0.67, 1.00)	...
Lesbian identity	0.27 (0.13, 0.55)	...
Risky behavior with men	3.47 (0.75, 16.16)	...
Lifetime no. of female partners	0.97 (0.92, 1.03)	...
Lifetime female sexual contacts (per 500 exposures)	0.93 (0.76, 1.15)	...
Lifetime no. of male partners	1.04 (1.01, 1.08)	1.03 (1.00, 1.06)
Lifetime male sexual exposures (per 500 exposures)	1.23 (1.07, 1.41)	1.28 (1.08, 1.50)
Age, y	0.96 (0.92, 1.00)	0.92 (0.87, 0.97)

Note. OR = odds ratio; CI = confidence interval.

ently associated with increased odds of STDs when female–male sexual behavior was controlled for. This represents the first estimation of magnitude of risk due specifically to sexual behavior between women.

Of the 5 sexual behavior variables tested as predictors of a history of STD diagnosis, only lifetime number of sexual exposures with female partners and lifetime number of male sexual partners were independently predictive in the final model. Although positively predictive in the bivariate analysis, high-risk sexual behavior with male partners dropped out of the final model. Age was also a positive predictor in the bivariate analysis, as would be expected with a cumulative outcome variable. However, it was not significant when included in the final model, indicating that the model variables better explained the outcome.

It is of interest that number of sexual exposures was predictive for female partners and number of partners was predictive for male partners. One possible explanation is that the per-contact probability of transmission is lower overall for female–female transmission, and thus more exposures are required, on average, to transmit disease. This explanation is biologically plausible in the case of diseases, such as chlamydia, that infect the cervix: although transmission from penile tip to cervix can easily occur through penile–vaginal intercourse, transmission from cervix to cervix would be less direct. The explanation is less biologically plausible in the case of diseases that may require only exter-

nal contact for transmission (e.g., human papillomavirus, herpes simplex virus). Future studies examining individual STDs or STDs grouped by site of infection could clarify this issue.

In the model predicting regular STD testing, increases in male partners and in male sexual exposures predicted an increased likelihood of regular testing. Female sexual partners and sexual exposures did not influence likelihood of testing and were not included in the model. Conversely, older age predicted a decreased likelihood of testing. This may have been due to an accurate assessment of risk, in that older individuals may more likely be monogamous, or it may have been due to a lower awareness of risk among older individuals than among the younger ones who came of age after the emergence of the AIDS epidemic.

Women self-identifying as lesbian were only 27% as likely to obtain regular STD testing as women self-identifying as bisexual or heterosexual. When age, number of male partners, and number of male sexual exposures were controlled for, lesbian identity was suggestive of decreased testing, with lesbians 47% as likely to obtain testing. This suggests that women self-identifying as lesbians may still be less likely to obtain testing, even after their lower risk sexual histories with male partners have been taken into account. Future studies should examine this issue in greater detail. A low frequency of preventive health care use by lesbians agrees with existing research. Moreover, it is consistent with perceptions within lesbian communities and

within the health care professions that STD testing is not critical because sexual relations between women involve negligible risk.

Although the present methodology was designed to produce a sample as representative as possible of the study geographic area, sources of bias must be considered. For example, this was a convenience sample, and only individuals who attended the 1997 Twin Cities Gay/Lesbian/Bisexual/Transgender Pride Festival were selected to participate. Depending on prevalence rates of underlying risk factors, STD prevalence rates can be expected to vary between this and other populations. Institutionalized individuals were not included, nor were extremely “closeted” individuals who are inaccessible to any research on this population. Furthermore, probability of selection increased with length of time spent at the festival. Nevertheless, sampling was done with consideration of the factors that make this event uniquely conducive to the goal of representativeness and that minimize selection bias.

Lesbians in this sample were not synonymous with WSW. Rather, WSW identified across all sexual orientation identities. This is consistent with the existing literature.^{21–23} Understanding the complex relationship between identity and behavior is crucial in interpreting data in this study and other studies of WSW.

Combined, the analyses conducted in this study indicate that the risk faced by WSW regarding STDs and their consequences is characterized not only by a significant risk for contracting STDs from both female and male partners but also by a corresponding lack of testing. This finding has important clinical and public health implications. Physicians and other clinicians should consider risk of transmission between women in health care decision making; decisions to administer STD testing and Papanicolaou tests should be made considering this risk and should not be based solely on current or past involvement with male sexual partners.

From a public health perspective, the perception that sexual relations between women are low risk or even risk free needs to be addressed. WSW, including lesbians as an identity group, should be provided with accurate information so that they can make informed decisions regarding their health. To provide

more complete information for such decision making, additional research needs to address precise behavioral risk factors for disease-specific sexual transmission between women. ■

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Contributors

G.R. Bauer and S.L. Welles conceptualized and designed the study. G.R. Bauer designed and conducted the analysis and drafted the original manuscript. S.L. Welles offered consultation on the analysis and made significant revisions to the manuscript.

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