STDs Among Sexually Active Female College Students: Does Sexual Orientation Make a Difference?

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CONTEXT: *Research addressing sexual health or STD risk among lesbian and bisexual college women is scarce.*

METHODS: *Data on 29,952 sexually active females aged 18–24 who completed the 2006 National College Health Assessment were examined to assess differences in sexual risk factors and recent STD incidence by sexual orientation. Comparisons were analyzed at the bivariate level and through multivariate logistic regression.*

RESULTS: *Bisexual students were the most likely to have had an STD during the past year (9%); lesbians were the least likely (2%). However, lesbians were also the least likely to have had a routine gynecologic examination (46%, compared with 64–73% of others). Among students who had had multiple partners in the past year, those who had had partners of both sexes were more likely to have had an STD (16%) than were students who had had only male partners (9%) or only female partners (6%). Students who had binged on alcohol the last time they partied, had had multiple partners or had had a routine gynecologic examination in the past year, had been tested for HIV or had not used condoms at last vaginal intercourse were at increased odds of having had an STD (odds ratios, 1.3–4.0).*

CONCLUSIONS: *Sexual health programs targeting female college students, regardless of sexual orientation, must focus on behavioral risks associated with STDs. In addition, the importance of regular gynecologic exams should be emphasized, especially among lesbians. Further research is needed on risk-taking among female college students who are sexually active with both sexes.*

Perspectives on Sexual and Reproductive Health, 2008, 40(4):212–217, doi: 10.1363/4021208

STDs are a significant health issue for college students in the United States. Human papillomavirus (HPV), chlamydia and genital herpes are among the most commonly reported STDs in college students.[1] Female college students are at higher risk of contracting STDs than are their same-age peers not attending college, because they tend to use alcohol more frequently and have a greater number of sex partners.[2] Moreover, having an immature cervix makes young females particularly susceptible to infection with HPV or chlamydia.[3,4] A segment of this population, lesbian and bisexual college women, may be at even greater risk for STDs than their heterosexual counterparts, as they are more likely to use drugs and alcohol and to engage in a variety of sexual behaviors without the use of condoms or other barriers.[5–7] Yet, young lesbian and bisexual women have been largely ignored in both STD research and sexual health promotion programs.

A common misperception among health care providers, as well as among sexual minority (nonheterosexual) women themselves, is that lesbian and bisexual women are not at risk for STDs.[8,9] However, research with older populations of lesbian and bisexual women suggests that this is grossly inaccurate: In various studies, 13–44% have reported having had an STD.[10–12] In addition, when women, including asymptomatic women, have been tested for STDs, lesbian and bisexual women have had a higher prevalence of bacterial vaginosis, hepatitis B and C, gonorrhea, genital herpes and chlamydia than heterosexual women.[12,13]

Several risk factors have been positively associated with STDs among lesbian and bisexual women, including age, substance use, number of sex partners and engaging in vaginal intercourse with men.[8,9,12,14] Furthermore, most sexual minority women in these studies, including 44–85% of lesbians, have reported participating in penile-vaginal intercourse during the past year, the majority of the time without using a condom or other barrier method.[9,12] Additionally, lesbians are significantly more likely than their heterosexual counterparts to drink and smoke—behaviors that are related to increased levels of sexual risk-taking or sexual risk—and are less likely to obtain routine gynecologic examinations.[9,11,12]

Most sexual health research involving lesbian and bisexual women has been with adult populations in the United Kingdom or with U.S. women in lesbian bars, attending music festivals or at STD clinics.[15–19] Very little research has explored STD risk among younger populations of lesbian and bisexual women or among lesbian and bisexual college women exclusively.[8] Furthermore, the extent to which sexual orientation is associated with substance use, sexual risk behaviors and STDs has not been examined among this population.

This study examines STDs and risk factors among sexually active female college students of different sexual

orientations who participated in the spring 2006 National College Health Assessment (NCHA).

METHODS

Survey and Sample

In spring 2006, a self-selected sample of 123 postsecondary institutions participated in the American College Health Association's NCHA survey. Of these, 117 institutions utilized a random sampling technique, which yielded a final sample of 94,806 students, including 57,903 females. (The remaining six institutions did not use random sampling and were excluded.) Most participating institutions were four-year (97%), public (62%) colleges or universities located throughout the United States (22% in the Northeast, 25% in the Midwest, 22% in the South and 27% in the West); 3% were located in Canada.[1]

Schools administered the survey either in class to a sample of classes that had been randomly selected at each course level or online to students who had been randomly selected and sent an e-mail invitation to participate. In total, 22 schools used the classroom survey, 92 used the Web-based survey and three used a combination of the two. The mean response rate was 85% for institutions using classroom surveys and 23% for those using Web-based surveys, producing an overall mean response of 35%. Students taking the Web survey were slightly younger than those taking the classroom survey; however, no other significant differences were found on the variables of interest, and data from the two surveys were combined. Additional details about the NCHA are available elsewhere.[1]

The survey examines a variety of behaviors and topics that affect the health and academic success of college students, including substance use, sexual behaviors, weight and nutrition, violence, and physical and mental health.[1] In addition, it collects information regarding students' age, sex, race and ethnicity, year in school, residence, relationship status and sexual orientation. This investigation is based on a subsample of 29,952 female students from the United States or Canada who were sexually active (i.e., had had one or more sex partners during the last school year) and of traditional college age (18–24).

Measures and Analyses

Sexual orientation was defined by students' response to the question "Which of the following best describes you?" Possible responses were "heterosexual," "gay/lesbian," "bisexual," "transgendered" and "unsure." Students who identified themselves as transgendered were not included in these analyses, as gender identity (whether someone identifies as male or female) is a different construct from sexual orientation (the gender to which someone is sexually attracted). Students were also asked whether their sex partners during the last school year were "male," "female," "both male and female" or "n/a." Students who responded "n/a" were excluded from the analyses.

Alcohol use was measured with the question "The last time you 'partied'/socialized, how many alcoholic drinks did you have?" This item was dichotomized, and students reporting four or more drinks were considered to have participated in binge drinking. The survey also asked on how many days within the past 30 days students had used cigarettes, marijuana (pot, hash or hash oil), cocaine (crack, rock or freebase), amphetamines (diet pills, speed, meth or crank) and ecstasy. Responses were coded as zero or at least one.

Students were asked if they had ever engaged in oral, vaginal or anal intercourse; if they had used a condom the last time they had had oral, vaginal or anal intercourse; if they had had a routine gynecologic examination in the past year; if they had ever been tested for HIV; and whether they had had HPV, chlamydia, genital herpes, gonorrhea or HIV within the last school year. An item was created from responses regarding STDs, indicating whether they had had any of the above conditions in the past year. Students also were asked to report the number of partners, if any, with whom they had had oral, vaginal or anal sex within the past school year.

We conducted descriptive analyses, chi-square tests, t tests, analyses of variance and multiple comparisons using the Tukey post hoc multiple comparison procedure to identify characteristics that were associated with respondents' sexual orientation. Adjusted odds ratios were calculated to assess associations between having had an STD and sexual orientation, and logistic regression analysis using the forward stepwise procedure was conducted to identify behaviors and characteristics associated with having had an STD during the past year. SPSS 15.0 was used for analyses, and all tests were considered significant at or below the .05 alpha level.

RESULTS

Respondent Characteristics

Most students in this sample were white (78%) and were undergraduates (93%); 42% were single, and 54% were in a committed dating relationship or engaged to be married (Table 1, page 214). Ninety-four percent identified themselves as heterosexual, 1% as lesbian and 3% as bisexual; 1% were unsure of their sexual orientation. Similarly, 96% reported that during the past school year, they had had sex only with males, 2% only with females and 2% with both males and females. Two-thirds had had only one partner during the past year.

The vast majority of heterosexual students (98%) and students who were unsure of their sexual orientation (81%) had had sex only with males during the past year (Table 2, page 214); the majority of lesbians (85%) had had sex only with females. Among bisexual students, 56% had had sex only with males, and 10% had had sex only with females. Some 35% of bisexual students, 10% of lesbian students, 14% of students who were unsure of their sexual orientation and fewer than 1% of heterosexual students had had sex with both males and females during the past year.

TABLE 1. Percentage distribution of sexually active female college students aged 18–24, by selected characteristics, National College Health Assessment, 2006

Characteristic	% (N=29,952)
Race/ethnicity	
White	78.0
Black	4.9
Hispanic	5.5
Asian/Pacific Islander	7.2
American Indian/Alaska Native	1.2
Other	3.1
Year in school	
1st-year undergraduate	22.7
2nd-year undergraduate	23.8
3rd-year undergraduate	23.2
4th-year undergraduate	19.5
5th-year undergraduate	4.3
Graduate	6.1
Other†	0.5
Marital status	
Single	41.7
Committed dating relationship/engaged	54.2
Married	3.8
Separated	0.2
Divorced	0.1
Sexual orientation	
Heterosexual	94.4
Lesbian	0.9
Bisexual	3.3
Unsure	1.4
Gender of sex partners in past year	
Male only	95.9
Female only	2.1
Both	2.0
No. of sex partners in past year	
1	65.0
2	17.3
3–5	14.7
6–9	2.3
≥10	0.7
Total	100.0

†Includes special education and nondegree programs.

Behavioral Risk Factors

Nearly all respondents had ever engaged in oral sex (94%) and vaginal intercourse (91%). Close to one-quarter (23%) had ever engaged in anal intercourse. Lesbians were significantly less likely (p<.001) than students who were heterosexual, bisexual or unsure of their sexual orientation to have engaged in vaginal intercourse, but 73% had done so (compared with 89–92% of others). Bisexual students were significantly more likely (p<.001) to have engaged in anal intercourse (43%) than were students who were heterosexual (22%), lesbian (32%) or unsure (33%) of their sexual orientation.

Students who had had oral sex generally did not use condoms. Only 9% had done so the last time they had had oral intercourse; the proportion was significantly lower among bisexual students (6%) than among others (9–11%; p=.002). By contrast, 53% of respondents who had had vaginal intercourse had used a condom at last sex. However, lesbians were significantly less likely to have done so (27%) than were students who were heterosexual, bisexual or unsure (51–56%; p<.001). Among students who had ever had anal intercourse, only 24% had used a condom the last time they had engaged in this behavior. Reports of condom use at last anal sex were less common among heterosexual students (24%) than among students who were bisexual or unsure of their sexual orientation (30–31%; p=.005).

Survey participants had had a mean of 1.8 sex partners during the past year; the number differed significantly by students' sexual orientation (Table 3). Bisexual students and those who were unsure of their sexual orientation had had significantly more partners (2.8 and 2.5, respectively) than had heterosexual (1.7) or lesbian (2.0) students. Students who had had any STD during the past year had had significantly more partners than those who had not (2.6 vs. 1.7), and the same pattern held for each STD except HIV.

Fifty-six percent of all students had binged on alcohol the last time they partied; 21% had smoked cigarettes and 18% had used marijuana during the past 30 days (Table 4). However, fewer students (1–3%) had recently used amphetamines, cocaine or ecstasy. Reports of substance use varied significantly by students' sexual orientation. Heterosexual and bisexual students were significantly more likely to have binged on alcohol the last time they partied (56% of each) than were lesbians or students who were unsure of their sexual orientation (48–50%). Lesbian, bisexual and unsure students were significantly more likely than heterosexual students to have smoked cigarettes during the last 30 days (30–37% vs. 20%). Bisexual and unsure students were significantly more likely than others to have used marijuana, amphetamines and cocaine during that period. Students who were unsure of their sexual orientation were the most likely to have used ecstasy during the past 30 days.

Overall, 72% of students had had a routine gynecologic examination during the past year, but the proportion differed by students' sexual orientation (Table 4). Lesbians were by far the least likely to have had a routine gynecologic examination in the past year (46%). Bisexual and unsure students also were less likely to have done so than were heterosexual students (64–69% vs. 73%).

TABLE 2. Percentage distribution of sexually active female college students, by gender of sex partners in the past year, according to sexual orientation

Sexual orientation	Male only	Female only	Both	Total
Heterosexual	98.4	0.9	0.6	100.0
Lesbian	4.8	84.9	10.3	100.0
Bisexual	55.7	9.7	34.6	100.0
Unsure	81.0	5.5	13.6	100.0
χ^2=15,820.93 (df=3)***				

***p<.001.

TABLE 3. Mean number of sex partners in the past year among sexually active female college students, by sexual orientation and by STD experience in the past year

Orientation and STD	Mean
All	**1.8 (1.72)**
Sexual orientation* **	
Heterosexual	1.7 (1.53)
Lesbian	2.0 (2.29)
Bisexual	2.8 (3.70)
Unsure	2.5 (3.80)
Any STD* **	
No	1.7 (1.56)
Yes	2.6 (3.09)
HPV* **	
No	1.7 (1.61)
Yes	2.6 (3.03)
Genital herpes* **	
No	1.8 (1.66)
Yes	2.4 (3.70)
Chlamydia* **	
No	1.8 (1.65)
Yes	3.2 (3.72)
Gonorrhea **	
No	1.8 (1.67)
Yes	4.1 (6.20)
HIV	
No	1.8 (1.66)
Yes	4.2 (9.18)

**p<.01. ***p<.001. *Notes:* Comparisons by sexual orientation were made with analysis of variance; all others were made with t tests. "Any STD" refers to the STDs listed below. Figures in parentheses are standard deviations.

More than two-thirds of the sample (69%) had never been tested for HIV. Bisexual students and those who were unsure of their sexual orientation were significantly more likely than heterosexual or lesbian students to have been tested (42–48% vs. 30–31%).

Recent STD

During the past year, 6% of students had had an STD: 4% HPV, 1% each chlamydia and genital herpes, and fewer than 1% each gonorrhea and HIV. Bisexual students were the most likely to have had an STD (9%), while lesbians were the least likely (2%). Moreover, bisexual students and those who were unsure of their sexual orientation were significantly more likely to have had HPV during the past year (6% and 5%, respectively) than were heterosexual (4%) or lesbian (1%) students.

Significant differences were reported in recent STD incidence based on gender of sex partners. Students who had had sex with both males and females during the past year were significantly more likely to have had an STD (16%) than were students who had had two or more male partners (9%) or two or more female partners (6%). Similarly, the incidence of HPV and genital herpes during the past year was higher among students who had had sex with both males and females (10% and 3%, respectively) than among students who had had two or more male partners (5% and 1%, respectively) or two or more female partners (5% and 2%, respectively). No significant differences in STD incidence were reported between students who had had sex only with males and students who had had sex only with females during the past year.

In our adjusted analyses (Table 5, page 216), bisexual students' odds of having had an STD during the past year were nearly 60% higher than those of heterosexual students (odds ratio, 1.6) and more than four times those of lesbians (4.2). Similarly, the odds of having recently had HPV were nearly twice as high among bisexual students as among heterosexual students (1.6) and nearly six times as high among bisexual students as among lesbians (5.5). Bisexual students also were more likely than heterosexual students to have had herpes (1.8—not shown). Students who were unsure of their sexual orientation were more likely than lesbians to have had any STD (3.0) or HPV (4.7), and lesbians were less likely than heterosexual students to have had any STD or HPV (0.4 and 0.3, respectively).

Five variables were associated with students' having had an STD during the past year (Table 6, page 216). The odds of reporting an incident STD were elevated among those who said that they had binged on alcohol the last time they partied (1.3), they had had multiple sex partners in the past year (2.0), they had not used a condom at last vaginal intercourse (1.3), they had had a gynecologic examination within the past year (4.0) or they had ever had an HIV test (2.1).

DISCUSSION

This was the first investigation of a large-scale, national sample of sexually active female college students in which STD risk was examined and compared by sexual orientation. Our results therefore begin to fill a gap in the literature and provide some direction for future research in understanding and explaining STD risk among this

TABLE 4. Percentage of sexually active female college students reporting selected risk-related behaviors and STD experiences in the past year, by sexual orientation

Behavior or recent STD	Total	Hetero-sexual	Lesbian	Bisexual	Unsure
Substance use†					
Binge drinking**	55.6	55.8	48.3	55.5	49.8
Cigarette smoking***	20.9	20.1	35.2	36.7	30.1
Marijuana use***	18.3	17.4	24.2	34.1	35.9
Amphetamine use***	3.4	3.2	4.8	7.2	6.9
Cocaine use***	1.9	1.7	2.6	5.9	5.3
Ecstasy use***	0.5	0.4	0.9	1.2	2.2
Sexual health screening					
Gynecologic examination in past year***	72.2	72.7	46.1	68.5	64.1
Ever tested for HIV***	31.2	30.4	30.9	48.3	41.8
Recent STD					
Any***	5.9	5.8	2.3	9.1	6.3
HPV***	3.8	3.8	1.1	5.9	5.0
Chlamydia	1.3	1.3	0.4	1.9	0.7
Genital herpes	1.1	1.1	1.5	1.9	1.2
Gonorrhea	0.2	0.2	0.0	0.4	0.2
HIV	0.1	0.1	0.0	0.3	0.2

**p<.01. ***p<.001. †Binge drinking referred to the last time students had partied; other substance use measures referred to the past 30 days. *Note:* "Any" STD refers to the STDs listed below.

TABLE 5. Odds ratios (and 95% confidence intervals) from adjusted analyses of sexually active female college students' risk of having had an STD in the past year, by sexual orientation

STD	Model 1	Model 2	Model 3
Any			
Heterosexual	1.00 (ref)	na	na
Lesbian	0.38 (0.17–0.85)*	1.00 (ref)	na
Bisexual	1.59 (1.27–1.99)***	4.24 (1.83–9.79)***	1.00 (ref)
Unsure	1.12 (0.75–1.66)	2.97 (1.21–7.30)*	0.70 (0.45–1.10)
HPV			
Heterosexual	1.00 (ref)	na	na
Lesbian	0.29 (0.09–0.90)*	1.00 (ref)	na
Bisexual	1.59 (1.21–2.08)***	5.53 (1.72–17.79)***	1.00 (ref)
Unsure	1.34 (0.86–2.08)	4.66 (1.38–15.78)**	0.84 (0.51–1.41)

*p<.05. **p<.01. ***p<.001. *Notes*: ref=reference group. na=not applicable. "Any" refers to the STDs listed here plus chlamydia, genital herpes, gonorrhea and HIV.

young adult population. In particular, the proportion of students reporting a recent STD in this investigation (6%) was similar to or slightly lower than the proportion of 18–26-year-old National Longitudinal Study of Adolescent Health (Add Health) participants who tested positive for an STD (6–9%).[20,21] However, the studies based on Add Health included both young adults who attended college and those who did not, and one of them[21] included both males and females; neither assessed STD risk based on sexual orientation. Thus, additional research is needed to compare sexual risk-taking and STD risk, by sexual orientation, among female university students and their comparably aged peers who are not students.

We found significant differences in substance use, sexual behaviors and STD risk among female college students by sexual orientation. Bisexual students and students who were unsure of their sexual orientation were at particularly high risk. These results are consistent with findings from studies of adult populations of bisexual and lesbian women,[9,11,12,16,22] and are important for providers of university health services and other clinicians who see college students to be aware of.

However, not all bisexual students in this investigation were engaging in high-risk behavior. Rather, a subpopulation of students who did not necessarily identify themselves as bisexual but had had sex with both males and females during the past year were at greatest risk. These students were more likely to have recently had an STD, including HPV and genital herpes, than were students who had had multiple male partners or multiple female partners during the past year. Additional research is needed to better understand this subpopulation of young women and the factors associated with their elevated risk for STDs, including their failure to identify themselves as bisexual.

TABLE 6. Odds ratios (and 95% confidence intervals) from logistic regression analysis assessing the likelihood that sexually active female college students had an STD in the past year, by selected risk-related behaviors

Behavior	Odds ratio
Binge drinking last time partied*	1.27 (1.04–1.56)
Had ≥2 sex partners in past year***	1.99 (1.62–2.43)
Did not use a condom at last vaginal intercourse*	1.26 (1.02–1.57)
Had a gynecologic exam in past year***	4.00 (2.64–6.06)
Ever had an HIV test***	2.14 (1.75–2.62)

*p<.05. ***p<.001. *Notes:* Analyses examined all behaviors and STDs shown in Table 4, as well as ever having had vaginal and anal intercourse, and condom use at last vaginal and anal intercourse. Only behaviors with significant results are shown.

Notably, lesbians in this investigation were the least likely to have had an STD, particularly HPV, during the past year. However, they also were the least likely to have had a routine gynecologic examination. Thus, some of these women may have had infections of which they were unaware. In previous studies, most adult lesbians who received a diagnosis of HPV or genital herpes had been unaware they were infected.[2–9] Without having had a gynecologic examination, it is unlikely that these women would have discovered that they had an infection.

Sexual health education programs and sexual health care providers on college campuses must recognize and address STD risk among lesbian populations and populations of young women who have sex with women. They must ensure that these women understand that even women who have sex only with women may become infected with an STD. Moreover, the importance of regular gynecologic examinations among lesbians and young women who have sex with women must be reiterated. Additional research is needed to understand why these young women do not seek routine gynecologic care.

Limitations

This investigation has several limitations. First, because participation in the NCHA was based on self-selection of colleges and universities, institutions that participated may have differed from those that did not. Similarly, students who completed the survey may have differed from those who did not. Thus, our results may not be representative of all sexually active female college students. Second, the NCHA utilized multiple data collection methods, each with its own limitations. In particular, the classroom survey captured the experiences only of students who were present on the day the survey was administered; use of the Web-based survey made it more likely that students completed the survey on more than one occasion or that a student other than the one randomly selected completed the survey. These limitations exist for most investigations utilizing the Internet as a means of data collection.[23]

Third, the NCHA relied on self-reported data regarding sexual behaviors that were not clearly defined in the survey, leaving their meaning open to interpretation. For example, it is not apparent whether students who reported having vaginal sex had engaged in penile-vaginal intercourse or if vaginal penetration with sex toys or fingers was included in this behavior. Previous research with sexual minority women suggests that the latter is most likely the case.[7,16,19,24] Thus, the extent to which unprotected vaginal intercourse was a risk factor for STDs

cannot be completely understood on the basis of our results.

Lastly, the sample size of lesbian, bisexual and unsure females was small, and the NCHA data were cross-sectional; observations over time and at an individual level were not possible. Such observations, with a larger sample of sexual minority women, may provide a more global view of risk behavior and sexual health among female college students.

Conclusion

This investigation clearly demonstrates that students' sexual orientation (the primary gender to which they are physically and emotionally attracted) does not necessarily predict their sexual behavior (whether they express their sexual feelings with males, females or both, and how they express those feelings). Thus, when assessing STD risk among sexually active female college students, it is important for health professionals to focus on students' behaviors rather than on their orientation or identity. In addition, sexual health programs on college campuses must address STD risk associated with alcohol use (especially binge drinking), having multiple sex partners and not using condoms during intercourse, regardless of students' sexual orientation. Most important, health care providers should never make assumptions about students' sexual behaviors or STD risk on the basis of their orientation or identity.

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