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Sexual Orientation Disparities in Sexually Transmitted Infection Risk Behaviors and Risk Determinants Among Sexually Active Adolescent Males: Results From a School-Based Sample

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Abstract

Objectives—We examined disparities in risk determinants and risk behaviors for sexually transmitted infections (STIs) between gay-identified, bisexual-identified, and heterosexual-identified young men who have sex with men (YMSM) and heterosexual-identified young men who have sex with women (YMSW) using a school-based sample of US sexually active adolescent males.

Methods—We analyzed a pooled data set of Youth Risk Behavior Surveys from 2005 and 2007 that included information on sexual orientation identity, sexual behaviors, and multiple STI risk factors.

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Contributors

B. G. Everett was responsible for study conceptualization, data analysis, data interpretation, and article preparation. P. W. Schnarrs, M. Rosario, R. Garofalo, and B. Mustanski were responsible for data interpretation and article preparation.

Note. The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health, the Centers for Disease Control and Prevention, or any agencies involved in collecting the data.

Human Participant Protection

Protocol approval was not necessary because we obtained de-identified data from secondary sources. Data use agreements were obtained from the Vermont Department of Health and Rhode Island Department of Health, which were the only 2 departments of health that required these agreements for access to YRBS data.

Results—Bisexual-identified adolescents were more likely to report multiple STI risk behaviors (number of sex partners, concurrent sex partners, and age of sexual debut) compared with heterosexual YMSW as well as heterosexual YMSM and gay-identified respondents. Gay, bisexual, and heterosexual YMSM were significantly more likely to report forced sex compared with heterosexual YMSW.

Conclusions—Our results provide evidence that sexual health disparities emerge early in the life course and vary by both sexual orientation identity and sexual behaviors. In particular, they show that bisexual-identified adolescent males exhibit a unique risk profile that warrants targeted sexual health interventions.

Several studies have documented an elevated risk of acquiring sexually transmitted infections (STIs), including HIV/AIDS, among young men who have sex with men (YMSM).[1] In recent years, HIV/AIDS infection rates have actually increased among this population.[2,3] To develop more effective and targeted STI prevention programs, researchers have suggested using multiple measures of sexual minority status when examining disparities in STI risk by sexual orientation.[4–8] Existing research on sexual health disparities among adolescents often uses community-based samples that rarely yield large enough sample sizes to examine multiple sexual minority statuses in any given study.[6,9] This gap in the literature is particularly problematic given the documented incongruence between sexual orientation identity and sexual behaviors among sexual minority adolescents.[10–12] Thus, although studies have demonstrated that both YMSM[1,13–15] and bisexual- and gay-identified male adolescent[16,17] are more likely to report a variety of STI risk factors, to our knowledge, no studies to date have used both indicators of sexual orientation identity and sexual behaviors to examine disparities in STI risk factors among adolescents.

Elevated rates of STI among sexual minority adolescent males are due to a variety of factors, including social conditions, sexual networks, and, in particular, the excess biological risk associated with anal sex.[1,18] Elevated STI risk, however, has also been attributed to sexual orientation disparities in a variety of risk behaviors, including earlier age of sexual debut, more sex partners,[14,17,19] higher rates of substance use during sex,[15] and lower rates of condom use.[13,20] These disparities have been documented through use of sexual behaviors[1,13–15] or sexual orientation identity[16,17] to capture sexual minority status. As a result, STI risk interventions based on studies that use sexual orientation identity alone may not reach adolescents who engage in same-sex behavior but identify as heterosexual.[1] Alternatively, focusing exclusively on sexual behavior obscures potentially important differences across social identities, which are critical for understanding and eliminating disparities in STIs.[5] Studies that use either sexual orientation identity or behavior are therefore likely to capture different populations and provide an incomplete portrait of STI risk among sexual minority adolescents.[21]

To develop appropriate STI intervention strategies, it is also critical to understand what factors might lead to risk-taking behaviors among sexual minority populations. Studies have shown that sexual minority adolescent males are more likely to report multiple sources of victimization, including forced sex[16,22] and intimate partner violence (IPV),[23–25] compared with their sexual nonminority peers. Forced sex may directly expose young men to STIs, but

it also may have long-lasting implications for the development of sexual self-efficacy, safe sex communication skills, and normative attitudes surrounding sexual risk behaviors.[26,27] IPV has been identified as a significant barrier to effective communication about safer sex behaviors and is linked to elevated STI risk among adolescents.[28] Similar to the literature on STI risk behaviors, existing studies on forced sex and IPV among sexual minorities rely on single indicators of sexual orientation—either sexual orientation identity[16,23] or the sex of sex partners.[25] Given the stigma associated with gay or bisexual identity, sexual minority–identified respondents may be more likely to be targeted for victimization than YMSM who identify as heterosexual.

Understanding which aspects of sexual minority status (e.g., sexual orientation identity, sex of sex partners) are related to STI risk factors during adolescence is critical for developing targeted prevention efforts to curb rising STI infection rates. New evidence suggests that STI risk varies by both sexual orientation identity and behaviors among young adult men.[4] It is unclear whether similar patterns in STI risk behaviors and risk behavior determinants emerge during adolescence. Using a school-based sample of adolescent males, we aimed to determine whether sexual risk behaviors, including age of sexual debut, number of sex partners, concurrent sex partners, condom use, and drug and alcohol during sex, as well 2 indicators of risk behavior determinants (forced sex and IPV) vary at the intersection of sexual orientation identity and sexual behaviors.

METHODS

The study pooled 2005 and 2007 Youth Risk Behavior Surveys (YRBS) from several jurisdictions that included 1 or more measures of sexual orientation. Details on the data and the pooling approach have been described elsewhere.[29] The current study analyzed pooled data from 8 jurisdictions: Boston, Massachusetts; Chicago, Illinois; Delaware; Maine; Massachusetts; New York City, New York; Vermont,; and Rhode Island.

Our analytic sample was restricted to male adolescents who reported at least 1 sex partner. We also excluded respondents who were missing information on the sexual orientation identity and sexual behavior items, race/ethnicity, or age, as well as respondents who reported being “unsure” of their sexual orientation and respondents who reported “other” race/ethnicity. The age range of the analytic sample was 12 to 18 years. Our final un-weighted analytic sample yielded a total of 13 174 eligible respondents. Because some respondents were missing information for single dependent variables, our analytic sample size varied across outcomes. Analytic sample sizes for each analysis are reported in the tables.

Measures

Independent variable—Respondents were asked in the YRBS whether they identified as heterosexual, bisexual, gay, or unsure. They were also asked if they have had “sexual contact” with males, females, both males and females, or no sexual contact. We combined both measures to create a series of dummy variables to capture multiple sexual minority statuses: heterosexual YMSW (young men who have sex with women; the referent), heterosexual YMSM/W (young men who have sex with men or with men and women),

respondents who identified as bisexual, and respondents who identified as gay. Additional tests revealed that results did not vary within the bisexual- and gay-identified population by the sex of their sex partners. That is, we compared whether the results varied between gay YMSM and gay YMSM/W, as well as bisexual YMSM/W and bisexual YMSW, and found no significant differences between these groups. Therefore, we did not further disaggregate them.

Dependent variables—We coded age at first sex as a continuous variable that ranged from 11 to 17 years. Number of sex partners ranged from zero to 6 or more sex partners. We coded concurrent sex partners as a dichotomous variable that measured whether respondents reported having more than 1 sex partner in the last 90 days or whether they did not (referent). Condom use captured whether the respondent did not use a condom at last sex or whether they did (referent). Drug and alcohol use during sex measured whether respondents reported using drugs or alcohol during their last sexual relationship or whether they did not (referent).

Forced sex refers to whether respondents reported ever having been "physically forced to have sexual intercourse" or whether they did not (referent). IPV captures whether respondents reported being hit or slapped in the past 12 months by their boyfriend or girlfriend.

Controls—We controlled for both race/ethnicity and age, both of which have been shown to be related to sexual behavior.[30–32] We coded race/ethnicity as a series of dummy variables that captured whether respondents identified as non-Hispanic White (referent), non-Hispanic Black, Hispanic, Asian, or Native American or Pacific Islander. We coded age as a continuous variable that ranged from 12 to 18 years.

Statistical Analysis

First, we present descriptive statistics for risk behavior determinants and STI risk behaviors, for the total population and by sexual minority status. We conducted F tests using the TEST command in Stata version 12.1 (StataCorp LP, College Station, TX) to test for statistical differences (expressed in means) for each sexual minority group compared with heterosexual YMSW. Second, we present the results from multiple regressions examining disparities in STI risk behaviors and risk behavior determinants by sexual minority status. Because our continuous variables were not normally distributed, we used Poisson regression for the analysis of age at first sex and number of partners. For all other analyses, we used binary logistic regression. For each analysis, we also conducted additional tests that assessed whether estimates varied between bisexual, gay, and heterosexual MSM/W respondents. We conducted all models, which controlled for age and race/ethnicity, using the SVY commands in Stata 12.1 to account for the YRBS complex sampling frame. Supplementary tests examining the effects of respondent jurisdiction showed that location had no significant effect on our results. Finally, we tested interactions between age and sexual minority status and found no significant differences by age group.

RESULTS

Table 1 presents the descriptive statistics (means or percentages) for the total population and by sexual minority status. The results show that only bisexual respondents reported significantly younger mean age at first sex (mean = 12.92; $P < .001$), a higher mean number of sex partners (3.32; $P < .01$), and a higher prevalence of concurrent relationships (32.30%; $P < .01$) compared with heterosexual YMSW. Heterosexual YMSM/W (39.27%; $P < .01$), bisexual (50.71%; $P < .001$), and gay (54.47%; $P < .001$) respondents reported higher prevalence levels of not using a condom at last sex. There were no differences in drug use at last sex by sexual minority status. Prevalence of forced sex among sexual minority adolescents was roughly 24%, compared with just 6% for heterosexual YMSW. Only bisexual respondents had significantly higher prevalence levels of IPV (28%; $P < .05$) than heterosexual YMSW.

Sexually Transmitted Infection Risk Behaviors

Table 2 presents the results from multivariate regressions for STI risk behaviors. They show that only bisexual respondents were associated with younger age at first sex (incident rate ratio [IRR] = 0.93; $P < .001$), more sex partners (IRR = 1.41; $P < .001$), and increased likelihood of reporting concurrent partners (OR = 2.56; $P < .001$) compared with heterosexual YMSW. Supplementary analyses (not shown) revealed that bisexual adolescents were also associated with younger ages at first sex, more sex partners, and increased likelihood of reporting concurrent sex partners compared with both heterosexual YMSM/W and gay respondents. All sexual minority groups were associated with an increased likelihood of reporting not using a condom at last sex compared with heterosexual YMSW.

Sexually Transmitted Infection Risk Behavior Determinants

Table 3 presents multivariate results for STI risk behavior determinants by sexual minority status. All sexual minority groups were associated with substantially increased odds of reporting forced sex compared with heterosexual YMSW. Bisexual respondents were the only group associated with increased odds of reporting IPV (OR = 2.63; $P < .001$) compared with heterosexual YMSW.

We also conducted supplementary analyses to examine the relationship between our STI risk determinants and STI risk behaviors. These results showed that risk behavior determinants were indeed associated with risk behaviors, but did not explain any of the disparities by sexual orientation. This may be in part attributble to significant limitations regarding the timing of events reported in the YRBS.

DISCUSSION

The results presented in this study underscore the importance of using both measures of sexual behavior and sexual orientation identity to examine disparities in STI risk factors during adolescence. In particular, they highlight potential problems associated with relying exclusively on behavior-based measures to define bisexuality. Our results suggest a unique risk profile among bisexual-identified youths, who had younger ages at first sex, higher rates

of sex partners, and increased odds of concurrent sex partners than heterosexual YMSW, heterosexual YMSM/W, and gay adolescents. On the basis of these results, studies that conflate YMSM across sexual orientation identity groups run the risk of overestimating STI risk factors among heterosexual YMSM and underestimating STI risk factors among bisexual YMSM. Other research has also cautioned against relying exclusively on sexual behaviors to measure bisexuality.[21]

The finding that bisexual adolescents are at greater risk for acquiring STIs is supported by other research[33] and may be attributable to a number of factors. Bisexual adolescents face several unique challenges to healthy development, including poorer academic performance[34] and elevated stigma,[35] compared with both heterosexual and gay adolescents, which may in part explain their unique sexual health risk. Other work, however, has not found differences between the well-being of bisexual and gay youths[36]; thus, more research is needed to understand the connections between these additional challenges (e.g., mental health, school outcomes, social isolation) and bisexual adolescents' STI risk.

The associations between bisexual identity and STI risk factors are even more striking when one considers the lack of disparities between heterosexual YMSW, heterosexual YMSM/W, and gay adolescents for many outcomes. We found no differences in age at first sex, number of sex partners, concurrent partners, or drug or alcohol use during sex between these groups. Given the young age range of the analytic sample, adolescents who identified as gay at the time of the survey may have had higher levels of self-esteem and lower levels of internalized homophobia, which serve as protective factors against risk behaviors.[37] By contrast, heterosexual YMSM/W respondents may have been less certain of their sexual orientation or possibly unwilling to identify with a sexual minority identity, such as bisexual or gay. Uncertainty of sexual orientation or fear of stigma related to a same-sex sexual orientation may mean that heterosexual YMSM/W are less likely to engage in sexual behaviors with either males or females. In fact, the descriptive statistics show that among sexual minority adolescents, heterosexual YMSM/W reported the lowest mean number of sex partners.

For all sexual minority groups, however, the results show increased odds of not using a condom at last sex. More research is needed to understand barriers to condom use among sexual minority adolescents to develop targeted prevention efforts to increase condom use and consistency of use. Research suggests that sexual minority adolescents exposed to sexual minority–specific HIV/AIDS education engage in fewer risk behaviors than sexual minority adolescents without exposure to such programs.[38] Providing adolescents with accurate and relevant sexual health information before their first sexual interaction, or early in their sexual histories, may therefore help establish healthy sexual norms and behaviors and reduce STI rates.[39–41] Given the differences in lived experiences among heterosexual, bisexual, and gay adolescents, it is critical that HIV prevention efforts targeted at YMSM should be sensitive to multiple audiences. The same prevention efforts that prove effective for gay YMSM may not accurately address the challenges faced by bisexual or heterosexual YMSM.

Our results also indicate that, compared with heterosexual YMSW, all sexual minority groups were more likely to report forced sex and bisexual adolescents were more likely to

report IPV. These findings are supported by other research finding that sexual minority male adolescents are more likely to report sexual abuse[33,42,43] and partner violence[24] than sexual nonminorities. Although supplementary analyses not shown in our results did reveal an association between victimization and risk behaviors, other research has found that victimization is strongly linked to sexual risk behaviors among male adolescents.[16,27,28,44] Thus, reducing victimization among sexual minority populations may be important for reducing STI disparities by sexual orientation.

This study has several limitations. First, sexual behaviors were not defined for respondents, so respondents' interpretations as to what counts as "sex" may vary. This may be particularly problematic for the sexual minorities, where the definition of sex may be less culturally universal. Moreover, although biological risk of STI acquisition varies by sexual act, specific sexual behaviors were not assessed. To better understand risk, a more nuanced assessment of sexual behaviors during the sexual event, coupled with condom use with these specific behaviors, is needed. Second, we were unable to assess the timing of events with much specificity; that is, we could not determine whether same-sex behaviors came before or after forced sex or IPV. Third, we were unable to include any measure of family support, partner communication, or psychological health, which may mediate the relationship between sexual minority status and STI risk factors.[1,14,45–47] Finally, because our analytic sample was school based and therefore excluded adolescents who were not in traditional school settings and who may have been more at risk for STIs, it is not nationally generalizable.

Despite these limitations, the findings provide new probability sample-based estimates for disparities in sexual health risk disparities for sexually active US adolescent males. Our results provide compelling evidence that sexual health disparities emerge early in the life course and that risk factors are not evenly distributed across the sexual minority population.

In particular, the results demonstrate that, depending on the measure used to define sexual minority status, researchers may come to different conclusions that hinder the development of targeted and effective public health interventions.[21] Future research on adolescent sexual health disparities should incorporate both measures of sexual orientation identity and sexual behavior whenever possible. Notably, our results highlight the need for more work to understand and eliminate elevated STI risk among bisexual-identified adolescent males, as well as the importance of continued efforts to increase condom use and reduce violence against sexual minority male adolescents.

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TABLE 1

Unadjusted Means or Percentages for Total Population and by Sexual Minority Status: Youth Risk Behavior Surveys, United States, 2005 and 2007

Variable	Heterosexual YMSW (93.51%), Mean (95% CI) or % (95% CI)	Heterosexual YMSM/W (2.94%), Mean (95% CI) or % (95% CI)	Bisexual (2.15%), Mean (95% CI) or % (95% CI)	Gay (1.40%), Mean (95% CI) or % (95% CI)	Total Population (100%), Mean (95% CI) or % (95% CI)
Sexual risk behaviors					
Age at first sex, y	13.97 (13.88, 14.07)	13.77 (13.44, 14.10)	12.92*** (12.44, 13.40)	13.86 (13.34, 14.39)	13.93 (13.84, 14.04)
No. of sex partners	2.51 (2.41, 2.62)	2.52 (2.11, 2.93)	3.32** (2.76, 3.89)	2.83 (2.28, 3.39)	2.53 (2.44, 2.63)
Concurrent partners	16.84 (15.35, 18.32)	11.54 (6.93, 16.14)	32.30** (20.25, 44.35)	24.64 (15.72, 33.57)	17.11 (15.76, 18.46)
No condom use at last sex	24.01 (22.40, 25.62)	39.27** (28.44, 50.09)	50.71*** (36.55, 64.88)	54.47*** (41.51, 67.42)	25.49 (23.85, 27.13)
Drugs or alcohol during sex	17.88 (16.84, 18.92)	20.42 (12.48, 28.38)	20.33 (12.13, 28.53)	18.38 (11.40, 25.36)	18.03 (17.01, 19.04)
Sexual risk behavior determinants					
Forced sex	6.25 (5.49, 7.01)	23.00*** (15.90, 30.09)	23.84*** (16.41, 31.28)	24.12*** (14.67, 33.56)	7.45 (6.57, 8.32)
Hit by a partner	13.10 (12.03, 14.17)	20.39 (13.56, 27.21)	27.89* (19.79, 36.00)	13.71 (7.49, 19.92)	13.64 (12.58, 14.71)
Controls					
Race/ethnicity					
Non-Hispanic White	44.79 (40.69, 48.89)	50.25 (41.42, 59.10)	47.37 (37.76, 56.99)	49.35 (38.49, 60.22)	45.10 (41.12, 49.09)
Non-Hispanic Black	25.77 (22.75, 28.79)	25.76 (17.90, 33.61)	20.43 (11.57, 29.29)	17.12 (11.05, 23.19)	25.51 (22.60, 28.42)
Hispanic	24.76 (21.55, 27.96)	18.98 (13.35, 24.60)	23.35 (14.82, 31.87)	30.24 (21.60, 38.88)	24.64 (21.59, 27.68)
Asian	3.52 (2.64, 4.40)	3.41 (0.87, 5.94)	5.71 (1.66, 9.76)	1.33 (0.00, 2.78)	3.52 (2.69, 4.36)
Pacific Islander/Native American	1.16 (0.96, 1.36)	1.60 (0.47, 2.74)	3.14 (0.00, 6.32)	1.95 (0.00, 3.94)	1.23 (1.02, 1.43)
Age, y	16.14 (16.06, 16.22)	16.22 (15.99, 16.45)	15.83 (15.52, 16.15)	16.26 (15.98, 16.54)	16.13 (16.06, 16.22)

Note. CI = confidence interval; YMSM/W = young men who have sex with men or with men and women; YMSW = young men who have sex with women. All significance tests compare sexual minorities with heterosexual YMSW.

* $P \leq .05$;

** $P \leq .01$;

*** $P \leq .001$.

TABLE 2

Coefficients for Sexual Minority Status Differences in Risk Behaviors for Sexually Transmitted Infections: Youth Risk Behavior Surveys, United States, 2005 and 2007

Variable	Age at First Sex, IRR (95% CI)	No. of Sex Partners, IRR (95% CI)	Concurrent Partners, OR (95% CI)	No Condom Used During Last Sex, OR (95% CI)	Drugs or Alcohol During Sex, OR (95% CI)
Sexual orientation status					
Heterosexual YMSW (Ref)	1.00	1.00	1.00	1.00	1.00
Heterosexual YMSM/W	0.97 (0.95, 1.00)	1.03 (0.89, 1.20)	0.66 (0.41, 1.08)	2.05** (1.28, 3.27)	1.20 (0.73, 1.97)
Bisexual	0.93*** (0.91, 0.96)	1.41*** (1.19, 1.66)	2.56*** (1.43, 4.57)	3.38*** (1.81, 6.29)	1.13 (0.68, 1.91)
Gay	0.98 (0.95, 1.01)	1.18 (0.95, 1.46)	1.67 (0.98, 2.85)	3.57*** (2.06, 6.20)	0.99 (0.60, 1.61)
Race/ethnicity					
Non-Hispanic White (Ref)	1.00	1.00	1.00	1.00	1.00
Non-Hispanic Black	0.92*** (0.91, 093)	1.82*** (1.70, 1.96)	2.16*** (1.70, 2.76)	0.71*** (0.59, 0.86)	0.47*** (0.38, 0.59)
Hispanic	0.95*** (0.94, 0.96)	1.52*** (1.41, 1.65)	1.77*** (1.39, 2.26)	1.08 (0.87, 1.34)	0.65*** (0.53, 0.80)
Asian	0.98 (0.96, 1.01)	0.74** (0.60, 0.90)	0.72 (0.45, 1.14)	1.27 (0.82, 1.95)	0.61* (0.38, 0.99)
Pacific Islander/Native American	0.94*** (0.91, 0.96)	1.54*** (1.36, 1.75)	2.47*** (1.63, 3.67)	0.78 (0.43, 1.16)	0.74 (0.51, 1.06)
Age	1.04*** (1.04, 1.04)	1.08*** (1.06, 1.11)	1.08* (1.00, 1.17)	1.13*** (1.05, 1.22)	1.05 (0.98, 1.13)

Note. CI = confidence interval; IRR = incident rate ratio; OR = odds ratio; YMSM/W = young men who have sex with men or with men and women; YMSW = young men who have sex with women. All models control for race/ethnicity and age. Estimates for number of sex partners and age at first sex are drawn from Poisson regression; all other analyses use logistic regression. Unweighted sample sizes were as follows: age at first sex, n = 10 454; number of sex partners, n = 11 706; concurrent partners, n = 13 150; no condom used during last sex, n = 10 073; drugs or alcohol during sex, n = 11 790.

* $P \leq .05$;

** $P \leq .01$;

*** $P \leq .001$.

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TABLE 3

Coefficients for Differences by Sexual Minority Status in Risk Behavior Determinants for Sexually Transmitted Infections: Youth Risk Behavior Surveys, United States, 2005 and 2007

Variable	Forced Sex, OR (95% CI)	IPV, OR (95% CI)
Sexual orientation status		
Heterosexual YMSW (Ref)	1.00	1.00
Heterosexual YMSM/W	4.68*** (3.13, 7.00)	1.49 (0.96, 2.33)
Bisexual	4.81*** (3.16, 7.32)	2.63*** (1.76, 3.92)
Gay	4.60*** (2.73, 7.76)	1.05 (0.61, 1.80)
Race/ethnicity		
Non-Hispanic White (Ref)	1.00	1.00
Non-Hispanic Black	1.02 (0.73, 1.43)	0.99 (0.77, 1.27)
Hispanic	1.34* (1.03, 1.75)	0.99 (0.81, 1.21)
Asian	0.88 (0.50, 1.55)	0.85 (0.50, 1.45)
Pacific Islander/Native American	1.22 (0.58, 2.60)	0.73 (0.45, 1.17)
Age	1.05*** (0.96, 1.14)	1.09 (1.00, 1.20)

Note. CI = confidence interval; IPV = intimate partner violence; OR = odds ratio; YMSM/W = young men who have sex with men or with men and women; YMSW = young men who have sex with women. All models control for age and race/ethnicity. Unweighted sample sizes were as follows: forced sex, n = 13 010; IPV, n = 10 397.

* $P \leq .05$;

** $P \leq .01$;

*** $P \leq .001$.