quantitative research to date has collapsed lesbian, bisexual, and other women who have sex with women into a single analytic group (eg, lesbian/bisexual, women who have sex with women, sexual minority, LGB).[19-21] While amalgamating bisexual and lesbian women into a single category may be beneficial for conducting statistical analyses or developing more generalizable results, it is often problematic as these categories may obfuscate our understanding of the unique risk profiles of female subgroups.[1,22-25] Additionally, even when bisexual women have been examined independently, researchers have typically explored only a single aspect of sexual orientation (eg, identity or behavior),[1,26] which may also conceal behavioral distinctions in sexual risk relative to other groups. For example, studies that explore sexual risk by combining bisexual and lesbian women on the basis of behavior (ie, women who have sex with women) may falsely conclude that bisexual and lesbian women are at equal risk for HIV and other STIs,[2,3] despite the fact that behaviorally bisexual women—a subgroup known to engage in higher-risk receptive penile intercourse with male partners—also comprise the sample and may have risk profiles that are more similar to heterosexual women than lesbian women.[6] However, examining sexual risk by identity alone (ie, not taking actual behavior into account) may also lead to the misclassification of health disparities as research indicates that sexual orientation identity is often fluid,[1,25,27] especially among women and adolescents who are in the process of identity exploration and formation.[1,28]

Adolescence is not only a key developmental period with regard to sexual identity, but also sexual behavior, as behavioral patterns emerging in adolescence often lead to behavioral patterns in adulthood that perpetuate HIV or STI risk.[21] Indeed, understanding the sexual experiences of school-aged youth is important, particularly among sexual minority young women as research shows that compared with their heterosexual peers, young sexual minority women report more unprotected sex,[21,29] sex at younger ages,[21,29] greater use of drugs or alcohol in general,[21,30] and during sex,[18] more sexual partners,[29,31] higher prevalence of forced or coerced sexual contact,[21,29,30] higher prevalence of pregnancy,[21,31] and more STIs.[32] Sexual minority youth are also at risk for bullying[18,33] and physical victimization,[19,34] which is associated with a number of adverse health outcomes including depression,[35] substance use,[18] and sexual risk behavior.[19] However, as with the empirical literature among adult sexual minority populations, sexual health research with adolescents has focused largely on young men who have sex with men or examined lesbian, bisexual and gay adolescents or lesbian and gay young women as a homogenous group.[1,19,36,37] Moreover, little research has examined young sexual minority women's use of HIV and STI testing services—a preventative strategy indicative of risk awareness, with implications for secondary prevention.[38,39] Given that sexual minority youth are at greater risk for a variety of negative health outcomes, relative to their heterosexual counterparts, and research has shown that sexual orientation identity may change over time,[28] it is important to simultaneously examine both behavior and identity when seeking new insights on the HIV and STI risk profiles of adolescent girls.

This study addressed several of the aforementioned gaps in the literature by examining differences in sexual risk behaviors and psychosocial factors by both sexual orientation identity and behavior using a large representative sample of high school girls in Massachusetts. The following research questions were examined: (1) Are bisexual girls at greater risk for adverse sexual risk behavior (unprotected sex, 4 or more sexual partners, early sexual debut, pregnancy, substance use during sex, HIV or STI diagnosis) and psychosocial outcomes (depression, binge drinking, drug use, and bullying) in comparison to their heterosexual peers? (2) In comparing bisexual girls to heterosexual girls, are there differences in these sexual risk and psychosocial outcomes by identity vs behavior? (3) To what extent does identity moderate the effects of any observed differences in health by sexual behavior? Finally, we also sought (4) to explore whether differences existed by bisexual behavior vs identity with regard to testing for HIV and STIs as these behaviors may serve as proxies for risk awareness and engagement in preventative health care services.

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METHODS

The Massachusetts Youth Risk Behavior Survey (MYRBS) is a survey of public high school students from a scientifically selected random sample of schools across the Commonwealth. The MYRBS is conducted by the Massachusetts Department of Elementary and Secondary Education (ESE), in conjunction with the Massachusetts Department of Public Health, and with funding from the Centers for Disease Control and Prevention (CDC). The survey monitors risk behaviors related to the leading causes of morbidity and mortality in the United States among youth in grades 9-12. The anonymous survey includes questions about sexual behaviors that might lead to unintended pregnancy or sexually transmitted diseases, alcohol and other drug use, dietary behaviors, physical activity, and behaviors associated with intentional or unintentional injuries. Data from the 2007 MYRBS were analyzed, as these were the most recent publicly available data.

Details of sampling procedures have been reported previously.[40] In brief, a probability proportionate to size random sample of public high schools (schools with at least 1 of grades 9 to 12) was selected. In the sampled schools, 6 classes were randomly selected; 3 were then randomly assigned to receive the MYRBS. Trained survey administrators administered the surveys in the participating schools. In 2007, data were collected from over 3000 high school students within 59 schools for the MYRBS. The overall response rate (student response rate × school response rate) was 73% for the 2007 MYRBS. Data from the MYRBS, using appropriate weighted estimates, provide accurate estimates of the prevalence of risk behaviors among public high school students in the Commonwealth of Massachusetts.[41] Additional documentation concerning weighting procedures have been described in detail elsewhere.[40]

Measures

Demographics. The sex of students was assessed by asking subjects to indicate their sex as male or female. Those who did not report their sex or identified as male were excluded from this analysis. Grade was determined by asking subjects what grade they were in, with response options given as 9th, 10th, 11th, 12th, ungraded, or other grade. A binary variable was created for lower grades (9th/10th) and upper grades (11th/12th). Students who reported being ungraded or in another grade and those who did not respond to this question were excluded from this analysis.

Participants were asked their race/ethnicity and classified as White/Caucasian, Black/African American, Latino/Hispanic, Asian/Pacific Islander, other race/identity (eg, American Indian/Alaskan Native, multiracial). Students were classified as White or racial/ethnic minority to allow for adequate statistical power to examine differences by sexual orientation and support. Those who did not report their race/ethnicity were excluded from analyses.

Students were asked the following question to assess sexual identity: ''Which of the following best describes you?'' Response options were heterosexual (straight), gay or lesbian, bisexual, not sure, or missing. Given that the analysis was focused on bisexual vs heterosexual behavior and identity, female students who indicated a lesbian identity, responded ''not sure,'' and who did not respond to this question were excluded from this analysis. Thus, girls were categorized as having either a bisexual or heterosexual identity. Students who had never had sexual intercourse were excluded from the analysis.

To assess sexual behavior, respondents were asked with whom they had sexual contact in their lifetime (ie, girls, boys, both, or neither). Girls indicating lifetime sexual contact with girls only, no history of sexual contact, and who did not respond to this question were excluded from the analysis. Thus, girls were categorized as having had lifetime sexual contact with girls and boys (behaviorally bisexual) or boys only (heterosexual).

Sexual health indicators. Eight domains of sexual health were assessed. (1) ''Unprotected intercourse at last sex'' was assessed by asking subjects if they or their partner had used a condom during the most recent sexual intercourse (yes/no). (2) ''Alcohol or drug use at last sex'' was assessed by asking students reporting prior sexual activity whether they had used alcohol or drugs during their last sexual encounter (yes/no). (3) Students reporting prior sexual activity were asked to indicate the age at which they engaged in sexual intercourse for the first time. Using a cutoff age of 14 years, we assessed ''early sexual debut'' as those reporting first sexual intercourse at age 14 years or younger (yes) vs age 15 years or older (no). (4) Subjects were asked to indicate the number of lifetime sexual partners. Those indicating ''4 or more lifetime partners'' were coded as yes, and those with 1 to 3 partners were coded as no. (5) ''History of pregnancy'' was assessed by asking female students to indicate how many times they had been pregnant in their lifetime. Those who had ever been pregnant were coded as yes and those who had never been pregnant were coded as no. (6) ''History of forced or unwanted sex'' was assessed by asking subjects whether they had ever had sexual contact with anyone against their will. Students reporting forced or unwanted sex were coded as yes and those who had not experienced forced or unwanted sex were coded as no. (7) ''History of HIV or STI diagnosis'' was determined by asking students if they had ever been told by a doctor or nurse that they had an HIV infection or any other STI (phrased as ''STD'' in the question). Responses were

coded dichotomously (yes/no). (8) Finally, ''history of STI testing'' was assessed by asking participants to indicate whether they had been tested for STIs such as genital herpes, chlamydia, syphilis, or genital warts. Responses were coded dichotomously (yes/no).

Psychosocial health indicators. Four psychosocial health indicators were investigated. (1) To assess ''depressive distress,'' students were asked a single-item screening question: ''During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some usual activities?'' Response options were yes or no. (2) ''Binge drinking'' was measured by asking students the following question, ''during the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?'' Responses ranged from 0 to 20 or more days. A binary indicator of binge drinking was created, such that students who reported 5 or more drinks of alcohol in a row on 1 or more days were classified as having binge drank in the past 30 days, and those who did not were classified as not having binge drank. (3) To assess ''drug use,'' subjects were asked to report how many times they used illegal drugs during the past 30 days. Students indicating 1 time or more were categorized as having used drugs in the past 30 days. Those reporting 0 times, were categorized as not having used drugs in the past 30 days. (4) Finally experiences of ''bullying'' were determined by asking subjects to report how many times they had been bullied at school in the past 12 months. Response options ranged from 0 to 12 or more times. Students were classified as having been bullied (1 or more times) vs not (0 times).

Data Analysis

All statistical analyses were conducted using SAS® version 9.2 statistical software. Using a sample of 3131 sexually active youth, the data were restricted to girls (N = 1598) who reported being sexually active with a male partner (N = 912). Individuals who did not report or had an invalid response for grade level (N = 2), race/ethnicity (N = 18), or sexual identity (N = 1) were excluded. A complete case analysis was conducted such that respondents were eligible for inclusion in this analysis if they completed MYRBS questions on the sexual and psychosocial health indicators described above (missing ranged from 0.3% for HIV testing history to 1.8% for reports of binge drinking). The final data analytic sample was comprised of 875 high school girls who were sexually active.

For all analyses, statistical significance was predetermined at the $\alpha = 0.05$ level. Descriptive statistics were obtained for all variables included in the analysis. Bivariate associations were obtained for all risk factors and covariates by bisexual behavior and bisexual identity (vs heterosexual). Survey procedures[42,43] with appropriate weights were used for all analyses to account for the MYRBS survey design and sampling procedures.[44] Proportional differences were assessed using the Rao-Scott chi-square tests, a version of the Pearson chi-square which adjusts for complex survey sample designs.[43]

A series of logistic regression models were fit to test the association between bisexual behavior and bisexual identity, separately, and sexual risk outcomes, as well as other risk factors. Additionally, to assess potential effect modification of bisexual behavior and identity, for each outcome, a model was fit with a behavior by identity interaction term in addition to the main effects terms.

RESULTS

Demographics

Table 1 presents demographic characteristics, sexual health-related indicators, and psychosocial health indicators, stratified by behaviorally bisexual and heterosexual girls, and by bisexual and heterosexual identity. Weighted bivariate comparisons are provided for each sexual orientation dimension.

The majority of students in the sample (91.9%) identified as heterosexual, and 8.1% identified as bisexual. Among those having only male sex partners in their lifetime (behaviorally heterosexual: 89.5%), the majority (97.2%) identified as heterosexual and 2.8% identified as bisexual. Among high school girls reporting lifetime sexual behavior with both male and female partners (behaviorally bisexual; 10.5%), 53.2% reported a bisexual identity and 46.8% reported a heterosexual identity ($p < .0001$).

Sexual Health-Related Indicators

Table 2 presents weighted multivariable models where the sexual health-related indicators are separately regressed on sexual behavior (comparing behaviorally bisexual and heterosexual young girls) in column A and sexual identity (comparing bisexual-identified and heterosexual-identified girls) in column B. Models testing whether the association between sexual behavior and the sexual health-related indicators are modified by identity are shown in column C. All models are adjusted for race/ethnicity and grade.

Compared with behaviorally heterosexual girls, behaviorally bisexual girls had higher odds of unprotected intercourse at last sex (adjusted odds ratio [AOR] = 2.22; 95% confidence interval [CI] = 1.26-3.92), alcohol and/or drug use at last sex (AOR = 2.30; 95% CI = 1.33-3.99), early sexual debut (AOR = 3.48; 95% CI = 1.54-7.85), having 4 or more sexual partners in their lifetime (AOR = 3.44; 95% CI = 1.95-6.08), history of forced or unwanted sex (AOR = 4.04; 95% CI = 2.61, 6.26), and having ever been tested for STIs (AOR = 2.00; 95% CI = 1.13-3.53). There were no statistically significant differences in history of

Table 1. **Sample Characteristics of High School Girls who Completed the 2007 Massachusetts Youth Risk Behavior Surveillance (MYRBS) Survey (N = 875), Stratified by Lifetime Sexual Behavior (Behaviorally Bisexual = 10.5% vs Behaviorally Heterosexual = 89.5%) and Sexual Identity (Bisexual = 8.1% vs Heterosexual = 91.9%)***

		Sexual Behavior—Lifetime				Sexual Identity—Current			
	Total Sample (N = 875)	Behaviorally Bisexual (N = 91) 10.5%	Behaviorally Heterosexual (N = 784) 89.5%	Rao X^2	p-Value	Bisexual Identity (N = 72) 8.1%	Heterosexual Identity (N = 803) 91.9%	Rao X^2	p-Value
Demographics									
Grade									
Lower grades (freshman or sophomore)	43.4	50.3	42.5	1.29	.256	55.0	42.4	3.71	.054
Upper grades (junior or senior)	56.6	49.7	57.5			45.0	57.6		
Race									
White/Caucasian	76.4	73.9	76.7	1.38	.848	68.9	77.0	4.81	.307
Black/African American	5.6	3.8	5.8			4.9	5.6		
Latino/Hispanic	12.4	15.6	12.0			15.2	12.1		
Asian/Pacific Islander	2.4	3.0	2.4			5.1	2.2		
Other race/ethnicity	3.3	3.7	3.2			5.9	3.0		
Sexual identity and behavior									
Bisexual identity									
Bisexual	8.1	53.2	2.8	238.62	**<.0001**	—	—	—	—
Heterosexual	91.9	46.8	97.2			—	—	—	—
Sexual health-related									
Sex in the past 3 months	56.9	60.1	56.6	0.27	.605	71.1	55.7	6.17	**.013**
Unprotected sex at last sex[†, ‡]	22.8	35.0	21.4	5.42	**.020**	39.2	21.3	11.94	**.001**
Alcohol and/or drug use during last sex[‡]	12.1	22.7	10.9	12.00	**.0005**	18.8	11.5	5.62	**.018**
Early sexual debut (age 14 and younger)	28.9	40.7	27.6	7.23	**.007**	50.0	27.0	14.48	**.0001**
Four or more sex partners—lifetime	17.4	37.2	15.2	18.42	**<.0001**	38.0	15.5	15.17	**<.0001**
History of pregnancy—lifetime	18.5	19.1	18.4	0.02	.895	19.2	18.4	0.03	.871
History of forced/unwanted sex—lifetime	24.7	52.0	21.5	47.34	**<.0001**	51.7	22.3	23.88	**<.0001**
HIV or STI diagnosis—lifetime	2.4	4.9	2.1	2.24	.134	6.2	2.1	4.07	**.044**
Tested for STI—lifetime	22.1	32.1	20.9	4.09	**.043**	35.0	21.0	6.99	**.008**
Psychosocial health related									
Depression—past 12 months	38.7	67.0	35.3	59.38	**<.0001**	75.3	35.5	51.05	**<.0001**
Binge drinking—past 30 days	39.3	44.1	38.7	0.93	.334	48.8	38.4	3.53	.061
Drug use—past 30 days	31.0	51.9	28.6	13.70	**.0002**	46.1	29.7	5.83	**.016**
Bullied—past 12 months	23.0	39.4	21.0	21.12	**<.0001**	30.1	22.3	1.47	.226

STI, sexually transmitted infection; HIV, human immunodeficiency virus.
P-values < 0.05 were considered significant and are represented in bold.
*All frequencies and bivariate estimates are weighted.
[†]Unprotected sex = sex without a condom during most recent sexual intercourse act.
[‡]This is for the entire sample (not just those who had sex in past 3 months).

pregnancy or history or lifetime HIV or STI diagnosis for behaviorally bisexual vs heterosexual adolescent girls (Table 2, column A).

Relative to girls self-identifying as heterosexual, bisexual-identified girls had higher odds of unprotected intercourse at last sex (AOR = 2.89; 95% CI = 1.77, 4.71), early sexual debut (AOR = 3.37; 95% CI = 1.63, 6.97), 4 or more lifetime sexual partners (AOR = 3.57; 95% CI = 1.80, 7.09), history of forced or unwanted sex (AOR = 3.81; 95% CI = 2.06, 7.04), lifetime history of HIV or STI diagnosis (AOR = 2.96; 95% CI = 1.08, 8.11), and having ever been tested for STIs (AOR = 2.37; 95% CI = 1.35, 4.18). No significant differences by sexual identity were found in alcohol and/or drug use at last sex or lifetime history of pregnancy (Table 2, column B).

Support for a behavior by identity interaction was found for only 1 of the 8 sexual health-related indicators: having ever been tested for STIs (for interaction: $\beta = -1.20$, p = .018)—indicating that while behaviorally bisexual girls had an higher odds of ever having been tested for STIs compared with behaviorally heterosexual girls, also identifying as bisexual decreases the magnitude of this association.

Psychosocial Health Indicators

Table 3 presents weighted multivariable models where the psychosocial health indicators are separately

Table 2. **Weighted Multivariable Logistic Regression Models: Regressing Sexual Health Indicators on Behaviorally Bisexual vs Behaviorally Heterosexual and Bisexual Identity vs Heterosexual Identity (Grade- and Race-Adjusted)**

	Sexual Health Indicator 1: Unprotected Intercourse at Last Sex						Sexual Health Indicator 2: Alcohol and/or Drug Use at Last Sex					
	Model 1A		Model 1B		Model 1C		Model 2A		Model 2B		Model 2C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	2.22 (1.26-3.92)	**.006**	—	—	0.76 (0.37)	**.039**	2.30 (1.33, 3.99)	**.003**	—	—	0.78 (0.47)	.094
Bisexual identity	—	—	2.89 (1.77-4.71)	**<.0001**	1.45 (0.48)	**.002**	—	—	1.68 (0.98-2.87)	.057	−0.41 (0.80)	.607
Interaction term	—	—	—	—	−1.27 (0.70)	.070	—	—	—	—	0.49 (1.08)	.648
Covariates												
Non-White race/ethnicity	1.46 (0.83-2.58)	.188	1.44 (0.81-2.55)	.214	0.38 (0.29)	.196	1.20 (0.74-1.96)	.464	1.19 (0.73-1.96)	.487	0.18 (0.25)	.466
Upper grades*	2.94 (2.11-4.08)	**<.0001**	3.04 (2.20-4.20)	**<.0001**	1.13 (0.17)	**<.0001**	1.68 (0.90-3.15)	.106	1.67 (0.90-3.09)	.101	0.52 (0.32)	.111

	Sexual Health Indicator 3: Early Sexual Debut (Age 14 and under)						Sexual Health Indicator 4: Four or More Sexual Partners—Lifetime					
	Model 3A		Model 3B		Model 3C		Model 4A		Model 4B		Model 4C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	1.67 **(1.08-2.57)**	**.02**	—	—	0.25 (0.36)	.474	3.44 (1.95-6.08)	**<.0001**	—	—	1.10 (0.38)	**.003**
Bisexual identity	—	—	2.30 (1.38-3.84)	**.001**	1.03 (0.49)	**.038**	—	—	3.57 (1.80-7.09)	**.0003**	1.17 (0.72)	.106
Interaction term	—	—	—	—	−0.52 (0.78)	.505	—	—	—	—	−0.84 (0.80)	.295
Covariates												
Non-White race/ethnicity	**2.09** (1.44-3.05)	**.0001**	2.06 (1.42-3.01)	**.0002**	0.73 (0.19)	**<.0001**	1.20 (0.79-1.82)	.399	1.17 (0.78-1.77)	.451	0.17 (0.21)	.421
Upper grades*	0.49 (0.27-0.83)	**<.0001**	0.50 (0.36-0.68)	**<.0001**	−0.70 (0.16)	**<.0001**	2.21 (1.36-3.60)	**.001**	2.26 (1.43-3.55)	**.0004**	0.83 (0.24)	**.0005**

	Sexual Health Indicator 5: History of Pregnancy—Lifetime						Sexual Health Indicator 6: History of Forced or Unwanted Sex—Lifetime					
	Model 5A		Model 5B		Model 5C		Model 6A		Model 6B		Model 6C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	1.19 (0.63-2.27)	.589	—	—	0.14 (0.47)	.763	4.04 (2.61-6.26)	**<.0001**	—	—	1.30 (0.33)	**<.0001**
Bisexual identity	—	—	1.33 (0.72-2.49)	.365	0.42 (0.64)	.511	—	—	3.81 (2.06-7.04)	**<.0001**	1.13 (0.44)	**.009**
Interaction term	—	—	—	—	−0.33 (0.80)	.679	—	—	—	—	−0.88 (0.53)	.100
Covariates												
Non-White race/ethnicity	0.66 (0.37-1.20)	.171	0.66 (0.36-1.20)	.173	−0.41 (0.30)	.173	1.08 (0.78-1.49)	.660	1.04 (0.75-1.45)	.806	0.06 (0.17)	.717
Upper grades*	4.24 (2.73-6.60)	**<.0001**	4.27 (2.75-6.64)	**<.0001**	1.45 (0.23)	**<.0001**	0.87 (0.59-1.29)	.499	0.88 (0.60-1.30)	.528	−0.11 (0.20)	.568

	Sexual Health Indicator 7: History of HIV or STI Diagnosis—Lifetime						Sexual Health Indicator 8: History of STI Testing—Lifetime					
	Model 7A		Model 7B		Model 7C		Model 8A		Model 8B		Model 8C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	2.35 (0.81-6.81)	.117	—	—	−0.06 (1.07)	.957	2.00 (1.13-3.53)	**.017**	—	—	0.72 (0.35)	**.041**
Bisexual identity	—	—	2.96 (1.08-8.11)	**.034**	0.38 (0.96)	.693	—	—	2.37 (1.35-4.18)	**.003**	1.24 (0.43)	**.004**
Interaction	—	—	—	—	0.98 (1.66)	.554	—	—	—	—	−1.20 (0.51)	**.018**
Covariates												
Non-White race/ethnicity	2.39 (1.02-5.61)	**.045**	2.33 (1.01-5.36)	**.047**	0.84 (0.43)	**.049**	1.69 (1.06-2.69)	**.028**	1.67 (1.05-2.67)	**.032**	0.53 (0.24)	**.026**
Upper grades*	1.03 (0.33-3.26)	.954	1.08 (0.34-3.39)	.901	0.06 (0.58)	.914	2.61 (1.75-3.89)	**<.0001**	2.66 (1.79-3.94)	**<.0001**	0.99 (0.20)	**<.0001**

AOR, adjusted odds ratio; CI, confidence interval; B, beta; SE, standard error.

P-values < 0.05 were considered significant and are represented in bold.

*Upper grades = 11th and 12 grades (referent = 9th and 10th grades).

Table 3. **Weighted Multivariable Logistic Regression Models: Regressing Psychosocial Health Indicators on Behaviorally Bisexual vs Behaviorally Heterosexual and Bisexual Identity vs Heterosexual Identity (Grade- and Race-Adjusted)**

	Psychosocial Indicator 1: Depression—Past 12 months						Psychosocial Indicator 2: Binge Drinking—Past 30 days					
	Model 9A		Model 9B		Model 9C		Model 10A		Model 10B		Model 10C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	3.59 (2.56-5.05)	**<.0001**	—	—	1.10 (0.34)	**.001**	1.26 (0.78-2.03)	.347	—	—	−0.17 (0.32)	.590
Bisexual identity	—	—	5.21 (3.01-9.04)	**<.0001**	2.06 (0.62)	**.001**	—	—	1.62 (1.03-2.56)	**.039**	0.20 (0.41)	.627
Interaction	—	—	—	—	−1.58 (0.93)	.091	—	—	—	—	0.57 (0.67)	.389
Covariates												
Non-White race/ethnicity	1.33 (0.97-1.83)	0.082	1.30 (0.93-1.80)	.122	0.28 (0.17)	.099	0.55 (0.35-0.84)	**.006**	0.54 (0.35-0.83)	**.005**	−0.62 (0.22)	**.004**
Upper grades*	0.68 (0.49-0.94)	**0.020**	0.69 (0.50-0.96)	**.027**	−0.37 (0.17)	**.027**	1.41 (1.07-1.86)	**.015**	1.43 (1.08-1.89)	**.014**	0.35 (0.15)	**.015**

	Psychosocial Indicator 3: Drug Use—Past 30 days						Psychosocial Indicator 4: Bullied—Past 12 months					
	Model 11A		Model 11B		Model 11C		Model 12A		Model 12B		Model 12C	
	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value	AOR (95% CI)	p-Value	AOR (95% CI)	p-Value	B (SE)	p-Value
Behaviorally bisexual	2.93 (1.72-4.99)	**<.0001**	—	—	0.88 (0.33)	**.008**	2.45 (1.61-3.72)	**<.0001**	—	—	1.07 (0.29)	**.0003**
Bisexual identity	—	—	2.28 (1.25-4.17)	**.007**	0.0005 (0.53)	.999	—	—	1.47 (0.75-2.90)	.261	−0.24 (0.62)	.696
Interaction	–	–	–	–	0.38 (0.55)	.491	–	–	–	–	−0.11 (0.63)	.865
Covariates												
Non-White race/ethnicity	0.64 (0.48-0.87)	**.004**	0.64 (0.48-0.86)	**.003**	−0.45 (0.15)	**.003**	0.63 (0.38-1.03)	.065	0.63 (0.39-1.02)	.062	−0.46 (0.25)	.067
Upper grades*	1.43 (1.03-1.98)	**.033**	1.41 (1.02-1.96)	**.039**	0.36 (0.17)	**.032**	0.51 (0.34-0.77)	**.001**	0.51 (0.34-0.76)	**.001**	−0.68 (0.21)	**.001**

AOR, adjusted odds ratio; CI, confidence interval; B, beta; SE, standard error.
P-values < 0.05 were considered significant and are represented in bold.
*Upper grades = 11th and 12 grades (referent = 9th and 10th grades).

regressed on sexual behavior (comparing behaviorally bisexual and heterosexual girls) in column A and sexual identity (comparing bisexual-identified and heterosexual-identified girls) in column B. Models testing whether the association between sexual behavior and the psychosocial health indicators are modified by identity are shown in column C. All models are adjusted for race/ethnicity and grade.

Relative to behaviorally heterosexual girls, behaviorally bisexual girls had higher odds of depression (AOR = 3.59; 95% CI = 2.56-5.05), drug use in the past 30 days (AOR = 2.93; 95% CI = 1.72-4.99), and having been bullied in the past 12 months (AOR = 2.45; 95% CI = 1.61-3.72). No statistically significant differences were found by sexual behavior and binge drinking in the past 30 days (Table 3, column A).

Compared with heterosexual-identified girls, those self-identifying as bisexual were at higher odds of depression (AOR = 5.21; 95% CI = 3.01-9.04), binge drinking in the past 30 days (AOR = 1.62; 95% CI = 1.03-2.56), and past 30 days drug use (AOR = 2.28; 95% CI = 1.25-4.17). Experiences of bullying in the past 12 months did not differ by sexual identity (Table 3, column B). Additionally, there was no evidence of a sexual behavior by sexual identity interaction for the 4 psychosocial health indicators (Table 3, column C).

DISCUSSION

Sexual orientation has not been routinely collected by all states and jurisdictions on the national YRBS.[45,46] Although the CDC will add questions about same-sex sexual contact and sexual identity to their state, territorial, or local YRBS questionnaires starting in 2015, currently, sexual behavior and identity questions remain optional, with only 21 states assessing both same sex behavior and identity in 2011.[47] Thus, statewide, representative data of high school girls from Massachusetts offer a unique contribution to the female adolescent health literature. This analysis demonstrates disparities in sexual and psychosocial health indicators by sexual orientation, such that bisexual girls, whether defined by behavior or identity, more frequently experienced poorer sexual and psychosocial health outcomes compared with heterosexual girls. In addition, findings demonstrated several distinct differences in sexual and psychosocial health outcomes by sexual orientation dimensions (ie, identity vs behavior), supporting the need to utilize multiple dimensions of sexual orientation when assessing the health of female adolescents.

Consistent with prior research,[34,35,48] girls who reported sex with both male and female partners more frequently reported being bullied and using substances during sex, compared with girls with only male partners. Moreover, compared with heterosexual behavior and identity, both bisexual behavior and identity were associated with the higher prevalence of depression, drug use, and a history of forced or unwanted sex. While the reasons for such findings are not completely understood due to limited sexual health research involving female adolescents, research among adult bisexual men and women shows that individuals who identify and/or engage in bisexual behavior, while included under the lesbian, gay, bisexual, and transgender (LGBT) umbrella, may not have access to the same sense of community as other members of the LGBT community, as the bisexual community is less unified.[49,50] Additionally, bisexual people may experience rejection from both their LGBT and heterosexual peers who perceive them as an outsider.[51-53] Rejection from heterosexual and gay peers may lead to greater minority stress for bisexual people, and in turn, contribute to poorer health outcomes.[50,53] Future research should explore the extent to which minority stress contributes to poor health outcomes in female sexual minorities, especially during their formative high school years.

Bisexual behavior and identity were associated with sexual behaviors that may place girls and young women at greater risk for HIV and other STIs. However, both girls with a bisexual identity and those who engaged in bisexual behavior had a higher probability than their heterosexual counterparts of having been tested for STI's in their lifetime—a health behavior important in protecting one's sexual health and that of their sexual partners. While the causal mechanisms behind the higher prevalence of testing among bisexual girls warrant investigation, these findings could suggest that bisexual girls are aware of their risk for HIV and STIs and/or may be more willing to engage in preventative health services, and are, thus, getting tested more frequently than their heterosexual peers. This finding could prove useful to those looking to develop school-based prevention interventions with at-risk bisexual girls as testing affords those accessing it with the opportunity to engage with health care providers who may be able to disseminate sexual health information and assist in building behavioral skills to reduce sexual risk. Point of care interventions with bisexual girls may also benefit from addressing the underlying psychosocial health concerns that many of these girls disproportionately face by providing supportive referrals or triage to mental health care and substance abuse treatment. Those engaged in intervention efforts will need to take care to assess both bisexual behavior and identity to ensure that bisexual girls engaged in risky health behaviors are identified and supported.

Girls who reported sexual contact with both male and female partners had significantly greater discordance between identity and behavior than behaviorally heterosexual girls, which is consistent

with previous research.[21,35,54] Sexual and psychosocial health outcomes also varied by sexual orientation dimension in some cases. For example, girls with a bisexual identity more frequently reported having received an HIV or STI diagnosis as well as recent binge drinking, compared with heterosexual girls, whereas bisexual behavior was associated with substance use during sex and experiences of bullying. In exploring 2 measures of sexual orientation, we identified a higher frequency of adverse health behaviors and outcomes among bisexual girls relative to their heterosexual peers; differences which may have been obscured had only 1 measure been utilized or bisexual identity or behavior combined with lesbian identity or behavior. Additional research is needed to understand the specific mechanisms behind these differences, including the contexts in which risk behaviors occur, given prior studies demonstrating that social context is a key determinant of health behaviors.[55-58] For example, participants in a qualitative study of girls described the social pressures to conform to the norms of heterosexuality, having a boyfriend, or having sex, and the challenges of meeting these ideals while attempting to make sense of their own desires and attractions.[58] Longitudinal studies that explore the individual and contextual factors that shape risk behavior may help to better understand the causal pathways for the specific risk differences observed among behaviorally bisexual and identified high school girls relative to their heterosexual peers.

Findings from this analysis should be interpreted in light of several limitations. The MYRBS enrolls school-engaged youth in public schools, which may miss homeless or marginally housed youth,[59] as well as teens attending private schools. Also, the cross-sectional design does not allow for causal conclusions to be made. While our sample size was large, stratification across measures resulted in small cell sizes for some analyses. Additionally, depressive distress was assessed categorically. Although categorical measurement of mental health disorders do not allow for the collection of all clinically relevant information (eg, severity of symptoms), and can result in the inaccurate measurement of disease prevalence, depressive distress is not a proxy for clinically diagnosed depression in this sample. Data from the 2007 MYRBS were analyzed as these were the most recent publicly available data. Although it is possible that the 2007 sample may be different than the 2013 sample, our results are largely consistent with findings from recently published studies,[21,45] and should be considered given the unique contribution of our findings using dual measures of sexual orientation. Last, given that this is a secondary data analysis, we were limited to the data that were collected and available for public use. As a result, lack of data on other potential confounders (eg, sexual assault at first sex, childhood sexual abuse) could bias the results.

Overall, these findings document that engaging in bisexual behavior or having a bisexual identity is associated with a variety of adverse sexual and psychosocial health outcomes in high school girls—findings that lend support to including questions using multiple dimensions of sexual orientation when evaluating the risk behavior of sexually active adolescents. Longitudinal research is needed to assess whether and how minority stress contributes to worse health outcomes among bisexual girls and identify the underlying factors that lead to such disparities so that effective interventions may be developed.

IMPLICATIONS FOR SCHOOL HEALTH

Bisexuality, whether defined by identity or behavior, is associated with numerous adverse sexual and psychosocial health outcomes in high school girls. This article illustrates the importance of identifying at-risk bisexual youth not just by their identity and affiliation with the LGBT community, but also by their behavior. The disparities faced by bisexual female youth must be addressed through comprehensive education and interventions facilitated by school personnel and district leadership.

Targeted, school-based programs addressing the specific health needs of bisexual youth are greatly needed. School settings are an ideal place for such interventions as the materials covered by educators in school-wide sexual health programs could serve to normalize bisexual behavior and identities, thereby improving the social environments of bisexual students and reducing experiences of bullying and other contextual factors. While the discussion of LGBT health can be controversial in some school districts, bisexuality is not historically more difficult to broach with concerned parents than other parts of the LGBT spectrum and should be incorporated into school-based health programs.

Ideal interventions include timely, nonjudgmental, comprehensive school-based sexual education programs to support and reduce the disparities experienced by high school girls. Specifically, school health practices and lessons should elucidate the health needs, risks, and resources directly associated with bisexual behaviors and identities in addition to addressing the needs of other groups within the LGBT spectrum. Additionally, school health practitioners should nurture peer educators to provide individual counseling as well as develop culturally competent local resources (such as information brochures) to address the sexual and psychosocial heath needs of female students engaging in bisexual behavior and/or bisexually identified.

Human Subjects Approval Statement

The Centers for Disease Control and Prevention's institutional review board granted approved the administration of the Youth Risk Behavior Survey MYRBS to be administered nationwide. We obtained administrative approvals from the Massachusetts Department of Elementary and Secondary Education (MDESE), and by the AIDS Advisory and Materials Review Panel, as required by the MDESE Cooperative Agreement with the Centers for Disease Control and Prevention. MDESE staff members conducted the survey in full compliance with standards for ethical treatment of individuals participating in the project.

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