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Risk and Protective Factors for Suicide among Sexual Minority Youth seeking Emergency Medical Services

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Abstract

Background: Differences in risk and protective factors (e.g., victimization, abuse, social support) have been used to explain elevated rates of suicidal ideation and suicide attempts in sexual minority youth (SMY) relative to heterosexual peers. However, little is known regarding how risk and protective factors may explain suicide risk differences among subgroups of SMY. The aims of this study were to 1) examine differences in prevalence and severity for suicide risk and protective factors among SMY, and 2) explore whether risk and protective factors are differentially associated with suicidal ideation and suicide attempts for SMY subgroups.

Methods: Participants were 6,423 adolescents (ages 12–17) recruited from 14 Emergency Departments across the United States who completed an assessment of suicide risk and protective

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Author Statement

A. Horwitz led the conceptualization of the study and writing of the manuscript. J. Grupp-Phelan and D. Brent co-led the conceptualization and design of the research project, and contributed to the conceptualization of the study. B. Barney and T.C. Casper led the preparation and analyses of the data. J. Berona assisted in the conceptualization of the study and contributed to writing the introduction and discussion sections. L. Chernick, R. Shenoig, and M. Cwik contributed to the conceptualization and design of the study. C. King co-led the conceptualization and research design of the project and contributed to the conceptualization of the study. All authors provided a critical review of the manuscript prior to submission.

Declarations of Interest

Authors for this manuscript have no conflicts of interest to declare.

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factors. SMY were 20% of the sample ($n = 1,275$) and categorized as bisexual (8%), gay/lesbian (2%), mostly straight (5%), or other sexual minority (5%).

Results: Bisexual youth had elevated rates of suicidal ideation and attempts, more risk factors (e.g., bullying victimization, depression), and fewer protective factors (e.g., parent-family connectedness, positive affect) relative to mostly straight and other sexual minority youth. Bisexual and gay/lesbian youth only differed in parent-family connectedness (lower among bisexual youth). Depression and parent-family connectedness had weaker associations with suicidal ideation for bisexual youth.

Limitations: Emergency departments were not nationally representative. Study design was cross-sectional, preventing causal inferences.

Conclusions: Interventions seeking to mitigate risk factors and promote protective factors are greatly needed for SMY and may benefit from tailoring to address unique stressors for sexual minority subgroups.

Keywords

sexual minority youth; suicidal ideation; suicide attempts; risk factors; connectedness

Introduction

Suicide is the second leading cause of death among adolescents in the United States (Centers for Disease Control and Prevention, 2020). Sexual minority youth (SMY; i.e., youth with same-sex attraction, behaviors, or identities such as gay, lesbian, bisexual, unsure) are 2–4 times more likely to report a history of suicide attempt relative to heterosexual youth (e.g., Hottes et al., 2016; Marshal et al., 2011; Miranda-Mendizábal et al., 2018). In addition, SMY experience a more severe trajectory of suicidal thoughts and behaviors such as younger age at onset, greater number of attempts, and stronger desire to die during attempts (e.g., Fox et al., 2018). It is undetermined, however, whether suicide mortality prevalence is higher among SMY relative to heterosexual youth (e.g., Haas et al., 2011) as sexual orientation is not routinely collected as part of death records.

The Minority Stress Model suggests that health disparities experienced by sexual minorities are driven by greater life stress due to prejudice, rejection, concealment, and internalized homophobia associated with their stigmatized identities (Meyer, 1995, 2003). These stigma-related stressors are hypothesized to contribute to factors that increase risk for mental health concerns influenced by emotion dysregulation, social/interpersonal problems, and cognitive vulnerabilities, relative to heterosexual peers (e.g., Hatzenbuehler, 2009). Indeed, SMY experience physical and sexual violence at greater rates than heterosexual youth (Caputi et al., 2020), and SMY report significantly less closeness with parents and less companionship with friends, relative to heterosexual youth (Williams et al., 2005). The Minority Stress Model may potentially help to explain differences in suicidal ideation and behaviors among subgroups of SMY (e.g., bisexual vs. gay/lesbian), though this has not been extensively examined.

Multiple meta-analytic studies have suggested that bisexual youth are at particularly high risk for suicide and are more likely to report suicidal thoughts and behaviors than gay, lesbian and other sexual minority peers (e.g., Marshal et al., 2011; Salway et al., 2019). However, the mechanisms driving these differences in suicidal ideation and behaviors among subgroups of SMY are not well understood. Some have suggested that those identifying as bisexual experience unique societal pressures (e.g., biphobia, monosexism) and fewer opportunities to participate in sexual minority communities/organizations (e.g., Scherrer, 2013; Yoshino, 1999), and others have indicated that bisexuals are less open about, and experience greater conflict regarding, their sexual orientation (Lewis et al., 2009). In line with these findings, those identifying as bisexual report higher levels of identity confusion, less self-disclosure, and less community connection relative to gay/lesbian peers (Balsam and Mohr, 2007). However, few studies have sought to connect minority-stress related experiences directly to suicide, particularly among SMY. As such, it is critically important to empirically examine the extent to which risk and protective factors implicated in the Minority Stress Model might explain differences in suicidal ideation and behaviors among sexual minority subgroups.

A number of past studies have examined differences in various risk and protective factors among SMY subgroups. In a meta-analytic examination of multiple forms of abuse, bisexual youth experienced significantly more physical abuse than other SMY, but did not differ in prevalence for sexual abuse or peer victimization (Friedman et al., 2011). In studies examining social support and connectedness, some have found bisexual youth to have lower school and family connectedness relative to other SMY (e.g., Saewyc et al., 2009), whereas others have indicated parental support does not differ for bisexual and lesbian women, but is less among gay men relative to bisexual men (e.g., Needham and Austin, 2010). Given the limited evidence, further research is needed to determine how connectedness factors might contribute to differences in suicidal ideation and behaviors among SMY. In contrast, findings have been quite consistent for differences in depression and anxiety among SMY (e.g., Baams et al., 2015), whereby depression and anxiety symptoms are frequently greater among those identifying as bisexual relative to other sexual minorities, including those identifying as gay/lesbian (e.g., Ross et al., 2018).

While these past studies have provided some evidence of differences in prevalence for risk and protective factors among subgroups of SMY, few have directly investigated the potential differential influence of theorized risk and protective factors (e.g., victimization, connectedness) on suicidal thoughts and behaviors. The aims of the present study are to: 1) determine the risk and protective factors most strongly associated with suicidal ideation and suicide attempts among SMY presenting for Emergency Department (ED) services, and 2) explore whether the relationship between risk/protective factors and suicidal thoughts and behaviors differs for subgroups of SMY. Based on previous meta-analyses suggesting elevated rates of suicidal ideation and behaviors (e.g., Marshal et al., 2011; Salway et al., 2019), we hypothesize that bisexual youth will have significantly greater prevalence/severity for risk factors, and fewer protective factors, relative to other SMY subgroups.

Method

Participants and Procedures

Participants were 6,423 adolescents (ages 12–17, median: 14) from the Study One cohort of the Emergency Department Screen for Teens at Risk for Suicide (ED-STARS) Study (King et al., 2019a). The sample was 59% female and had the following racial distribution: 52% White, 22% Black, 6% Multi-racial, 5% Other, and 15% Unknown Race. Additionally, 23% of the sample identified as Hispanic or Latinx. Adolescents' sexual identities were as follows: Straight (80%); Bisexual (8%); Mostly Straight (5%); Queer, Unlabeled, or Unsure (5%; henceforth referred to as Other Sexual Minority); and Gay/Lesbian or Mostly Gay/Lesbian (2%; henceforth referred to as Gay/Lesbian).

Recruitment occurred between June 2015 and July 2016 in 13 pediatric EDs members of the Pediatric Emergency Care Applied Research Network (PECARN), and included multiple sites in all four Census-Bureau-designated US regions. Recruitment also occurred in an Indian Health Service ED from November 2015–April 2017. IRB approval was obtained from all sites. Of the 10,664 patients approached for possible participation, 6,641 eligible participants enrolled (62%). Chief complaints were categorized as medical complaints (67%), unintentional injury (19%), or psychiatric complaints (14%). Participants were administered a suicide risk survey in the ED (except for the Indian Health Service site, where adolescents were contacted following discharge). For this analysis, we removed participants who had missing responses to the sexual identity question (analytic sample of 6,423). Study exclusion criteria included: ward of state, non-English speaking, medically unstable, or severe cognitive impairment. Written informed consent and assent were obtained from parents/guardians and adolescents, respectively.

Measures

Demographics.—Youth demographics (age, natal sex, gender, racial and ethnic identification) were assessed at baseline by participant and parent/guardian report.

Depression.—The Patient Health Questionnaire-9 (Kroenke et al., 2001) is a nine-item scale assessing frequency of depression symptoms over the past two weeks on a 4-point Likert scale (full scale range: 0–27). The internal consistency coefficient was $\alpha = 0.90$; all internal consistency coefficients reported in this study were from the 6,448 enrolled participants in the full study with at least 80% of the baseline assessment complete (including those with missing sexual identity items).

Anxiety.—We used five items from the Screen for Child Anxiety-Related Emotional Disorders (Birmaher et al., 1999) assessing anxious symptoms over the past three months on a 3-point Likert scale (full scale range: 0–10). Example item includes, “I am afraid to be alone in the house.” The internal consistency coefficient was $\alpha = 0.68$.

Bullying Victimization and Physical Fights.—The Peer Victimization Questionnaire (Klomek et al., 2007) is a two-item self-report scale with questions about frequency of peer victimization in, and away, from school on a 5-point Likert scale (full scale range: 0–8).

Example item includes, “How often have you been bullied in school this term?” Due to scale skewness, total scores were categorized into three groups [None (0), a few times (1–2), more than a few times (3 or higher)] for analyses. Number of physical fights in the past 12 months was assessed using a single item from the Youth Risk Behavior Survey (Brener et al., 2004).

Childhood Physical Abuse, Sexual Abuse, and Exposure to Trauma.—

Childhood sexual and physical abuse were assessed using a brief two-item screener derived from the Childhood Trauma Questionnaire (Bernstein et al., 2003) and adapted into a yes/no format. Items include, “People in my family have hit me so hard that it left me with bruises or marks” and “Someone has tried to touch me in a sexual way or tried to make me touch them.” Exposure to trauma was also assessed with yes/no questions adapted from the Diagnostic Interview Schedule for Children (Shaffer et al., 2000) specifically, “Have you ever been in a situation where you or someone close to you was going to be killed or hurt very badly?” and “Have you ever been threatened with a weapon?”

Parent-Family, School, and Peer Connectedness.—The parent-family connectedness and school connectedness scales (Resnick et al., 1997) were each adapted into two-item measures, both on a 5-point Likert scale (full scale ranges: 2–10). Example items include, “How much do people in your family understand you” and “You feel like you are part of your school.” The internal consistency coefficients were $\alpha = 0.75$ for the parent-family connectedness scale, and $\alpha = 0.79$ for school connectedness. Hemingway’s Adolescent Connectedness Scale (Karcher and Sass, 2010) was adapted into a two-item peer connectedness measure on a 5-point Likert scale (full scale range: 2–10). Example item includes, “Spending time with friends is a big part of my life”. The internal consistency coefficient was $\alpha = 0.78$.

Positive Affect.—The positive affect subscale of the Positive and Negative Affect Scale (Watson et al., 1988) contains 5 items assessing the extent to which an individual has experienced specific positive feelings and emotions over the past few weeks on a 5-point Likert scale (full scale range: 5–25). Example emotions/feelings include, “joyful” and “proud.” The internal consistency coefficient was $\alpha = 0.94$.

Gender identity.—Gender identity was measured by, “What is your current gender identity (please select all that apply)” with options for: Male, Female; Trans male/Trans boy; Trans female/Trans girl; Genderqueer or Gender non-conforming; Other/not listed above. Responses were categorized into ‘male’, ‘female’, and ‘transgender/genderqueer/non-binary’.

Sexual identity, behaviors, and attractions.—Sexual identity was measured by, “Do you see yourself as (please select all that apply)” with options for: Straight; Mostly Straight; Bisexual; Mostly gay/lesbian; Gay/lesbian; Queer; Unlabeled; Not Sure. Two items adapted from the Youth Risk Behavior Survey (Brener et al., 2004) were used to assess sexual behaviors and attractions. Sexual behaviors were assessed by, “During your life, with whom have you had sexual contact (not including unwanted experiences)?” with options for: Females; Males; Females and males; None. Sexual attractions were assessed by, “During your life, to whom have you had a romantic or sexual attraction?” with options for: Only

attracted to females; Mostly attracted to females; Equally attracted to females and males; Mostly attracted to males; Only attracted to males; Not sure.

Suicidal thoughts and behaviors.—Suicidal thoughts and behaviors were assessed using the Ask Suicide-Screening Questions (Horowitz et al., 2012) and the Columbia Suicide Severity Rating Scale (C-SSRS; Posner et al., 2011). Recent suicidal ideation (i.e., suicidal ideation falling within the past month) was determined by an affirmative response to either the ASQ past-week item, “have you been having thoughts about killing yourself” or a past-month score of 2 or higher on the C-SSRS severity scale, which minimally requires an affirmative response to “have you had any thoughts of killing yourself.” Lifetime suicidal ideation was indicated by a score of 2 or higher on the C-SSRS severity scale for worst-point lifetime ideation. Suicide attempt history was determined from affirmative response to C-SSRS item, “Have you ever in your life made a suicide attempt?” or “Have you ever in your life tried to harm yourself because you were at least partly trying to end your life”, with a follow up to each item of “how many times in your life” for those reporting an attempt. Lifetime attempts were categorized as: none, single attempt, and multiple attempts.

Data Analytic Plan

Since individuals could select multiple sexual identities (generating dozens of unique combinations), we generated an algorithmic hierarchy whereby identification with the first group among the following: 1) Bisexual, 2) Gay/Lesbian or Mostly Gay/Lesbian, 3) Queer or Unlabeled or Not Sure (Other Sexual Minority), 4) Mostly Straight, 5) Straight, would determine their sexual identity group (i.e., selection of Gay/Lesbian and Queer would be categorized as Gay/Lesbian, selection of Bisexual and Mostly Straight would be categorized as Bisexual). We considered an additional SMY category for Straight youth reporting non-exclusively other-sex attraction/behaviors, yet informal comparisons suggested there were no differences in suicidal ideation and behaviors for this group compared to Straight youth with exclusively other-sex attractions/behaviors. Consequently, the group of Straight youth was not partitioned.

A series of Kruskal-Wallis and Fisher’s exact tests were conducted to test for association between sexual identity group and each demographic, risk, and protective factor. Although descriptive summaries were provided for all five sexual identity groups, statistical tests in the tables were restricted to the four sexual minority subgroups (i.e., Straight youth were not statistically compared to SMY). Variables with significant omnibus tests had post-hoc tests performed to identify significant differences among pairs, with Holm’s stepdown procedure employed separately for each variable to adjust for the six pairwise comparisons.

The multivariable regression analyses were restricted to the sexual minority subsample, and the potential moderating effect of the sexual identity group was an analytical target. To limit overfitting, not all possible interactions were tested. Instead, a multivariable model for each outcome (i.e., recent SI, lifetime SI, suicide attempts) was created, initially leaving sexual identity group out of the model. We used Akaike Information Criterion (AIC) to select a subset of candidate variables for each multivariable model. Then, we added sexual identity group as a main effect and interaction effects between sexual identity group and every other

included effect, with estimated odds ratios described along with 95% confidence intervals for significant interactions.

Results

Sample Characteristics and Bivariate Analyses

Among the 6,423 youth participants in this study, 20% ($n = 1,275$) reported a sexual minority identity (see Table 1 for distribution of sexual orientation identities). Overall rates among SMY of past-month suicidal ideation (SI) (36.6%), lifetime SI (61.5%), and lifetime suicide attempt (SA) (39.5%) were elevated relative to straight youth (9.0%, 21.2%, and 10.6%, respectively). There were no significant pairwise differences among SMY with regard to race or ethnicity, though there were several age and gender-based differences (see Table 2).

Bisexual youth were more likely to report a history of lifetime SI and lifetime SA relative to mostly straight and other sexual minority (OSM) youth, but contrary to expectations, did not significantly differ in SI or SA from gay/lesbian youth. With regard to differences in risk and protective factors, the only difference between bisexual youth and gay/lesbian youth was lower levels of parent-family connectedness among bisexual youth. Relative to mostly straight and OSM youth, bisexual youth reported more severe depressive symptoms, more exposure to life-threatening violence, less parent-family connectedness, and less positive affect. Gay/lesbian youth were more likely to have a SA history than mostly straight and OSM youth, but did not differ from OSM youth for other risk/protective factors (see Table 2).

Multivariable Logistic Regressions Examining Risk and Protective Factors for Suicide Ideation

In the logistic regression examining past-month SI among SMY, there were significant main effects for risk (depressive symptoms, history of sexual abuse) and protective (parent-family connectedness, positive affect) factors. Parent-family connectedness was moderated by sexual identity group such that parent-family connectedness was significantly associated with lower odds of past-month SI among mostly straight, but not bisexual youth (Table 3).

In the logistic regression examining lifetime SI among SMY, there were significant main effects for risk (depressive symptoms, history of sexual abuse, bullying victimization) and protective (parent-family connectedness, positive affect) factors (Table 4). Moderation effects were present for depressive symptoms and parent-family connectedness. While depressive symptoms were associated with lifetime SI among all SMY, this association was significantly stronger for gay/lesbian and OSM youth relative to bisexual youth. For parent-family connectedness, the protective association with lifetime SI was stronger for mostly straight youth relative to bisexual youth.

Logistic Regression Examining Risk and Protective Factors for Suicide Attempts

In the proportional odds (cumulative logit) model examining suicide attempts, there were significant main effects for risk (depressive symptoms, history of sexual abuse, bullying

victimization, history of physical abuse, exposure to life-threatening trauma) and protective (parent-family connectedness, positive affect) factors (Table 5). These risk and protective factors did not have significantly differential associations with suicide attempts as a function of sexual minority subgroup.

Discussion

This multi-site study characterized risk and protective factors for suicide among a large sample of sexual minority youth (SMY) seeking ED services. SMY comprised one-fifth of the overall sample, and those identifying as bisexual were the largest SMY subgroup. Depression, bullying victimization, and sexual abuse emerged as the most significant risk factors, and parent-family connectedness and positive affect were the most significant protective factors, for suicidal ideation and suicide attempts among SMY. Bisexual youth were more likely to report lifetime suicidal ideation and a history of suicide attempt relative to mostly straight and other sexual minority (OSM) youth, which is consistent with other studies that have examined differences in suicidal ideation and attempts among these subgroups (e.g., Horwitz et al., 2020a). However, in contrast to previous studies (e.g., Marshal et al., 2011; Salway et al., 2019), bisexual youth did not significantly differ from gay/lesbian youth in suicidal ideation or attempts. Importantly, we identified heterogeneity in the distribution of suicide risk and protective factors among SMY, whereby bisexual youth reported greater prevalence and severity for suicide risk factors (e.g., depression, trauma, bullying victimization), and lower scores for protective factors (e.g., positive affect, parent-family connectedness) in several direct comparisons to SMY subgroups.

The greater prevalence of minority-stress-related suicide risk and protective factors for bisexual youth offers preliminary support for utilizing the Minority Stress Model (Meyer, 1995, 2003) to explain some of the differences in suicidal ideation and behaviors within sexual minority subgroups. In other words, the differences between bisexual and mostly straight youth on minority-stress-related variables, such as bully-victimization and parent-family connectedness (which were significantly associated with suicidal ideation and attempts for all SMY), may explain why bisexual youth have significantly greater prevalence of suicidal ideation and attempts. However, additional research is needed to better specify the exact minority-stress mechanisms (e.g., internalized heterosexism, identity confusion, discrimination) contributing to these differences, and how these variables vary among various sexual minority subgroups.

Exploratory analyses identified risk and protective factors with differing associations for suicidal ideation among SMY subgroups. For bisexual youth, depression was less explanatory of lifetime suicidal ideation, and parent-family connectedness was less protective against suicidal ideation, in some subgroup comparisons. These findings, while preliminary, suggest that interventions for bisexual youth may need to go beyond targeting depression or family support to reduce suicidal ideation. However, there were no significantly differential effects of risk and protective factors for suicide attempts based on SMY subgroup. The elevated rate of suicide attempts among bisexual youth may be better explained by the more frequent exposure to associated risk factors, and having fewer protective factors, relative to other SMY subgroups. Additional studies are needed to further

examine these moderation effects, as findings may aid in the development of interventions that can be tailored to address the most critical risk and protective factors for suicide.

Our findings with youth enrolled in ED settings differ somewhat from studies enrolling community and population samples. Most prior studies have found greater risk for suicide ideation and attempt for bisexual youth compared to gay/lesbian peers (e.g., Marshal et al., 2011; Salway et al., 2019), but these differences were not observed in this study. Males are more likely than females to identify as gay (Savin-Williams and Vrangalova, 2013), yet our gay/lesbian sample was only 21% cisgender male. Our over-representation of girls and transgender/non-binary youth, who tend to have higher rates of suicidal ideation and suicide attempts, in the gay/lesbian category, may partly explain this non-significant difference between groups. Unfortunately, due to lower rates of sexual minority status among males in this study, we were underpowered to examine these risk factors separately by sex or gender. There may have also been a restricted range of severity as a function of being present in the ED. Consistent with past studies suggesting that parental attachment is lower among bisexual youth relative to gay/lesbian youth (e.g., Montano et al., 2018), bisexual youth in our study reported significantly less parent-family connectedness than gay/lesbian youth. A longitudinal study utilizing this study's sample indicated that parent-family connectedness was lower among those who made a suicide attempt in the subsequent three months (King et al., 2019b), so it is possible that a lack of family connectedness contributes to increased risk for suicide attempts over time for bisexual youth.

While the results of this study focused on differences in suicide risk and protective factors within sexual minority subgroups, these must be considered in the context of all SMY subgroups having significantly higher rates of depression, trauma/abuse, suicidal ideation, suicide attempts, and less interpersonal connectedness, relative to straight youth. In spite of the well documented disparities, only one published study to date has explored the efficacy of interventions for SMY (Diamond et al., 2012). Given that cultural sensitivity issues related to sexual orientation and gender identity are commonly cited as barriers to care (e.g., Horwitz et al., 2020b; Keuroghlian et al., 2017), there is a significant need for tailored interventions that can address the needs of SMY broadly, as well as the significant differences that exist among SMY subgroups. School- and community-level policies and interventions that can target factors contributing to minority stress (e.g., victimization, discrimination, stigma) are critically important for preventing experiences that contribute to increased risk for suicidal ideation and attempts among SMY (e.g., Kull et al., 2016; Russell and Fish, 2016).

Limitations

While a strength of the study was the recruitment of a large sample of adolescents from mostly PECARN-affiliated ED sites across the US, these sites are large academic centers, and not nationally representative. Our study was able to examine many risk and protective factors for suicide, but many study measures were reduced, and may not have had the same psychometric strength as their full scales, or were dichotomized (e.g., physical abuse) in ways that do not allow inferences into severity. Race and ethnicity data were missing for a large portion of the dataset, limiting comprehensive analyses of possible moderation effects

for these variables. Furthermore, we did not have sufficient statistical power to examine potential intersectionality by gender or race/ethnicity. While we employed Holm's stepdown procedure to formally correct for multiple testing in the post-hoc comparisons in the Kruskal-Wallis and Fisher exact tests of Table 2, the examination of interaction effects in the logistic regressions did not include formal corrections and should be regarded as exploratory. Finally, our study was cross-sectional, so directionality regarding risk/protective factors and suicidal ideation and suicide attempt cannot be determined. A non-random subset of this sample completed follow-up assessments, but we suspect inadequate power to predict prospective outcomes of interest for SMY using this subset. Longitudinal studies examining risk and protective factors among SMY are greatly needed, particularly those powered to detect potential differences as a function of dual-minority (e.g., gender, race/ethnicity) intersectionality, in order to best learn how to tailor prevention and intervention approaches to health disparities among SMY.

Conclusions

Differences between SMY and heterosexual youth have already been clearly established, yet to adequately address these disparities, it is also imperative to better understand how minority-stress-related risk (e.g., victimization, trauma) and protective factors (e.g., connectedness) contribute to differences in suicidal ideation and behaviors among subgroups of SMY. Bisexual youth in our study had either higher or similar prevalence/severity for all examined suicide risk and protective factors relative to other sexual minority subgroups. Further, bisexual youth appeared to be less protected by parent-family connectedness. Interventions seeking to mitigate risk factors and promote protective factors are greatly needed for SMY and may benefit from tailoring to address unique stressors for sexual minority subgroups.

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Highlights

- Bisexual youth reported greatest severity of depression, victimization, and trauma
- Parent-family connectedness among bisexual youth was lower than all SMY subgroups
- Suicide ideation and attempts did not differ for bisexual and gay/lesbian youth
- Associations between risk factors and suicide ideation differed among SMY subgroups

Table 1

Sexual behaviors and sexual attractions by sexual identity group, stratified by sex at birth

Sex at Birth	Behavior/Attraction	Sexual Identity Group					Overall N=6423 (100%)
		Bisexual n=523 (8%)	Gay/Lesbian n=148 (2%)	Other Sexual Minority n=292 (5%)	Mostly Straight n=312 (5%)	Straight ^I n=5148 (80%)	
Female	<i>Sexual Behavior</i>						
	Opposite-sex Only	84 (18%)	7 (6%)	26 (12%)	67 (30%)	778 (29%)	962 (26%)
	Same-sex Only	22 (5%)	43 (38%)	6 (3%)	4 (2%)	36 (1%)	111 (3%)
	Both Sexes	126 (27%)	16 (14%)	19 (8%)	28 (13%)	19 (1%)	208 (6%)
	None	238 (51%)	48 (42%)	174 (77%)	123 (55%)	1893 (69%)	2476 (66%)
	<i>Sexual Attraction</i>						
	Opposite-sex Only	11 (2%)	3 (3%)	29 (13%)	45 (20%)	2154 (80%)	2242 (60%)
	Mostly Opposite-sex	101 (21%)	3 (3%)	32 (15%)	136 (62%)	207 (8%)	479 (13%)
	Equal Attraction	260 (55%)	9 (8%)	46 (21%)	19 (9%)	7 (0%)	341 (9%)
	Mostly Same-sex	42 (9%)	47 (42%)	13 (6%)	2 (1%)	8 (0%)	112 (3%)
	Same-sex Only	4 (1%)	46 (41%)	3 (1%)	2 (1%)	52 (2%)	107 (3%)
	Not sure	55 (12%)	5 (4%)	96 (44%)	17 (8%)	274 (10%)	447 (12%)
Male	<i>Sexual Behavior</i>						
	Opposite-sex Only	15 (32%)	2 (6%)	7 (11%)	36 (42%)	881 (37%)	941 (36%)
	Same-sex Only	0 (0%)	13 (38%)	2 (3%)	2 (2%)	5 (0%)	22 (1%)
	Both Sexes	14 (30%)	5 (15%)	3 (5%)	1 (1%)	3 (0%)	26 (1%)
	None	18 (38%)	14 (41%)	52 (81%)	47 (55%)	1488 (63%)	1619 (62%)
	<i>Sexual Attraction</i>						
	Opposite-sex Only	3 (6%)	1 (3%)	15 (23%)	37 (43%)	2088 (88%)	2144 (83%)
	Mostly Opposite-sex	15 (31%)	2 (6%)	6 (9%)	32 (37%)	30 (1%)	85 (3%)
	Equal Attraction	24 (50%)	2 (6%)	6 (9%)	2 (2%)	2 (0%)	36 (1%)
	Mostly Same-sex	1 (2%)	11 (32%)	1 (2%)	2 (2%)	2 (0%)	17 (1%)
	Same-sex Only	0 (0%)	16 (47%)	2 (3%)	1 (1%)	14 (1%)	33 (1%)
	Not sure	5 (10%)	2 (6%)	35 (54%)	13 (15%)	228 (10%)	283 (11%)

Note. N=6423 eligible subjects had a nonmissing sexual identity group, but 2 of these subjects did not have a reported sex at birth. Missing values for sexual behavior and sexual attraction by sex at birth ranged from n=22 to n=63 (1%–2% of each subgroup's N). All subgroup column percentages were calculated among subjects with nonmissing values for sex at birth and for the indicated behavior/attraction variable.

^IN=5128 of the Straight youth had a reported sex at birth and nonmissing values for attraction or behavior. Among these, the 846 Straight youth with same-sex attractions/behaviors did not substantially differ in suicidal ideation or suicide attempts compared to the 4282 Straight youth with exclusively opposite-sex attractions/behaviors, and were thus not included as an independent sexual minority group.

Table 2

Demographic and Clinical Characteristics with Sexual Minority Group Comparisons

Characteristic	Sexual Identity Group					Overall N=6423 (100%)	Omnibus Test P- value
	Bisexual ^a n=523 (8%)	Gay / Lesbian ^b n=148 (2%)	Other Sexual Minority ^c n=292 (5%)	Mostly Straight ^d n=312 (5%)	Straight ^e n=5148 (80%)		
Median Age (IQR)	15 (14, 16)	15 (15, 16)	14 (13, 15)	15 (14, 16)	14 (13, 16)	14 (13, 16)	<0.001 ²
Sex at Birth							<0.001 ³
Female	475 (13%)	114 (3%)	226 (6%)	224 (6%)	2752 (73%)	3791 (100%)	
Male	48 (2%)	34 (1%)	65 (2%)	88 (3%)	2395 (91%)	2630 (100%)	
Gender							<0.001 ³
Girl/Female	423 (12%)	87 (2%)	184 (5%)	218 (6%)	2681 (75%)	3593 (100%)	
Boy/Male	50 (2%)	31 (1%)	56 (2%)	91 (3%)	2424 (91%)	2652 (100%)	
TGNB	49 (31%)	30 (19%)	48 (30%)	2 (1%)	30 (19%)	159 (100%)	
Race							0.044 ³
White	277 (8%)	76 (2%)	173 (5%)	153 (5%)	2649 (80%)	3328 (100%)	
Black	124 (9%)	34 (2%)	45 (3%)	78 (5%)	1158 (80%)	1439 (100%)	
Multi-racial	30 (8%)	14 (4%)	19 (5%)	21 (6%)	270 (76%)	354 (100%)	
Other	16 (5%)	4 (1%)	11 (3%)	21 (7%)	263 (83%)	315 (100%)	
Unknown	76 (8%)	20 (2%)	44 (4%)	39 (4%)	808 (82%)	987 (100%)	
Ethnicity							0.549 ³
Hispanic/Latino	118 (8%)	38 (3%)	71 (5%)	72 (5%)	1208 (80%)	1507 (100%)	
Not Hispanic/ Latino	326 (8%)	92 (2%)	192 (5%)	200 (5%)	3256 (80%)	4066 (100%)	
Unknown	79 (9%)	18 (2%)	29 (3%)	40 (5%)	684 (80%)	850 (100%)	
Depression	11 (5, 18)	10 (4, 19)	8 (3, 16)	8 (3, 14)	3 (1, 7)	4 (1, 9)	<0.001 ²
Anxiety	4 (2, 5)	4 (2, 6)	4 (2, 6)	3 (1, 5)	2 (1, 3)	2 (1, 4)	<0.001 ²
Bully Victimization							<0.001 ²
Not at all	221 (43%)	77 (53%)	135 (47%)	182 (59%)	3494 (68%)	4109 (64%)	
A few times	152 (29%)	38 (26%)	93 (32%)	80 (26%)	1161 (23%)	1524 (24%)	
More than a few times	145 (28%)	31 (21%)	61 (21%)	49 (16%)	469 (9%)	755 (12%)	
Physical fights past year							0.066 ²
0	358 (69%)	104 (71%)	222 (76%)	210 (68%)	3894 (76%)	4788 (75%)	
1	65 (12%)	20 (14%)	37 (13%)	47 (15%)	633 (12%)	802 (13%)	
2 or 3	53 (10%)	14 (10%)	16 (5%)	39 (13%)	416 (8%)	538 (8%)	

Characteristic	Sexual Identity Group					Overall N=6423 (100%)	Omnibus Test P- value
	Bisexual ^a n=523 (8%)	Gay / Lesbian ^b n=148 (2%)	Other Sexual Minority ^c n=292 (5%)	Mostly Straight ^d n=312 (5%)	Straight ¹ n=5148 (80%)		
4 or more	46 (9%)	8 (5%)	17 (6%)	15 (5%)	193 (4%)	279 (4%)	
Exposure to LT violence	157 (30%)	40 (27%)	55 (19%)	68 (22%)	735 (14%)	1055 (16%)	0.002 ³
Threatened with weapon	106 (20%)	27 (18%)	41 (14%)	45 (15%)	535 (10%)	754 (12%)	0.065 ³
Physical abuse	101 (19%)	25 (17%)	36 (12%)	47 (15%)	392 (8%)	601 (9%)	0.059 ³
Sexual abuse/assault	143 (28%)	36 (24%)	52 (18%)	63 (20%)	325 (6%)	619 (10%)	0.007 ³
Parent-Family Connect	7 (5, 8)	7 (6, 8)	8 (6, 9)	8 (6, 9)	9 (7, 10)	8 (7, 10)	<0.001 ²
Social/Peer Connect	8 (6, 10)	8 (6, 9)	8 (6, 9)	8 (6, 9)	9 (7, 10)	8 (7, 10)	0.783 ²
School Connect	6 (5, 8)	7 (5, 8)	7 (5, 8)	7 (5, 8)	8 (7, 9)	8 (6, 9)	0.010 ²
Positive Affect	14 (10, 19)	15 (9, 19)	16 (10, 21)	16 (12, 20)	20 (15, 24)	19 (15, 23)	<0.001 ²
Recent SI	213 (41%)	63 (43%)	97 (33%)	94 (30%)	461 (9%)	928 (14%)	0.004 ³
Lifetime SI	355 (68%)	95 (64%)	155 (53%)	176 (57%)	1086 (21%)	1867 (29%)	<0.001 ³
Suicide Attempts ⁴							<0.001 ²
None	267 (53%)	79 (54%)	199 (69%)	222 (71%)	4592 (90%)	5359 (84%)	
Single	43 (8%)	19 (13%)	19 (7%)	24 (8%)	166 (3%)	271 (4%)	
Multiple	196 (39%)	49 (33%)	69 (24%)	65 (21%)	358 (7%)	737 (12%)	

Note. Percentages reflect column percentages except for the following rows showing row percentages: sex at birth, gender, race, ethnicity All continuous variables report the Median (Quartile 1, Quartile 3).

TGNB = Transgender, non-binary, or gender queer. SI = Suicidal Ideation. Connect= Connectedness. LT = Life-threatening.

Missing/unknown values were n = 987 for race and n=850 for ethnicity but were treated as distinct levels. Missing values ranged from n (<= 1.2% of total) for clinical variables, from n = 7–56 (<= 0.9%) for the outcomes, n = 19 for gender, n = 2 for sex at birth.

¹The Straight group is included for descriptive purposes only.

²Kruskal-Wallis Test (based on 100,000 permutations)

³Fisher's exact test (based on 100,000 permutations or complete enumeration)

⁴36 participants with an attempt history did not specify number of attempts and are not represented in this attempt variable.

For post-hoc comparisons

^a=Bisexual

^b= Gay/Lesbian

^c= Other Sexual Minority

^d= Mostly Straight

Table 3

Multivariable Logistic Regression Model for Recent Suicidal Ideation

Variable	Best Main Effects Model per AIC, without considering Sexual Identity Group		Augmented Model (After addition of main effect of, interactions with sexual identity group)		Summary of Interactions ² Adjusted Odds Ratio (95% CI)
	Main Effect P-value	Main Effect P-value ¹	Interaction with Sexual Identity Group P-value	Interaction with Sexual Identity Group	
Age	0.003	0.016	0.194		
Depression	<0.001	<0.001	0.177		
Anxiety	0.125	0.091	0.008		MS vs. Bi (ref) = 0.77 (0.63, 0.93)
Bully Victimization	0.065	0.337	0.910		
Sexual abuse/assault	0.028	0.004	0.097		
Parent-Family Connectedness	0.033	0.665	0.036		MS vs. Bi (ref) = 0.69 (0.53, 0.89)
Positive Affect	<0.001	<0.001	0.070		
Sexual Identity Group	----	0.042	----		

Note. n = 1225. Bi = Bisexual. MS = Mostly Straight. OSM = Other Sexual Minority.

¹The p-values in this column depend on which sexual minority group is chosen as the reference. These main effect p-values result from using the Bisexual group as the reference.

²Only statistically significant comparisons with the Bisexual group are included in the summary.

Table 4

Multivariable Logistic Regression Model for Lifetime Suicidal Ideation

Variable	Best Main Effects Model per AIC, without considering Sexual Identity Group		Augmented Model (After addition of main effect of, interactions with sexual identity group)		Summary of Interactions ² Adjusted Odds Ratio (95% CI)
	Main Effect P-value	Main Effect P-value ¹	Interaction with Sexual Identity Group P-value	Main Effect P-value	
Race	0.018	0.166	0.864		
Ethnicity	0.036	0.060	0.630		
Depression	<0.001	<0.001	0.031		G/L vs. Bi (ref) = 1.11 (1.01, 1.24); OSM vs. Bi (ref) = 1.11 (1.02, 1.21)
Bully Victimization	0.004	0.031	0.949		
Physical abuse	0.084	0.187	0.805		
Sexual abuse/assault	<0.001	0.002	0.074		
Parent-Family Connectedness	<0.001	0.016	0.011		MS vs. Bi (ref) = 0.66 (0.50, 0.86)
Positive Affect	<0.001	0.057	0.037		n.s.
Sexual Identity Group	----	0.010	----		

Note. n = 1223. Bi = Bisexual. MS = Mostly Straight. G/L = Gay/Lesbian. OSM = Other Sexual Minority.

¹The p-values in this column depend on which sexual minority group is chosen as the reference. These main effect p-values result from using the Bisexual group as the reference.

²Only statistically significant comparisons with the Bisexual group are included in the summary.

Table 5
Multivariable Proportional Odds (Cumulative Logit) Model for Suicide Attempts

Variable	Best Main Effects Model per AIC, without considering Sexual Identity Group		Augmented Model ¹ (After addition of main effect of, interactions with sexual identity group)		Summary of Interactions ³ Adjusted Odds Ratio (95% CI)
	Main Effect P-value	Main Effect P-value ²	Main Effect P-value	Interaction with Sexual Identity Group P-value	
Gender Identity	0.026	0.770	0.190		
Race	0.094	0.544	0.504		
Ethnicity	<0.001	0.017	0.269		
Depression	<0.001	<0.001	0.315		
Bully Victimization	<0.001	<0.001	0.210		
Exposure to LT violence	0.012	0.310	0.748		
Physical abuse	0.026	0.041	0.991		
Sexual abuse/assault	<0.001	0.036	0.473		
Parent-Family Connectedness	<0.001	0.068	0.709		
Positive Affect	0.010	0.018	0.163		
Sexual Identity Group	----	0.424	----		

Note. n = 1201. LT = Life-threatening.

Suicide attempts were categorized in the dependent variable as 0 (no attempts), 1 (single attempt), and 2 (two or more attempts)

¹The proportional odds assumption of the augmented model was violated, but not in the main effects model.

²The p-values in this column depend on which sexual minority group is chosen as the reference. These main effect p-values result from using the Bisexual group as the reference.

³No comparisons with the Bisexual group are summarized because none of the interaction effects had $p < 0.05$.