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Variation in Suicide Risk among Subgroups of Sexual and Gender Minority College Students

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Objective: Sexual and gender minorities are at elevated risk for suicide, yet few studies have examined differences in risk within many sexual and gender minority subgroups. The purpose of this study was to examine differences in prevalence for suicide risk factors among a wide range of sexual orientations and gender identities.
Method: Forty-one thousand four hundred and twelve college students (62% cis-female, 37% cis-male, 1% transgender/genderqueer) completed a wellness screen that included four suicide risk factors (depression, heavy alcohol use, suicide ideation, suicide attempt).
Results: Gender minority students (i.e., transgender, genderqueer/non-binary) had significantly higher rates of depression, suicide ideation, and suicide attempts relative to cisgender peers, although there were no within-group differences among gender minority students. Adjusted odds ratios for endorsing two or more (2+) suicide risk factors were substantially higher for all sexual minority subgroups relative to heterosexuals. Among sexual minorities, those identifying as pansexual, bisexual, queer, or mostly gay/lesbian had greater odds of endorsing 2+ suicide risk factors relative to students identifying as mostly heterosexual, gay/lesbian, asexual, or 'other sexual minority'. Pansexual students had 33% greater odds of endorsing 2+ suicide risk factors relative to bisexual students.
Conclusions: These findings highlight significant variation in suicide risk among sexual minority subgroups and the need for targeted interventions for subgroups at highest risk.

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Suicide is the second leading cause of death of college students and globally for individuals aged 15–29 (World Health Organization, 2018). A meta-analysis by Mortier et al. (2018) of over 36 college student samples estimated that 22.3% of college students have a lifetime history of suicidal ideation and 3.2% have a lifetime history of suicide attempt. Further, a recent international study of college students indicated that 31% of first-year undergraduates met criteria for one of the six common mental health disorders (e.g., mood, anxiety, substance use disorders) in the past year (Auerbach et al., 2018). While the prevalence of depression, suicidal thoughts, and suicidal behaviors are high among college students, they are even higher among adolescents and young adults identifying as a sexual minority (e.g., gay, lesbian, bisexual) or gender minority (e.g., transgender, genderqueer, nonbinary; Auerbach et al., 2018; Kuper, Adams, & Mustanski, 2018; Mustanski, Garofalo, & Emerson, 2010; Silva, Chu, Monahan, & Joiner, 2015). In particular, lifetime prevalence of suicide attempts is approximately 4% in the general population, 11%–20% among those identifying as a sexual minority, and 40% among those identifying as a gender minority (Hottes, Bogaert, Rhodes, Brennan, & Gesink, 2016; James et al., 2016; Kessler, Borges, & Walters, 1999).

Meta-analyses and reviews have indicated a clear distinction in risk for suicide between heterosexual and non-heterosexual groups (e.g., Hottes et al., 2016; Ploderl & Tremblay, 2015), yet less research has focused on differences in risk between subgroups of sexual minority populations. A review by Salway et al. (2018) indicated that individuals identifying as bisexual have a greater prevalence of suicidal ideation and suicide attempts relative to those identifying as gay/lesbian. Similarly, a study by Tsypes et al. (2016) examined sexual attraction in relation to suicidal thoughts and behaviors in a sample of college students and found that suicidal thoughts and behaviors were more prevalent among those with a nonexclusively other-sex attraction, with greatest prevalence among those reporting an equivalent same–other-sex attraction. The minority stress model (Meyer, 1995) outlines how ownership of a stigmatized social identity (e.g., transgender, gay) in a culture that privileges being heterosexual and cisgender exposes individuals to various external (e.g., discrimination) and internal (e.g., identity concealment) stressors that may contribute negatively to health over time. This model has been used to explain differences in suicide risk among sexual and gender minorities relative to heterosexual and cisgender populations, but can also be used to explain higher risk outcomes among bisexual populations relative to gay/lesbians, given that bisexual populations may face discrimination from within sexual minority communities (e.g., lack of participation opportunities) and violate broader societal expectations of monosexism (i.e., attraction to only one sex; Scherrer, 2013). Yet, few studies have gone beyond comparing those identifying as gay/lesbian to bisexual and fail to distinguish between a broader spectrum of sexual minority groups, who may face unique stressors within this model.

With regard to diversity within gender minority populations, few studies have directly examined differences in mental health or suicide risk among those identifying as transgender relative to those identifying as genderqueer (i.e., non-normative gender) or nonbinary (i.e., gender falling outside binary of man/woman). Warren et al. (2016) found that transgender men and women had significantly higher rates of depression, anxiety, and stress, relative to cisgender sexual minority counterparts, whereas those identifying as genderqueer/nonbinary did not significantly differ from cisgender sexual minorities. In line with these findings, rates of suicide attempts in the national transgender discrimination survey were slightly higher for transgender men and women (42%–46%) compared to those identifying as genderqueer or gender nonconforming (36%–38%; Haas, Rodgers, & Herman, 2014). Yet, a review by Matsuno and Budge (2017) indicated that

nonbinary individuals may be at a higher risk for depression and anxiety relative to binary transgender persons. Additional data are needed to determine whether suicide risk factors differ among individuals identifying with various nonbinary gender identities.

Taken together, while the evidence is clear that sexual and gender minorities are at greater risk for suicide relative to heterosexual and cisgender peers, additional research is needed to clarify differences in suicide risk among subgroups of sexual and gender minority populations. The current study addresses the gaps in the existing literature by conducting a secondary data analysis from a large sample of college students assessing the degree to which less-investigated subgroups of sexual and gender minority populations differ in risk for depression, heavy alcohol use, suicidal ideation, and suicide attempts.

METHOD

Participants

Participants were 41,412 college students at four US universities who completed a suicide risk screening survey during the 2nd through 5th waves of the eBridge study [clinicaltrials.gov: (NCT03380117)] between September 2015 and October 2018. Eligibility criteria included being age 18 or above, enrollment in a degree-seeking program, and residing domestically (e.g., not studying abroad). Exclusion criteria included those who were within one semester of graduation and those who had been invited for participation in previous years.

Measures

Demographics. Participants reported their age, gender identity, race, ethnicity, and sexual orientation. Participants were able to "check all that apply" with regard to gender identity, race, and sexual orientation. For gender identity, individuals were given the option to identify as male, female, transmale, transfemale, genderqueer, or other. They were also asked to provide their gender assignment at birth as either male or female. Gender identity was grouped into mutually exclusive categories of male, female, female-to-male transgender, male-to-female transgender, female-assigned genderqueer/nonbinary, and male-assigned genderqueer/nonbinary. For race, individuals were given the option to identify as White/Caucasian, Black/African American, Asian/Asian American, American Indian/Alaska Native, Pacific Islander, or Other. For ethnicity, individuals were given the option to identify as Hispanic/Latino or not Hispanic/Latino. Race and ethnicity were grouped into mutually exclusive categories of non-Hispanic White, Black, Hispanic, Asian, and Other. For sexual orientation, individuals were given options to identify as heterosexual, mostly heterosexual, mostly gay or lesbian, gay or lesbian, bisexual, pansexual, asexual, demisexual, queer, unlabeled, not sure, and other. Sexual orientation was grouped into mutually exclusive categories of heterosexual (selected "heterosexual" exclusively), mostly heterosexual (selected "mostly heterosexual" exclusively or selected "heterosexual" and "mostly heterosexual" with no other selections), gay/lesbian (selected "gay/lesbian" with no selection of "bisexual" or "pansexual"), bisexual (selected "bisexual" with no selection of "pansexual"), pansexual (selected "pansexual"), queer (selected "queer" with no selection of "pansexual," "bisexual," or "gay/lesbian"), mostly gay/lesbian (selected "mostly gay/lesbian" with no selection of "pansexual," "bisexual," "gay/lesbian," or "queer"), asexual (selected "asexual" with no selection of "pansexual," "bisexual," "gay/lesbian," "queer," or "mostly gay/lesbian"), and other sexual minority (those who did not meet conditions for other categories; most frequently selected sexual orientation labels were "unlabeled," "not sure," or "other").

Depression. The Patient Health Questionnaire-2 (PHQ-2; Kroenke, Spitzer, & Williams, 2003) was used as a depression screener. It is a two-item measure that assesses for depressed mood and anhedonia over the past 2 weeks on a 4-point Likert scale ranging from "never" to "nearly every

day" (full-scale range of 0–6). This scale has psychometric properties comparable to longer depression scales and demonstrated good sensitivity and specificity relative to a diagnostic interview, with a cutoff score of 3 as being optimal for detection of major depression or other depressive disorders (Löwe, Kroenke, & Gräfe, 2005). Scores of 3 or higher on the PHQ-2 were used to indicate a positive screen for depression in this study.

Heavy Alcohol Use. The Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) is a 10-item scale that assesses frequency, quantity, and negative consequences associated with alcohol use. Items are rated on a 5-point Likert scale, and the scale has a range of 0–40. The AUDIT has been used for detecting high-risk drinking in college students with a recommended cutoff of 6–8 (Kokotailo et al., 2004). To maximize specificity, a cutoff of 8 was used to indicate a positive screen for heavy alcohol use.

Suicidal Ideation and Suicide Attempt. Dichotomous yes/no questions derived from the National Comorbidity Survey (Kessler et al., 2004) were used to assess suicidal ideation in the past year, "In the past 12 months, have you ever felt so low that you thought about committing suicide?", and history of suicide attempts, "In your lifetime have you ever attempted suicide?".

Procedures

IRB approval was obtained for the study at all four participating university sites, and the intervention was registered with clinicaltrials.gov. Students were invited by e-mail (obtained from each university registrar's database) to participate in a wellness screen 3–4 weeks into the fall semesters from 2015 to 2018. Individuals responding affirmatively to suicidal ideation or suicidal behavior items received a notification containing crisis numbers for use if they were currently suicidal. All invited participants at each campus were enrolled in a drawing for ten $100 amazon gift cards. Of the 178,879 invitations sent, 41,617 (23.3%) completed the online consent form and completed the full screen, with a final analytic sample of 41,412 after removing 205 students who either did not report their sexual orientation.

Data Analytic Plan

In this secondary analysis of the *e*Bridge study, chi-square analyses were utilized to examine differences of age, race, and gender with sexual orientation. Chi-square analyses also examined sociodemographic differences in clinical risk factors for suicide. We performed post hoc testing for chi-square analyses by examining the unique contribution (i.e., standardized residual) of each cell (Beasley & Schumacker, 1995). In order to control for Type I errors, only standardized residuals of 2.58 (p-value of $<.01$) or greater were reported as statistically significant. Five logistic regressions, adjusted for age, gender, race, and university, were utilized to compute adjusted odds ratios and 99% confidence intervals for sexual orientation as predictors of clinical risk factors for suicide. The five largest sexual orientation categories (heterosexual, mostly heterosexual, bisexual, gay/lesbian, pansexual) were each examined individually as a reference point in order to directly compare them with the nine sexual orientation groups. All analyses were conducted utilizing SPSS version 24 (IBM Corp., Armonk, NY, USA).

RESULTS

Table 1 presents the demographic distribution of sexual orientation across age, gender, and race. Overall, 76.8% of the sample reported a strictly heterosexual sexual orientation, with the remaining 23.2% divided among the sexual minority groups—mostly heterosexuals were the largest sexual minority group, making up 9.3% of the total sample. Those in the 31 and older group were most likely to endorse a heterosexual orientation. The 18- to 19-year-old age group was less likely to identify as mostly heterosexual, gay/lesbian, or queer, and were more likely to identify as bisexual, pansexual, asexual, and

TABLE 1
Sexual Orientation Frequencies based on Age, Gender, and Race

	n	%	Hetero *n* = 31,817 (%)	M Hetero *n* = 3,841 (%)	Gay/Les *n* = 1,298 (%)	Bisexual *n* = 2,100 (%)	Pansexual *n* = 708 (%)	Queer *n* = 324 (%)	M Gay/ Les *n* = 284 (%)	Asexual *n* = 415 (%)	Other SM *n* = 625 (%)
Total sample	41,412	100	76.8	9.3	3.1	5.1	1.7	0.8	0.7	1.0	1.5
Age											
18–19	15,178	36.5	76.0 (−)	8.3 (−)	2.8 (−)	6.3 (+)	2.1 (+)	0.6 (−)	0.7	1.3 (+)	1.9 (+)
20–22	11,534	27.7	76.7	10.1 (+)	2.8 (−)	4.8	1.6	0.8	0.7	1.1	1.5
23–30	11,831	28.4	76.8	10.3 (+)	3.7 (+)	4.3 (−)	1.5	1.0 (+)	0.6	0.7 (−)	1.1 (−)
31+	3,054	7.3	81.8 (+)	7.4 (−)	3.7	3.2 (−)	1.1 (−)	0.7	0.7	0.3 (−)	1.1
Gender identity											
Female	25,683	61.8	74.5 (−)	11.5 (+)	1.4 (−)	6.4 (+)	1.9 (+)	0.7	0.5 (−)	1.2 (+)	1.8 (+)
Male	15,289	36.8	83.5 (+)	5.7 (−)	5.6 (+)	2.3 (−)	0.5 (−)	0.2 (−)	0.9 (+)	0.4 (−)	0.9 (−)
FTM Trans	98	0.2	20.4 (−)	5.1	11.2 (+)	19.4 (+)	18.4 (+)	20.4 (+)	2.0	2.0	1.0
MTF Trans	33	0.1	6.1 (−)	0.0	21.2 (+)	18.2 (+)	24.2 (+)	9.1 (+)	6.1 (+)	3.0	12.1 (+)
F Gqueer	346	0.8	0.9 (−)	3.2 (−)	11.8 (+)	18.8 (+)	29.8 (+)	17.6 (+)	3.8 (+)	9.0 (+)	5.2 (+)
M Gqueer	103	0.2	5.8 (−)	5.8	24.3 (+)	10.7 (+)	19.4 (+)	17.5 (+)	2.9 (+)	4.9 (+)	8.7 (+)
Race/Ethnicity											
White	25,185	60.5	77.4 (+)	8.8 (−)	3.2	5.2	1.8	0.8	0.7	1.0	1.1 (−)
Black	2,062	5.0	72.2 (−)	10.8	4.2 (+)	6.1	2.0	1.1	0.8	0.9	2.0
Asian	9,158	22.0	78.0 (+)	10.0 (+)	2.5 (−)	4.1 (−)	1.0 (−)	0.5 (−)	0.7	1.1	2.2 (+)
Hispanic	3,860	9.3	73.9 (−)	9.7	4.0 (+)	6.0 (+)	2.5 (+)	0.7	0.9	0.7	1.6
Other	1,332	3.2	74.9	8.9	2.5	4.7	2.7 (+)	1.5 (+)	0.5	1.4	2.9 (+)

All three chi-square analyses were significant at $p < .001$. (+) and (−) indicate statistical significance at $p < .01$ in respective directions for post hoc analyses used to interpret chi-square contingency table test results, with significance indicators at the individual-cell level for significant contribution to the overall chi-square test. F(M) trans/queer, female-assigned-at-birth (male-assigned-at-birth) transgender, genderqueer, or nonbinary; Hetero, heterosexual; M Hetero, mostly heterosexual; Gay/Les, gay/lesbian; M Gay/Les, mostly gay/lesbian; SM, sexual minority.

TABLE 2
Comparing Frequencies of Suicide Risk Factors by Age, Gender, Race, and Sexual Orientation

	Depression (%)	Alcohol (%)	SI (%)	SA (%)	2 + RF (%)
Total sample	16.0	15.8	12.8	5.8	10.5
Age					
18–19	19.1 (+)	14.4 (−)	16.4 (+)	6.9 (+)	12.7 (+)
20–22	16.4	20.4 (+)	12.9	4.9 (−)	11.3 (+)
23–30	13.0 (−)	14.6 (−)	9.0 (−)	4.7 (−)	7.7 (−)
31+	10.5 (−)	9.4 (−)	9.2 (−)	7.9 (+)	7.0 (−)
Gender					
Female	17.0 (+)	13.5 (−)	13.5 (+)	6.6 (+)	11.0 (+)
Male	13.3 (−)	19.7 (+)	10.4 (−)	3.7 (−)	8.8 (−)
FTM Trans	29.9 (+)	11.3	46.4 (+)	30.9 (+)	33.7 (+)
MTF Trans	39.4 (+)	12.1	36.4 (+)	24.2 (+)	26.4 (+)
F Gqueer	40.9 (+)	11.3	40.9 (+)	23.8 (+)	33.8 (+)
M Gqueer	45.1 (+)	16.7	35.3 (+)	24.5 (+)	36.9 (+)
Race/Ethnicity					
White	15.8	19.1 (+)	13.2 (+)	5.8	11.2 (+)
Black	20.1 (+)	12.8 (−)	17.5 (+)	8.8 (+)	14.2 (+)
Asian	14.2 (−)	8.3 (−)	10.5 (−)	4.3 (−)	7.2 (−)
Hispanic	17.6 (+)	14.7	12.2	7.6 (+)	11.3
Other	19.4 (+)	12.8 (−)	15.1 (+)	7.1	12.8 (+)
Sexual orientation					
Heterosexual	12.9 (−)	15.9	9.3 (−)	3.8 (−)	7.7 (−)
Mostly Hetero	20.8 (+)	18.4 (+)	19.4 (+)	8.9 (+)	15.8 (+)
Gay/Lesbian	21.0 (+)	15.4	20.0 (+)	12.1 (+)	15.9 (+)
Bisexual	30.3 (+)	15.6	30.3 (+)	16.9 (+)	25.3 (+)
Pansexual	38.1 (+)	13.9	37.2 (+)	22.7 (+)	34.0 (+)
Queer	31.5 (+)	17.1	30.2 (+)	19.6 (+)	26.9 (+)
Mostly G/L	29.6 (+)	22.7 (+)	29.6 (+)	10.5 (+)	23.2 (+)
Asexual	31.9 (+)	3.1 (−)	24.3 (+)	6.6	16.4 (+)
Other SM	29.4 (+)	6.8 (−)	23.2 (+)	9.5 (+)	17.0 (+)

All 20 chi-square analyses were significant at $p < .001$. (+) and (−) indicate statistical significance at $p < .01$ in respective directions for post hoc analyses used to interpret chi-square contingency table test results. SI, suicidal ideation; SA, suicide attempt; FTM, female-to-male; MTF, male-to-female, Trans, transgender, F(M) Gqueer, female-assigned-at-birth (male-assigned-at-birth) genderqueer or nonbinary; RF, risk factors; G/L, gay/lesbian; SM, sexual minority.

other sexual minority. Males were more likely to endorse a heterosexual orientation, whereas females were more likely than males to be in every sexual minority group, apart from "gay/lesbian" and "mostly gay/lesbian." Those identifying as transgender or nonbinary were most commonly identifying as pansexual, bisexual, queer, and gay/lesbian. Black and Hispanic students were more likely to endorse a sexual minority orientation relative to White and Asian students, with Hispanic students having stronger representation in the gay/lesbian, bisexual, and pansexual groups, and Black students having stronger representation in the gay/lesbian group.

The prevalence of positive screens for depression, heavy alcohol use, past-year suicidal ideation, and suicide attempt history, and combinations of two or more risk factors are presented in Table 2, with breakdowns by age, gender, race, and sexual orientation. Post hoc chi-square tests did not indicate any significant differences between the four gender minority subgroups for these risk factors

or their combinations. Table 3 presents the adjusted odds ratios of sexual orientation groups when controlling for age, gender, race, and university site. Sexual minority groups had greater odds of depression (adjusted odds ratio (AOR) range = 1.76–3.35), suicidal ideation (AOR range = 2.41–4.59), suicide attempt (AOR range = 2.35–5.46; excluding asexual), and presence of 2 + risk factors (AOR range = 2.09–4.97), relative to strictly heterosexual students.

In direct comparisons within sexual minority groups, odds of a positive screen for depression were significantly higher among each of the sexual minority groups relative to mostly heterosexual (AOR range = 1.45–1.90) and gay/lesbian (AOR range = 1.37–1.79) students. Mostly heterosexual students had significantly greater odds of heavy alcohol use relative to gay/lesbian, bisexual, asexual, and other sexual minority students (AOR range = 1.22–7.14). With regard to suicidal ideation, odds of endorsement were significantly higher for those identifying as pansexual (AOR range = 1.72–1.91) and bisexual (AOR range = 1.45–1.60) relative to those identifying as mostly heterosexual, gay/lesbian, asexual, or other sexual minority. Lifetime history of suicide attempt did not differ between those identifying as gay/lesbian relative to those identifying as bisexual, although pansexual students had significantly greater odds of a suicide attempt relative to all other sexual minorities (AOR range = 1.41–3.45) apart from those identifying as queer or bisexual. Students identifying as pansexual (AOR range = 2.13–2.38) or bisexual (AOR range = 1.61–1.78) had significantly greater odds of endorsing 2 or more suicide risk factors relative to mostly heterosexual, gay/lesbian, asexual, and other sexual minority students. Further, students identifying as pansexual had 1.33x greater odds of endorsing 2 or more suicide risk factors relative to bisexual students (see Table 3). Queer and mostly gay/lesbian students did not significantly differ from bisexual or pansexual students in odds for suicide risk variables, apart from pansexual students having 1.76x greater odds of suicide attempt relative to mostly gay/lesbian students.

DISCUSSION

While many studies limit examination of sexual orientation categories to heterosexual, gay/lesbian, bisexual, and other/unsure, the present study examined the relative prevalence of depression, heavy alcohol use, suicidal ideation, and suicide attempts among sexual minority and gender minority college students, including oft-overlooked sexual orientation labels/categories of mostly heterosexual, pansexual, mostly gay/lesbian, and queer. Sexual minority and gender minority college students were consistently more likely to screen positive for depression, suicidal ideation, and suicide attempts, relative to heterosexual and cisgender counterparts.

Findings from this study supported previously published research suggesting that those identifying as bisexual or reporting equivalent attraction to multiple sexes had greater risk for suicidal ideation and behaviors (e.g., Salway et al., 2018; Tsypes et al., 2016; Vrangalova & Savin-Williams, 2014). Specifically, individuals identifying as pansexual (i.e., sexual attraction to anyone, regardless of sex or gender identity) had the highest prevalence of suicidal ideation and suicide attempts. Those identifying as pansexual or bisexual also had greater adjusted odds for 2 + suicide risk factors relative to those identifying as gay/lesbian, mostly heterosexual, asexual, or other sexual minority. A small number of students were identified as queer or mostly gay/lesbian. These students were more likely than gay/lesbian or mostly heterosexual students to endorse 2 + risk factors and did not significantly differ from those identifying as pansexual or bisexual in odds for suicide risk factors, suggesting they may be at similar levels of risk. Give that those identifying as bisexual are generally considered to be at the greatest risk for suicide, it was particularly noteworthy that pansexual students had 33% greater adjusted odds of 2 + risk factors relative to those identifying as bisexual. A study by Borgogna et al. (2018) indicated that individuals identifying with an "emerging identity," such as pansexual, may

TABLE 3
Comparison of Adjusted Odds Ratios for Suicide Risk Factors within Sexual Orientation Groups

	Heterosexual[a]		Mostly Heterosexual[b]		Gay/Lesbian[c]		Bisexual[d]		Pansexual[e]	
	AOR	99% CI	AOR	99% CI	AOR	99% CI	AOR	99% CI	AOR	99% CI
Depression										
Mostly Het	1.76*	1.57–1.98	1.00	–						
Gay/Lesbian	1.87*	1.55–2.25	1.06	0.86–1.31	1.00	–				
Bisexual	2.66*	2.33–3.04	1.51*	1.28–1.78	1.43*	1.14–1.78	1.00	–		
Pansexual	3.35*	2.70–4.16	1.90*	1.50–2.41	1.79*	1.36–2.37	1.26	0.99–1.61	1.00	–
Queer	2.75*	1.97–3.84	1.56*	1.10–2.21	1.47*	1.01–2.14	1.03	0.73–1.47	0.82	0.56–1.20
Mostly G/L	2.83*	2.00–4.00	1.60*	1.12–2.30	1.51*	1.03–2.23	1.06	0.74–1.53	0.84	0.56–1.26
Asexual	2.79*	2.10–3.70	1.58*	1.18–2.13	1.49*	1.07–2.08	1.05	0.77–1.42	0.83	0.59–1.18
Other SM	2.55*	2.01–3.23	1.45*	1.12–1.87	1.37*	1.02–1.84	0.96	0.74–1.25	0.76	0.56–1.04
Alcohol misuse										
Mostly Het	1.34*	1.19–1.51	1.00	–						
Gay/Lesbian	0.84	0.68–1.03	0.62*	0.49–0.79	1.00	–				
Bisexual	1.10	0.93–1.30	0.82*	0.68–0.99	1.32*	1.02–1.71	1.00	–		
Pansexual	1.00	0.74–1.34	0.74	0.54–1.02	1.19	0.83–1.70	0.90	0.65–1.26	1.00	–
Queer	1.22	0.81–1.83	0.91	0.60–1.38	1.46	0.93–2.29	1.11	0.72–1.70	1.22	0.75–1.99
Mostly G/L	1.50*	1.03–2.20	1.12	0.76–1.66	1.80*	1.17–2.77	1.37	0.91–2.06	1.51	0.94–2.43
Asexual	0.19*	0.09–0.39	0.14*	0.07–0.29	0.23*	0.11–0.48	0.17*	0.08–0.36	0.19*	0.09–0.42
Other SM	0.47*	0.31–0.85	0.35*	0.23–0.54	0.57*	0.36–0.90	0.43*	0.28–0.67	0.48*	0.29–0.79
Suicidal ideation										
Mostly Het	2.41*	2.13–2.71	1.00	–						
Gay/Lesbian	2.52*	2.08–3.06	1.05	0.84–1.30	1.00	–				
Bisexual	3.86*	3.36–4.42	1.60*	1.36–1.89	1.53*	1.22–1.92	1.00	–		
Pansexual	4.59*	3.68–5.72	1.91*	1.50–2.42	1.82*	1.37–2.41	1.19	0.93–1.52	1.00	–
Queer	3.58*	2.54–5.05	1.49*	1.05–2.13	1.42	0.97–2.08	0.93	0.65–1.33	0.78	0.52–1.15
Mostly G/L	4.05*	2.86–5.74	1.68*	1.17–2.42	1.61*	1.09–2.37	1.05	0.73–1.52	0.88	0.59–1.32
Asexual	2.69*	1.97–3.65	1.12	0.81–1.54	1.06	0.75–1.52	0.70*	0.50–0.97	0.59*	0.41–0.85

(continued)

TABLE 3
(continued)

	Heterosexual[a]		Mostly Heterosexual[b]		Gay/Lesbian[c]		Bisexual[d]		Pansexual[e]	
	AOR	99% CI	AOR	99% CI	AOR	99% CI	AOR	99% CI	AOR	99% CI
Other SM	2.67*	2.06–3.45	1.11	0.84–1.46	1.06	0.77–1.45	0.69*	0.52–0.92	0.58*	0.42–0.81
Suicide attempt										
Mostly Het	2.50*	2.11–2.96	1.00	–						
Gay/Lesbian	3.88*	3.03–4.96	1.55*	1.17–2.05	1.00	–				
Bisexual	4.51*	3.78–5.38	1.80*	1.45–2.24	1.16	0.88–1.54	1.00	–		
Pansexual	5.46*	4.20–7.10	2.18*	1.63–2.92	1.41*	1.00–1.97	1.21	0.91–1.62	1.00	–
Queer	5.19*	3.44–7.81	2.07*	1.35–3.18	1.34	0.85–2.11	1.15	0.75–1.76	0.95	0.60–1.50
Mostly G/L	3.04*	1.81–5.13	1.22	0.71–2.09	0.79	0.45–1.38	0.68	0.39–1.16	0.56*	0.32–0.99
Asexual	1.58	0.93–2.67	0.63	0.37–1.08	0.41*	0.23–0.72	0.35*	0.20–0.60	0.29*	0.16–0.51
Other SM	2.35*	1.62–3.40	0.94	0.63–1.39	0.61*	0.39–0.93	0.52*	0.35–0.77	0.43*	0.28–0.66
2 + Risk factors										
Mostly Het	2.33*	2.05–2.65	1.00	–						
Gay/Lesbian	2.29*	1.86–2.82	0.99	0.78–1.25	1.00	–				
Bisexual	3.74*	3.24–4.32	1.61*	1.35–1.92	1.63*	1.28–2.08	1.00	–		
Pansexual	4.97*	3.97–6.22	2.14*	1.67–2.73	2.17*	1.62–2.91	1.33*	1.04–1.71	1.00	–
Queer	3.86*	2.72–5.47	1.66*	1.15–2.38	1.68*	1.13–2.50	1.03	0.72–1.49	0.78	0.52–1.15
Mostly G/L	3.61*	2.49–5.24	1.55*	1.05–2.28	1.57*	1.04–2.39	0.97	0.65–1.43	0.73	0.47–1.11
Asexual	2.09*	1.47–2.97	0.90	0.62–1.30	0.91	0.61–1.36	0.56*	0.39–0.81	0.42*	0.28–0.63
Other SM	2.31*	1.74–3.07	0.99	0.73–1.34	1.01	0.71–1.42	0.62*	0.45–0.84	0.47*	0.33–0.66

AOR, adjusted odds ratio; odds ratios are adjusted for age, gender, race, and university; G/L, gay/lesbian; SM, sexual minority.
[a]Heterosexual was the reference category for all odds ratios in this column.
[b]Mostly heterosexual was the reference category for all odds ratios in this column.
[c]Gay/Lesbian was the reference category for all odds ratios in this column.
[d]Bisexual was the reference category for all odds ratios in this column.
[e]Pansexual was the reference category for all odds ratios in this column.
*$p < .01$.

be at elevated risk for minority stressors such as discrimination, although additional research is needed to clarify the factors explaining elevated risk among individuals identifying as pansexual.

Consistent with previous research (e.g., Savin-Williams & Vrangalova, 2013), "mostly heterosexual" constituted the largest subgroup within the sexual minority population. Students identifying as mostly heterosexual were at an elevated risk for all four examined suicide risk factors (AOR range = 1.38–2.45) relative to strictly heterosexual students and had similar risk patterns of risk to those identifying as "gay/lesbian." Many individuals identifying as mostly heterosexual are likely miscategorized as heterosexual in standard assessment paradigms, which would potentially mask this elevated risk for suicide, suggesting a need for inclusion of "mostly heterosexual" on standard assessments of sexual orientation.

When examining subgroups of students identifying with a non-cisgender identity, we did not find statistically significant differences within subgroups (e.g., transgender vs. genderqueer, male-assigned transgender/genderqueer vs. female-assigned transgender/genderqueer). This is inconsistent with past research by Warren et al. (2016), suggesting transgender individuals might be at greater risk relative to those identifying as genderqueer/nonbinary, and requires further investigation. A study by Kuper et al. (2018) indicated that gender minorities identifying as pansexual were more likely to screen positive for suicide risk. Additional research utilizing large samples of gender and sexual minority participants is needed to further assess the intersection of gender minority status and sexual orientation to better delineate levels of risk among these groups.

Given the elevated risk for suicide among sexual and gender minority individuals, it is imperative to understand the underlying factors that lead to adverse mental health outcomes. Origins of this risk disparity can be partly explained through the minority stress model (Meyer, 1995), and our findings suggested significant variation in suicide risk among different sexual minority groups. As such, there is a need to better understand the ways in which experiences as a sexual minority differ, particularly among less studied groups such as mostly heterosexual, pansexual, or asexual. Differences within sexual minority groups may be partially explained by negative views and lack of participatory opportunities within sexual and gender minority communities (Scherrer, 2013), in addition to differential and discriminatory treatment from dominant members of society. There may also be issues related to increased identity concealment among less-defined groups (e.g., mostly heterosexual, mostly gay/lesbian), or potentially lower levels of connectedness or identity affirmation if there is less certainty or stability behind a currently held identity. Additionally, there may be greater misunderstanding and/or discrimination of emerging identities, such as pansexual (Belous & Bauman, 2017), who have not been included in public discourse as long as other sexual minority subgroups. For instance, in an analysis of callers to an LGBT-specific crisis line, pansexual youth were more likely than gay/lesbian youth to report using the service specifically for LGBT-affirming counselors (Goldbach, Rhoades, Green, Fulginiti, & Marshal, 2018). As such, there is a great need for counselors and other front-line workers to be knowledgeable and trained to work with sexual or gender minority individuals in an affirming manner in order to increase service utilization for at-risk populations.

Limitations

Findings from this study should be interpreted within the context of its limitations. While we had a large sample for this study, the screen had relatively low 23% participation rate. While this rate is consistent with other college student online screens or surveys (e.g., Lipson, Lattie, & Eisenberg, 2018) and low response rates in college student samples have been found to provide reliable estimates in large sample sizes (Fosnacht, Sarraf, Howe, & Peck, 2017), females were more likely to complete the screen than

males. Thus, it is unclear whether nonresponders differed systematically in other ways from participants, and how this bias might have affected results. The four participating universities were located in different parts of the United States, but were not nationally representative. The screen for this study used brief measures to assess depression and heavy alcohol use, which are not equivalent to clinical diagnoses, but have been shown in validation studies to correlate highly with their broader constructs. While a study strength was the use of an expanded set of sexual orientation labels, this study did not assess for other domains associated with sexual orientation and preferences, such as romantic/sexual attraction and sexual behaviors. Two individuals within the same orientation label may vary widely with regard to sexual attraction and behaviors, so a better understanding of attraction/behaviors may have improved our ability to specify risk among these groups. The assessment of sexual orientation is complicated by fluidity, as many individuals in our study endorsed multiple sexual orientation labels, and sexual orientation is not static (Savin-Williams & Ream, 2007). We examined subsets of gender minority students separately (i.e., transgender, genderqueer/nonbinary), but did not have information regarding gender dysphoria, stage of transition, hormone replacement, or other specifying factors that may influence differences in suicide risk among gender minorities. Lastly, this paper did not explore how sexual and gender minority membership might intersect with each other, as well as with age, race/ethnicity, and socioeconomic factors, relative to suicide risk factors.

CONCLUSIONS

Suicide is a major public health concern, and sexual and gender minority populations have higher prevalence of depression, suicidal ideation, and suicide attempts. In this study, we examined a broad range of sexual orientation labels, including mostly heterosexual, pansexual, queer, and mostly gay/lesbian, in relation to mental health and suicide risk among college students. Results indicated significant differences in suicide risk across sexual minority subgroups, suggesting both the importance of a more fine-tuned approach to the assessment of sexual orientation that has characterized previous studies with college students as well as the importance of prospective research to understand longitudinal trajectories of risk and resilience for these subgroups. Further, these findings have important implications for health professionals working with gender and/or sexual minority clients, both in regard to understanding differential risks for suicide, as well the significance for providing LGBTQ-affirming care.

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