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Title: Disparities in eating disorder risk and diagnosis among sexual minority college students:
Findings from the national Healthy Minds Study

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Abstract

Objective: To examine differences in eating disorder (ED) risk and diagnosis by sexual orientation in a national sample of college students. *Method:* Data from 178 U.S. colleges and universities participating in the Healthy Minds Study between 2016-2019 were analyzed (36,691 cisgender men, 81,730 cisgender women; 15.7% self-identifying as sexual minorities). Outcomes were ED risk (≥ 2 on the SCOFF) and self-reported lifetime ED diagnosis. Prevalence estimates adjusted for demographics and weight status were computed via logistic regression. *Results:* Higher proportions of questioning (29.1%), bisexual (26.3%), and gay men (30.9%) exhibited elevated risk than heterosexual men (14.3%), and a higher proportion of gay men exhibited elevated risk than bisexual men. Higher proportions of questioning (34.5%) and bisexual women (34.6%) exhibited elevated risk than heterosexual women (27.6%); proportions of lesbian (28.1%) and heterosexual women were similar. Among those with elevated risk, higher proportions of bisexual (5.0%) and gay men (7.1%) and of questioning (14.7%), bisexual (18.1%), and lesbian women (19.6%) had been diagnosed relative to heterosexual men (2.0%) and heterosexual women (10.3%), respectively. *Discussion:* Questioning and bisexual individuals appear to be particularly vulnerable; they may experience elevated ED risk relative to their heterosexual peers yet underdiagnosis relative to their gay or lesbian peers.

Keywords: Feeding and Eating Disorders; Sexual Orientation; Sexual and Gender Minorities; Diagnosis; Universities

Introduction

Eating disorders (EDs) affect 1-3% of young men and 6-15% of young women (Allen, Byrne, Oddy, & Crosby, 2013; Smink, van Hoeken, Oldehinkel, & Hoek, 2014; Stice, Marti, & Rohde, 2013), but ED risk may vary by sexual orientation. Two predominant approaches have been proposed to explain why sexual minorities (i.e., those who do not identify as heterosexual or who report same-gender attraction or sexual behavior) may experience differential ED risk. Sociocultural theories emphasize the importance of sexual minority community norms concerning appearance, and minority stress theory posits that sexual orientation-related discrimination, victimization, and self-stigma lead to disproportionate levels of stress in sexual minority groups, which contribute to elevated ED risk (Calzo, Blashill, Brown, & Argenal, 2017). Evidence indicates sexual minority males may experience more appearance pressures than their heterosexual peers (Fussner & Smith, 2015), while sexual minority females may not (Dotan, Bachner-Melman, & Dahlenburg, 2019). Therefore, a sociocultural perspective might predict elevated ED risk only in sexual minority males, whereas a minority stress perspective might predict elevated ED risk in both male and female sexual minorities.

In line with these theories, research consistently indicates that sexual minority males are at greater ED risk than heterosexual males (Calzo et al., 2017; Miller & Luk, 2019). Research among females, however, has been less consistent, with some studies finding higher ED risk among sexual minority females, some finding lower risk, and others finding no differences (Calzo et al., 2017; Miller & Luk, 2019). Inconsistencies may relate to assessment timing (e.g.,

adolescence versus young adulthood), as sexual minority females have been found to experience key milestones in their sexual orientation identity development later than sexual minority males (Katz-Wise et al., 2017), and ED risk may fluctuate with sexual orientation identity development stage (Austin et al., 2009; Miller & Luk, 2019). Conflicting evidence among females may also be reconciled by examining sexual minority subgroups (e.g., bisexual, lesbian) separately. While most existing research combines all sexual minorities into one group, the few studies which examine differences across subgroups find that, consistent with work in other areas of mental health (Taylor, 2017), women identifying as bisexual and “mostly heterosexual” may be particularly at risk for EDs (Dotan et al., 2019).

As untreated EDs can result in serious medical complications and psychosocial impairment (Hudson, Hiripi, Pope, & Kessler, 2007; Mitchell & Crow, 2006), ED identification and treatment is crucial. However, many individuals with EDs go undiagnosed (Hart, Granillo, Jorm, & Paxton, 2011), and important disparities in ED diagnosis among symptomatic individuals by characteristics such as sex and race/ethnicity have been documented (Sonneville & Lipson, 2018). While a recent study in a combined sample of men and women found no differences in ED diagnosis between sexual minority and heterosexual college students with symptoms of an ED (Sonneville & Lipson, 2018), no studies to our knowledge have examined whether differences in ED diagnosis exist among individuals exhibiting elevated ED risk by gender and sexual orientation subgroup.

The present study utilized a national sample of U.S. college students – largely comprised of young adults, an important population with regard to timing of sexual orientation identity development (Katz-Wise et al., 2017) and ED onset (Hudson et al., 2007) – to examine differences in ED risk by sexual orientation subgroup among men and women and elucidate sexual orientation differences in ED diagnosis among those with elevated risk. We expected elevated ED risk across subgroups among sexual minority men but more variation across subgroups among women, with bisexual women at greatest risk. Among men with elevated risk, we anticipated higher diagnosis rates in sexual minorities, whereas we anticipated lower diagnosis rates among sexual minority women with elevated risk.

Methods

Study Design

The Healthy Minds Study (HMS) is an annual, web-based survey about mental health in undergraduate and graduate student populations (Eisenberg & Lipson, 2019). The three most recent waves of data were used for the present study, collected from 178 U.S. colleges/universities between 2016-2019. For institutions that participated more than once across these waves ($n=13$), only data from the most recent wave were used. Institutional enrollment was voluntary. At larger institutions, a random 4,000-student sample was invited to participate; all students were invited at smaller institutions. Students were recruited via email and informed that regardless of participation, they were eligible to win one of ten \$100 or two \$500 gift cards.

Students had to be ≥ 18 years old to participate and provided informed consent. All research was approved by Institutional Review Boards at participating institutions.

Response rates were 23% in 2016-2017 and 2017-2018 and 16% in 2018-2019. To account for non-response bias, sample probability weights were constructed based on gender, race/ethnicity, academic level, and grade point average. Weights were larger for participants with underrepresented characteristics, ensuring estimates represented the full college student population in terms of these characteristics.

Measures

Sexual orientation. Participants self-identified as heterosexual, questioning, bisexual, gay, or lesbian in response to, “How would you describe your sexual orientation?”.

ED risk. ED risk was assessed with the five-item SCOFF (Morgan, Reid, & Lacey, 1999). The cut-off for a positive screen (i.e., being at risk for an ED) was ≥ 2 affirmative responses, which has been determined to yield the optimal trade-off between sensitivity and specificity (Mond et al., 2008).

ED diagnosis. Participants self-reported lifetime ED diagnosis by selecting *eating disorder* (e.g., *anorexia nervosa*, *bulimia nervosa*) in response to, “Have you ever been diagnosed with any of the following conditions by a health professional?”.

Covariates. Participants self-reported their age, degree level, parental educational attainment, race/ethnicity, height, and weight. Body mass index (kg/m^2) was calculated from self-reported height and weight.

Participants

The analytic sample includes 118,421 cisgender men and women (i.e., those reporting concordant gender identity and sex assigned at birth), 17,933 of whom were sexual minorities. Transgender men ($n=692$), transgender women ($n=292$), and genderqueer/gender non-conforming students ($n=1,734$) were not included due to inadequate statistical power to examine sexual orientation differences in these groups. Also not included were students missing data on gender identity ($n=1,118$), sexual orientation ($n=3,863$), or ED risk ($n=505$). Sample characteristics are reported in Table 1.

Statistical Analysis

Analyses were conducted in Stata 16.0 using robust standard errors and incorporating sample probability weights to account for non-response. Gender-stratified logistic regression models tested associations of sexual orientation with (a) ED risk in the full sample and (b) lifetime ED diagnosis among participants with elevated risk. Models were adjusted for age, degree level, parental education, race/ethnicity, and weight status to account for potential confounding, as these covariates have previously demonstrated associations with sexual orientation (Laska et al., 2015), ED risk (Lipson & Sonnevile, 2017), and ED diagnosis (Sonneville & Lipson, 2018). Data on covariates were missing at rates of <1%-3% and were multiply imputed with 20 replications using the fully conditional specification method. Logistic regression results were pooled across replications and used to compute adjusted prevalence estimates of each outcome with marginal standardization via `mimrgns` (Muller & Maclehorse,

2014). In sensitivity analyses, models predicting ED diagnosis among at-risk participants were additionally adjusted for SCOFF sum score (possible range among those at risk: 2-5).

Results

Adjusted prevalence estimates of elevated ED risk and, among those with elevated risk, having ever received an ED diagnosis are presented by gender and sexual orientation in Figure 1. Multivariable results are reported in Tables S1 and S2 (available online).

Elevated ED Risk

Men identifying as questioning (odds ratio [OR]=2.57; 95% confidence interval [CI]: 1.88-3.51), bisexual (OR=2.22; 95% CI: 1.84-2.67), and gay (OR=2.82; 95% CI: 2.45-3.25) had greater odds of a positive SCOFF than heterosexual men, and gay men had greater odds of a positive SCOFF than bisexual men (OR=1.27; 95% CI: 1.02-1.60). Women identifying as questioning (OR=1.39; 95% CI: 1.24-1.56) and bisexual (OR=1.40; 95% CI: 1.31-1.50) had greater odds of a positive SCOFF than heterosexual women, while lesbian women had similar odds of a positive SCOFF as heterosexual women (OR=1.03; 95% CI: 0.89-1.18). Women identifying as questioning (OR=1.36; 95% CI: 1.14-1.62) and bisexual (OR=1.36; 95% CI: 1.17-1.58) also had greater odds of a positive SCOFF than lesbian women. Differences between sexual minority students and heterosexual students were more pronounced among men than women, as evidenced by non-overlapping odds ratio confidence intervals across genders.

ED Diagnosis Among Those With Elevated Risk

Among men with a positive SCOFF, men identifying as bisexual (OR=2.61; 95% CI: 1.32-5.15) and gay (OR=3.83; 95% CI: 1.88-7.79) had greater odds of a lifetime ED diagnosis than heterosexual men. Among women with a positive SCOFF, women identifying as questioning (OR=1.52; 95% CI: 1.13-2.06), bisexual (OR=1.97; 95% CI: 1.69-2.29), and lesbian (OR=2.18; 95% CI: 1.59-2.99) had greater odds of a lifetime ED diagnosis than heterosexual women. Differences between sexual minority subgroups were not statistically significant but demonstrated a consistent pattern across genders, such that the proportion having received a diagnosis was greater for gay men (7.1%) compared with bisexual (5.0%) and questioning men (4.6%) and for lesbian women (19.6%) compared with bisexual (18.1%) and questioning women (14.7%). No results changed substantially after additionally adjusting for SCOFF sum score.

Discussion

In this national sample of U.S. college students, questioning, bisexual, and gay men had over twice the odds of elevated ED risk compared with heterosexual men, and gay men were more likely to exhibit elevated risk than bisexual men. Women identifying as questioning and bisexual had about 1.4 times the odds of elevated ED risk than heterosexual women, while lesbian women and heterosexual women had similar odds of elevated risk. Consistent with our hypothesis for men but counter to our hypothesis for women, we found that among both men and women at elevated risk for an ED, sexual minorities overall were more likely to have received an ED diagnosis than their heterosexual peers. However, a consistent trend across genders emerged, such that gay men and lesbian women with elevated ED risk were most likely within their

respective genders to have received a diagnosis, followed by their bisexual, questioning, and then heterosexual peers (see Figure 1). Therefore, questioning and bisexual men and women may be somewhat less likely to receive a diagnosis than their gay/lesbian peers with equivalent risk severity.

With regard to sexual orientation differences in ED risk, our results are generally consistent with prior research in males finding sexual minority males to be at elevated risk (Calzo et al., 2017; Miller & Luk, 2019). Our results for ED risk among women may help reconcile inconsistencies in prior research (Calzo et al., 2017; Miller & Luk, 2019), as we found questioning and bisexual women, but not lesbian women, to be at greater risk than heterosexual women. These results are consistent with previous studies that have examined ED risk across sexual minority subgroups separately (Dotan et al., 2019). Elevated risk in questioning men and women may be explained, in part, by challenges related to sexual orientation identity development and its associated stress (Miller & Luk, 2019). Potential explanations for increased risk in bisexual men and women include bisexual-specific minority stressors, such as biphobia (i.e., discrimination toward bisexual people, which can emerge from within heterosexual and gay/lesbian communities) and bisexual invisibility (i.e., questioning or denying the legitimacy of bisexuality; Taylor, 2017), while sociocultural and minority stress theories may help explain elevated risk among gay men (Calzo et al., 2017).

Our results indicating greater likelihood of ED diagnosis among sexual minorities with elevated ED risk compared with their heterosexual peers aligns with prior evidence showing that

sexual minorities, particularly those who identify as gay or lesbian, are more likely to utilize mental health services than their heterosexual peers (Eisenberg, Hunt, Speer, & Zivin, 2011). Our findings with regard to ED risk and diagnosis complement recent findings indicating elevated rates of ED diagnoses among bisexual and lesbian women (Simone, Askew, Lust, Eisenberg, & Pisetsky, 2020); our results suggest elevated ED diagnosis rates in lesbian women may reflect differences in mental health service utilization rather than differences in ED risk.

Important limitations to the present study must be noted. ED risk and diagnosis were assessed via brief, self-report measures, and diagnoses other than anorexia nervosa and bulimia nervosa may have been underrepresented due to how ED diagnosis was assessed. Further, it is not known whether the diagnostic accuracy of the SCOFF is comparable across sexual orientation groups. Additionally, institutions were not randomly selected but rather elected to participate. Response rates were low, and although sample probability weights accounted for non-response based on known characteristics, differences may exist between responders and non-responders on unobserved characteristics. Finally, the sample was limited to cisgender participants due to inadequate statistical power to examine sexual orientation differences among gender minorities, highlighting the need to routinely collect sexual orientation and gender identity data in large samples in order to study EDs in these marginalized groups.

Results of this study indicate elevated ED risk among sexual minority men and women on college campuses, with particularly pronounced disparities among men. Findings identify questioning and bisexual men and women as subgroups that may be particularly vulnerable, as

they may be subject to elevated ED risk relative to their heterosexual peers yet underdiagnosis relative to their gay/lesbian peers. Therefore, both males and females – especially those identifying as questioning and bisexual – should be considered when developing interventions aimed to reduce ED disparities by sexual orientation.

Data Availability Statement: The data that support the findings of this study are available upon request from the Healthy Minds research team. Please visit

<https://healthymindsnetwork.org/research/data-for-researchers/> for more information.

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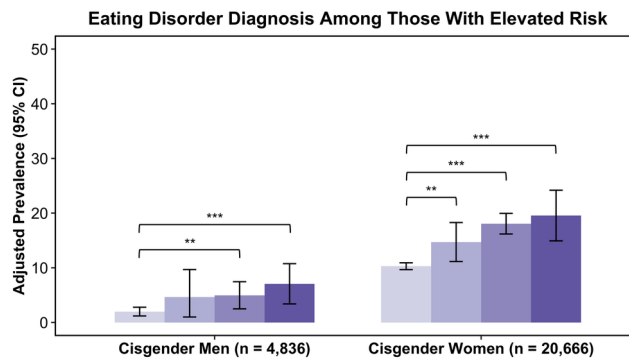
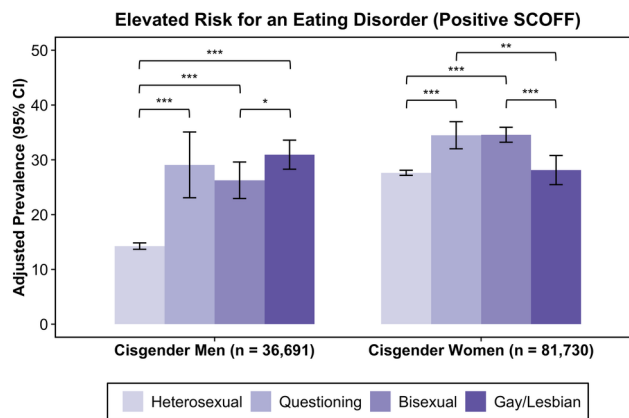
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Table 1. Sample characteristics by gender

	Cisgender Men (<i>n</i> = 36,691)	Cisgender Women (<i>n</i> = 81,730)
	<i>n</i> (%)	
Sexual orientation		
Heterosexual	32,199 (87.7)	68,289 (81.9)
Questioning	532 (1.6)	2,409 (3.2)
Bisexual	1,549 (4.5)	8,956 (12.2)
Gay/lesbian	2,411 (6.2)	2,076 (2.8)
Age		
18-22 years	22,881 (66.5)	54,412 (67.6)
23-25 years	5,233 (12.6)	10,811 (11.9)
26-30 years	4,526 (9.7)	8,249 (9.0)
31+ years	4,050 (11.2)	8,258 (11.6)
Degree level		
Undergraduate	26,680 (83.4)	61,447 (83.1)
Graduate	9,057 (16.7)	18,140 (16.9)
First-generation college student		
No	25,402 (65.4)	53,018 (60.1)
Yes	10,956 (34.6)	28,199 (39.9)
Race/ethnicity		
Non-Hispanic white	23,462 (64.2)	53,367 (63.6)
Non-Hispanic black	2,087 (8.3)	5,724 (9.3)
Hispanic/Latinx	3,517 (9.6)	8,321 (11.1)
Asian	5,496 (12.2)	10,625 (11.5)
Other	2,059 (5.6)	3,596 (4.6)
Weight status		
BMI < 18.5	1,336 (3.9)	4,277 (5.3)
BMI = 18.5 - 24.9	19,148 (49.6)	47,073 (54.1)
BMI ≥ 25.0	15,960 (46.5)	29,597 (40.6)
Elevated eating disorder risk (positive SCOFF)	5,597 (16.1)	22,976 (28.7)
Lifetime eating disorder diagnosis	219 (0.7)	3,620 (4.8)

Note. BMI = body mass index; first-generation college student indicates that neither parent has a bachelor's degree. Frequencies represent observed counts; percentages are weighted to account for non-response.