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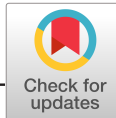
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Examining day hospital treatment outcomes for sexual minority patients with eating disorders

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Abstract

Objective: Epidemiological data support that sexual minorities (SM) report higher levels of eating pathology. Theories suggest these disparities exist due to stressors specific to belonging to a minority group; however, few studies have specifically explored differences between SM and heterosexual individuals in clinical eating disorder samples. Thus, the present study compared SM and heterosexual patients with eating disorders on demographic characteristics and eating disorder and psychological outcomes during day hospital treatment.

Method: Patients ($N = 389$) completed surveys of eating pathology, mood, anxiety, and skills use at treatment admission, 1-month post-admission, discharge, and 6-month follow-up. Overall, 19.8% of patients ($n = 79$) identified as SM, while 8.0% ($n = 32$) reported not identifying with any sexual orientation. SM were more likely to present across genders (17.7% of females, 24.2% of males, 33.3% of transgender patients, and 87.5% of nonbinary patients).

Results: SM patients were significantly more likely to endorse major depressive disorder, panic disorder, and self-harm at admission than their heterosexual counterparts. Multilevel models demonstrated that across time, SM patients demonstrated greater eating pathology, emotion dysregulation, depressive symptoms, and anxiety symptoms. Significant interactions between sexual orientation and time were found for eating pathology and emotion dysregulation, such that although SM patients started treatment with higher scores, they improved at a faster rate compared to heterosexual patients.

Discussion: Consistent with minority stress theory, SM patients report greater overall eating disorder and comorbid symptoms. Importantly, results do not support that there appear to be significant disparities in treatment outcome for SM patients in this sample of day hospital patients.

KEYWORDS

day hospital, eating disorders, minority stress, sexual orientation, treatment outcome

1 | INTRODUCTION

Historically, eating disorders (EDs) and related issues have been considered unique to straight, young, white women which has resulted in a limited scope of research and intervention efforts (Grabe, Ward, &

Hyde, 2008; Hoek & Van Hoeken, 2003; Mitchison, Hay, Slewa-Younan, & Mond, 2014). In recent decades, the field has recognized that EDs affect individuals across demographic categories including diverse races and ethnicities (Franko, 2007; Marques et al., 2011), socioeconomic backgrounds (Gard & Freeman, 1996), genders

(Lavender, Brown, & Murray, 2017), and across the lifespan (Brandsma, 2007). While EDs can occur in all individuals, certain groups are at an elevated risk. Sexual minorities (SM) have been identified as one group disproportionately and uniquely affected by EDs (Calzo, Blashill, Brown, & Argenal, 2017; Meneguzzo et al., 2018). Although effective treatments have been developed, EDs remain difficult to treat and are associated with serious psychosocial and medical sequelae, as well as high mortality rates (Keel & Brown, 2010; Khalsa, Portnoff, McCurdy-McKinnon, & Feusner, 2017). As ED treatments were developed largely for straight females, it is critical to examine treatment effectiveness among SM and other diverse groups to better inform future research and intervention efforts.

Across studies there is variability in the precise definition of SMs; however, the term generally includes individuals who do not identify as heterosexual (e.g., gay, lesbian, bisexual, queer), individuals who report attractions to people of the same or multiple genders, and individuals who report engaging in sexual contact with people of the same or multiple genders (Copen, Chandra, & Febo-Vazquez, 2016). Estimating the number of individuals who identify as a SM is challenging for a variety of reasons, including sampling issues, measurement confounds, and socio-political constraints related to stigmatization and homophobia. Consequently, estimates in the general population have ranged widely from 1% to 10% (Seidman & Rieder, 1994; Spiegelhalter, 2015). Recent estimates from one of the largest and most representative samples of LGBT individuals supports that 4.1% of adult Americans identify as SM (Gates, 2017). Another recent study conducted by Copen et al. (2016) suggests that rates may be even higher. When surveying individuals aged 18–44, 10.7% identified as SM (6.8% of women and 3.9% of men said they were “homosexual, gay, lesbian, or bisexual”; and 0.9% of women and 1.0% of men said, “do not know” or “refused” to answer).

Although SM still constitute a relatively small proportion of the general population, demographic trends suggest that more people are identifying as SM (Copen et al., 2016; Gates, 2017). Moreover, research has identified that beyond EDs, individuals identifying as SM are at disproportionately higher risk than their heterosexual peers for numerous mental health issues, including: major depressive disorder, anxiety and related disorders, alcohol and substance abuse, abuse history/trauma, self-harm, and suicidality (Cochran, Sullivan, & Mays, 2003; Cohen, Blasey, Barr Taylor, Weiss, & Newman, 2016; Goldbach, Tanner-Smith, Bagwell, & Dunlap, 2014; King et al., 2008; Mensinger, Granche, Cox, & Henretty, 2020; Ming, Lin Miao Shan, Kuek Shu Cen, Lian, & Boon Swee Kim, 2014). Specific to EDs, data consistently suggest that SM males have higher rates of ED diagnoses than their heterosexual counterparts. In both community and clinical studies of men, those who identified as gay or bisexual accounted for higher proportions of diagnosed ED cases (Bankoff, Richards, Bartlett, Wolf, & Mitchell, 2016; Carlat, Camargo Jr., & Herzog, 1997; Ming et al., 2014). Consequently, some researchers have described SM status as a specific risk factor for body image and eating-related issues among men (Hospers & Jansen, 2005; Russell & Keel, 2002). Research examining EDs among SM females has yielded more mixed findings. Early studies suggested SM women have comparable rates of EDs compared to their heterosexual peers (Feldman & Meyer, 2007), or that SM status may even

serve as a protective factor among women in the development of EDs and related issues (Conner, Johnson, & Grogan, 2004; Moore & Keel, 2003). However, a review by Meneguzzo et al. (2018) found that SM women may be more vulnerable to ED psychopathology than their heterosexual counterparts as well. A more recent review by Calzo et al. (2017) found that ED disparities were more pronounced among SM men than SM women; however, they also noted that overall SM populations are at greater risk than their heterosexual peers for disordered eating behaviors, particularly unhealthy weight control behaviors (e.g., purging, laxatives, diet pill use).

Several theoretical models exist to explain the disparities in rates and presentations of disordered eating and other psychopathology among SM populations. Minority stress theory (Meyer, 2003) represents one framework for understanding various mental health disparities among SM, including EDs. Broadly, minority stress theory suggests that SM individuals may be at increased risk for both EDs and other mental health problems (e.g., depression and anxiety-related disorders) due to stress-induced responses to discrimination, externalized and internalized homophobia, as well as sexual orientation-related stigma and acceptance issues (Feldman & Meyer, 2007; Mayock, Bryan, Carr, & Kitching, 2008; Russell & Fish, 2016). More specific to eating pathology, sociocultural viewpoints generally theorize SM develop EDs and body image concerns due to SM community norms emphasizing and overvaluing appearance and body ideals, particularly for SM men (Feldman & Meyer, 2007; Tylka & Andorka, 2012).

Although research has demonstrated that individuals identifying as SM are at higher risk for developing an ED and theoretical models exist to better understand these disparities, few studies have actually explored differences between SM and heterosexual individuals with clinical EDs. While SM men are more likely to present in treatment-seeking ED samples (Carlat et al., 1997; Ming et al., 2014), limited research has examined whether SM women are more or less likely to present for ED treatment. However, a recent analysis of 2,818 individuals who received treatment at an ED center in the United States found that 471 (17%) identified as an SM (Mensinger et al., 2020). Within this sample of treatment-seeking SMs, 443 (94%) identified as female and 28 (6%) identified as male. An additional 189 individuals (94% female; 10% male) were unsure if they identified as a sexual or gender minority. When viewing ED treatment data in the context of demographic trends (e.g., Copen et al., 2016; Gates, 2017) SM individuals present for ED treatment at relatively higher rates than their heterosexual counterparts, with SM females accounting for approximately 16.64% and SM men accounting for 18.54% of cases.

While little data have examined the intersectionality of sexual and gender minorities, research suggests that SM are overrepresented in gender minority populations as well and this group tends to exhibit increased eating pathology risk (Diemer, Grant, Munn-Chernoff, Patterson, & Duncan, 2015). Importantly, to date, only one recent study has examined whether outcomes for SM patients with EDs differ from their heterosexual counterparts. Mensinger et al. (2020) found that SM ED patients had higher levels of eating pathology compared to heterosexual patients at admission to treatment, but improved at a faster rate, to the point that eating pathology did not

differ between groups at treatment discharge. These results suggest that outcomes may not significantly differ between SM and heterosexual ED patients. However, it is unclear if that pattern extends beyond discharge from treatment and whether this pattern differs for broader mental health outcomes. A better understanding of potential disparities in outcome may suggest the need to develop specific ED interventions for individuals identifying as SM.

Accordingly, the current study sought to: (a) ascertain the proportion of patients identifying as SM in a treatment-seeking sample of EDs; (b) compare SM and heterosexual individuals on patterns of comorbidity at admission; and (c) compare treatment outcomes for SM and heterosexual patients on ED symptomatology and broader mental health outcomes (depression, anxiety, emotion dysregulation, and skills acquisition) at treatment admission, 1-month post-admission, discharge, and 6-month follow-up. We hypothesized that a larger percentage of males and gender minority patients would endorse identifying as a SM and that SM patients would be more likely to meet criteria for mood, trauma, substance use disorders, and have higher rates of suicidality and self-harm. Regarding outcomes, based on previous research, we hypothesized that SM patients would report higher admission levels for eating pathology and broader mental health outcomes, but that few differences would emerge between SM and heterosexual patients by treatment follow-up.

2 | METHOD

2.1 | Participants and procedures

Participants for the present study were 398 adolescent and adult patients with primary ED diagnoses ($n = 351$ female, $n = 33$ male, $n = 6$ transmasculine/trans male, $n = 8$ gender nonconfirming/non-binary) who were admitted for at least 1 month to a university-based PHP between 2016 and 2019. ED and comorbid diagnoses were determined using the Structured Clinical Interview for DSM-5 Disorders (SCID-5; First, Williams, Karg, & Spitzer, 2015) administered by trained, bachelor's-level research assistants. Suicidality risk and current self-harm behaviors were assessed via the Mini Neuropsychiatric Interview (MINI; Sheehan et al., 2015).

Informed consent was obtained from all participants included in the study before completing online self-report surveys within 14 days of admission, one-month post-admission, discharge, and 6-month follow-up. Regarding retention, 75.6% ($n = 301$) completed one-month assessments, 79.9% ($n = 318$) completed discharge assessments, and 42.7% ($n = 170$) completed 6-month follow-up assessments. All study procedures were approved by the local Institutional Review Board.

2.2 | Program overview

Consistent with APA guidelines, the ED program included individual, family, and group therapy, medication management, meal support, and dietary consultation. Upon admission to PHP, patients attended

treatment for 10 hours per day, 6 days per week. As symptoms improved, patients stepped down to intensive outpatient programming before discharging to regular outpatient care. Programming was designed based on the dialectical behavior therapy (DBT) model and guidelines for severe and complex EDs (Wisniewski, Safer, & Chen, 2007) and offered all elements of standard DBT, including DBT skills groups, individual therapy, phone coaching, and DBT consultation teams (see Brown et al., 2018 for more details). Adolescent programming used a blended family-based therapy (FBT)-DBT approach (see Reilly et al., 2020 for more details). In addition to DBT/FBT-based programming, patients ate three meals and two snacks per day in program and participated in two to three other ED-related groups per day. The average length of stay in treatment was 94.96 days ($SD = 47.02$; range = 28–444) and did not differ by sexual orientation ($p = .75$).

2.3 | Measures

2.3.1 | Sexual orientation identity

Sexual orientation identity was assessed dimensionally using an 8-point scale adapted from Kinsey, Pomeroy, and Martin (1948) with wording adjustments from Klein, Sepekoff, and Wolf (1985) (1 = I do not identify with any sexual orientation; 2 = Exclusively gay; 3 = Mostly gay; 4 = More gay; 5 = Equally gay and straight; 6 = More straight; 7 = Mostly straight; 8 = Exclusively straight). This measure has been used in previous ED studies (Brown, Forney, Pinner, & Keel, 2017; Brown & Keel, 2015). Individuals who identified as “exclusively gay” to “more straight” were classified as sexual minorities (Klein et al., 1985).

2.3.2 | Gender identity

Gender identity was assessed via self-reported gender identity at admission, consistent with recommendations by the GenIUSS group (2015), with response options: “male,” “female,” “trans male or transmasculine,” “trans female or transfeminine,” “genderqueer/gender non-conforming/gender non-binary,” or “different identity (please state).”

2.3.3 | ED symptomatology

The Eating Disorder Examination—Question (EDE-Q; Fairburn & Beglin, 1994, 2008) is a well-established 28-item self-report questionnaire. The EDE-Q Global score was used to reflect ED symptomatology. Internal consistency within the present sample was excellent across time (SM $\alpha = .95-.97$; heterosexual: $\alpha = .97$).

2.3.4 | Depression

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item, well-validated self-report questionnaire

used to evaluate the severity of depressive symptoms. Internal consistency within the present sample was excellent across time (SM $\alpha = .93-.94$; heterosexual: $\alpha = .93-.96$).

2.3.5 | Anxiety

The State-Trait Anxiety Inventory-Trait Subscale (STAI-T; Spielberger, Gorsuch, & Lushene, 1970) is a 20-item self-report measure that assesses trait anxiety. Internal consistency within the present sample was good across time (SM $\alpha = .89-.92$; heterosexual: $\alpha = .89-.92$).

2.3.6 | Emotion dysregulation

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure that assesses emotion dysregulation. The DERS total score assesses global emotion dysregulation across six domains: nonacceptance of emotional responses, difficulties engaging in goal directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Higher scores on the DERS indicate greater difficulties with emotion regulation. The DERS has demonstrated solid psychometric properties (Gratz & Roemer, 2004) and the internal consistency across subscales over time in this sample was excellent (SM $\alpha = .95-.96$; heterosexual: $\alpha = .94-.96$).

2.3.7 | DBT skill use

The DBT Ways of Coping Checklist-DBT Skills Subscale (DBT-WCCL DSS; Neacsiu, Rizvi, & Linehan, 2010) includes 38 items assessing the self-reported frequency of DBT skills use (DBT Skills Subscale) over the last month. The present study used the DBT Skills Subscale as a proxy for DBT-consistent skillful behavior. Previous research supports that the DBT-WCCL demonstrates adequate test-retest reliability, excellent internal consistency, and sensitivity to changes following DBT skills training (Neacsiu, Rizvi, Vitaliano, et al., 2010). Internal consistency in the present study was excellent across time (SM $\alpha = .91-.95$; heterosexual: $\alpha = .92-.96$).

2.4 | Statistical analyses

Data were first examined for missingness. Little's MCAR test was not significant, $X^2(841) = 832.37$, $p = .58$, suggesting that data were missing completely at random (MCAR). Consistent with this, participants with missing data did not differ from participants without missing data at discharge and follow-up on sexual orientation, gender, diagnosis, age, length of stay, length of illness, body mass index at admission or discharge, or admission levels of eating pathology and comorbid symptoms (all p values $>.05$).

Chi-square analyses were run to examine admission differences in categorical variables by sexual orientation and t-tests were run to examine differences in continuous variables by sexual orientation. Data were not imputed for these descriptive analyses and the alpha level was set at a more conservative $p = .01$ to account for the number of tests.

Multilevel models were run using the Mixed Models module of the Statistical Package for the Social Sciences (SPSS, Version 26) to examine changes in ED and related psychopathology between sexual orientation over time (admission, 1-month post-admission, discharge, 6-month follow-up). Within-person changes in ED or related psychopathology were modeled at Level 1, and sexual orientation and the interaction between sexual orientation and time were modeled at Level 2. Random intercept, fixed slopes models were fit to the data, linear distributions were specified for dependent variables, and an identity covariance matrix and full information maximum likelihood (FIML) was used as an estimator and to account for missing data (Schafer & Graham, 2002). Previous research has demonstrated that FIML yields unbiased estimates when data are MCAR or MAR (Enders, 2011; Schafer & Graham, 2002) and can provide unbiased estimates for large amounts of missing data (e.g., up to 75%; Schafer & Graham, 2002). The alpha level was set at $p = .05$.

3 | RESULTS

3.1 | Admission demographics and comorbidities by sexual orientation

Table 1 compares demographic data by sexual orientation. Overall, 19.8% ($n = 79/398$) of patients were classified as SM. Notably, over half of those who identified as SM (66%) reported being "more straight" or "equally gay and straight." Further, 8.0% ($n = 32/398$) reported not identifying with any sexual orientation. Of note, individuals not identifying with any orientation were not included in analyses reported below. Individuals identifying as sexual minorities represented 17.66% of females ($n = 62/351$), 24.24% of males ($n = 8/33$), 33.33% of transmasculine ($n = 2/6$), and 87.5% of nonbinary ($n = 7/8$) individuals. ED diagnosis, race, and ethnicity did not differ by sexual orientation (p values $>.28$). Most of the sample identified as non-Hispanic ($n = 326/398$, 81.9%), White ($n = 333/398$, 83.7%). Regarding ED behaviors, SM patients were more likely to be diagnosed with current major depressive disorder and panic disorder. SM individuals were also more likely to endorse current self-harm behaviors (SM = 22.2%, $n = 16/72$, heterosexual = 8.9%, $n = 24/269$) during the clinical interview ($X^2[1] = 9.70$, $p = .002$, Cramer's $V = 0.17$). No other significant differences were found between groups.

Sensitivity analyses were run classifying anyone who did not identify as "exclusively heterosexual" as SM. The pattern of results remained unchanged. Sensitivity analyses were also run excluding transmasculine/non-binary folks and results were largely unchanged, with the exception that SM individuals reported higher BMIs than non-SM individuals ($p = .008$).

TABLE 1 Admission demographics across diagnoses

	Non-SM (n = 287) M(SD)/n(%)	SM (n = 79) M(SD)/n(%)	F/ χ^2	p	d/V
Age	22.06 (8.80)	20.86 (8.08)	1.19	.28	0.14
BMI	19.74 (4.04)	20.97 (4.56)	5.30	.02	0.29
Gender			27.69	<.001	0.28
Female	260 (90.6%)	62 (78.5%)			
Male	24 (8.4%)	8 (10.1%)			
Transmasculine/trans male	3 (1.0%)	2 (2.5%)			
Gender non-conforming/non-binary	0 (0.0%)	7 (8.9%)			
Sexual orientation			—	—	
Exclusively gay	—	13 (16.5%)			
Mostly gay	—	9 (11.4%)			
More gay	—	5 (6.3%)			
Equally gay & Straight	—	29 (36.7%)			
More straight	—	23 (29.1%)			
Mostly straight	60 (20.9%)	—			
Exclusively straight	227 (79.1%)	—			
ED diagnosis			5.07	.28	0.12
Anorexia nervosa – Restricting	121 (42.2%)	26 (33.9%)			
Anorexia nervosa—Binge—purge	41 (14.3%)	12 (15.2%)			
Bulimia nervosa	51 (17.8%)	20 (25.3%)			
Avoidant restrictive food intake disorder	17 (5.9%)	2 (2.5%)			
Other specified feeding or ED	57 (19.8%)	19 (24.1%)			
ED behaviors					
Objective binge episodes	72 (26.8%)	27 (37.5%)	3.18	.08	0.10
Self-induced vomiting	99 (36.8%)	37 (51.4%)	5.04	.03	0.12
Laxatives	27 (10.0%)	11 (15.3%)	1.58	.21	0.07
Diuretics	3 (1.1%)	2 (9.7%)	1.09	.30	0.06
SCID major depressive disorder	79 (30.3%)	35 (50.0%)	9.52	.002	0.17
SCID bipolar I disorder	12 (4.6%)	6 (8.8%)	1.86	.17	0.08
MINI suicidality			10.12	.02	0.18
High risk	55 (21.1%)	27 (38.6%)			
Moderate risk	26 (10.0%)	8 (11.4%)			
Low risk	68 (26.1%)	12 (17.1%)			
No suicidality risk	112 (42.9%)	23 (32.9%)			
SCID panic disorder	22 (8.5%)	14 (20.3%)	7.83	.005	0.15
SCID social anxiety disorder	69 (26.4%)	26 (37.7%)	3.37	.07	0.10
SCID generalized anxiety disorder	67 (25.7%)	21 (30.4%)	0.63	.43	0.04
SCID obsessive compulsive disorder	29 (11.1%)	10 (14.5%)	0.60	.44	0.04
SCID posttraumatic stress disorder	34 (13.0%)	14 (20.0%)	2.17	.14	0.08
SCID alcohol use disorder	32 (12.3%)	9 (12.9%)	0.02	.89	0.01
SCID substance use disorder	39 (14.9%)	16 (23.19%)	2.67	.10	0.09

Note: Italicized results indicated significant differences between groups at $p < .01$.

Abbreviations: d, Cohen's d (small = 0.20, medium = 0.50, large = 0.80); V, Cramer's V (small = 0.10, medium = 0.30, large = 0.50); AN-R, anorexia nervosa—restricting subtype; AN-BP, anorexia nervosa—binge/purge subtype; BN, bulimia nervosa; BMI, body mass index; MINI, Mini Neuropsychiatric Interview; SCID, Structured Clinical Interview for DSM-5 Disorders; SM, sexual minority.

3.2 | Changes in ED psychopathology and broader mental health outcomes over time

Tables 2 and 3 present estimated marginal means and results from multilevel models over time between SM and heterosexual patients. Regarding the multilevel model for eating pathology, there was a main effect of time, indicating that on average, patient's eating pathology decreased significantly over time, and a main effect of sexual orientation, such that SM patients generally had higher eating pathology scores compared to heterosexual patients. Importantly, there was also a significant sexual orientation by time interaction, suggesting that although SM patients started out with higher eating pathology scores compared to heterosexual patients, they demonstrated a significantly faster rate of improvement in eating pathology scores over time. Specifically, SM patients demonstrated significantly higher eating pathology scores, of a small effect size, at treatment admission compared to heterosexual patients ($p = .04$), but their scores at 1-month, discharge, and 6-month follow-up did not differ (all p values $> .17$).

Regarding non-ED outcomes, for the model of depression, there was a main effect of time, suggesting that on average, patient's depression scores decreased significantly over time. There was also a main effect of sexual orientation, of a small effect size, such that SM patients generally had higher depression scores compared to heterosexual patients. However, there was no significant sexual orientation by time interaction, indicating that the trajectory of depression symptom change did not significantly differ by sexual orientation. Regarding anxiety symptoms, there was a main effect of time and a main effect of sexual orientation. However, there was not a significant interaction between sexual orientation and time on anxiety symptoms. For the model of emotion dysregulation, as with previous models, there was a main effect of time and a main effect of sexual orientation. Further, there was a significant sexual orientation by time interaction, suggesting that SM patients had a significantly faster rate of improvement in emotion dysregulation scores through 6-month follow-up. Notably, SM patients demonstrated significantly higher emotion dysregulation scores, of small to medium effect size, at treatment admission, 1-month, and discharge (p values $< .04$), however, their scores no longer differed from heterosexual patients at 6-month follow-up (all p values = $.34$). Regarding DBT skills use, there was a main effect of time, such that across patients, DBT skills use improved over time, however, there was neither a significant main effect of sexual orientation or a significant interaction between sexual orientation and time on skills use.

Of note, the pattern of results for sensitivity analyses for sexual orientation group were comparable for BDI-II and WCCL scores, and generally comparable for DERS and STAI-Trait scores, with the exception that DERS scores were not significantly different between groups at discharge ($p = .20$), and STAI-Trait scores were not significantly different at discharge ($p = .12$) or follow-up ($p = .35$). For EDE-Q scores, there was neither a significant main effect of sexual orientation ($p = .54$) nor a significant interaction between sexual orientation and time ($p = .13$). Sensitivity analyses for transgender/gender non-binary folks supported results were unchanged, with two exceptions. SM

TABLE 2 Estimated marginal means for outcome variables at each time point by sexual orientation

	Admission, M (SE)		One-month, M (SE)		Discharge, M (SE)		6-month follow-up, M (SE)									
	Non-SM	SM	Non-SM	SM	Non-SM	SM	Non-SM	SM								
EDE-Q Global	3.38 (0.09)	3.78 (0.18)	-0.26	-0.51, -0.01	2.85 (0.08)	3.09 (0.16)	-0.17	-0.42, 0.07	2.32 (0.09)	2.40 (0.17)	-0.05	-0.30, 0.20	1.79 (0.10)	1.70 (0.19)	0.05	-0.20, 0.30
BDI-II	28.61 (0.91)	34.29 (1.63)	-0.37	-0.62, -0.12	23.83 (0.79)	28.19 (1.44)	-0.33	-0.58, -0.08	19.04 (0.82)	22.09 (1.51)	-0.22	-0.47, 0.03	14.26 (0.98)	15.98 (1.80)	-0.10	-0.35, 0.14
STAI-Trait	57.87 (0.66)	61.42 (1.25)	-0.32	-0.57, -0.07	54.35 (0.58)	57.90 (1.11)	-0.36	-0.61, -0.11	50.83 (0.61)	54.38 (1.17)	-0.34	-0.59, -0.09	47.31 (0.73)	50.85 (1.39)	-0.29	-0.54, -0.04
DERS	110.71 (1.60)	122.82 (3.03)	-0.45	-0.70, -0.20	103.10 (1.41)	112.41 (2.68)	-0.39	-0.64, -0.14	95.49 (1.49)	102.01 (2.85)	-0.26	-0.51, -0.01	87.88 (1.81)	91.60 (3.47)	-0.12	-0.37, 0.13
DBT-WCCL	1.58 (0.04)	1.50 (0.07)	0.12	-0.13, 0.37	1.69 (0.03)	1.64 (0.06)	0.10	-0.15, 0.35	1.79 (0.03)	1.79 (0.07)	0.00	-0.25, 0.25	1.90 (0.04)	1.93 (0.08)	-0.04	-0.29, 0.21

Note: Cohen's d effect sizes calculated between groups (small = 0.20, medium = 0.50, large = 0.80).

Abbreviations: CI, 95% confidence interval (lower, upper); BDI-II, Beck Depression Inventory-II; DERS, Difficulties in Emotion Regulation Scale; DBT-WCCL, DBT Ways of Coping Checklist—DBT Skills Subscale; EDE-Q, Eating Disorder Examination—Questionnaire; SM, sexual minority; STAI-Trait, State-Trait Anxiety Inventory—Trait subscale.

TABLE 3 HLM estimates for fixed effects and variance components for primary outcome variables

	Fixed effects				Variance	
	Intercept γ (SE)	Time γ (SE)	Sexor γ (SE)	Time*Sexor γ (SE)	Within person γ (SE)	Intercept γ (SE)
EDE-Q Global	4.48*** (0.22)	−0.69*** (0.06)	−0.57* (0.24)	0.16* (0.07)	0.89*** (0.05)	1.61*** (0.15)
BDI-II	40.39*** (2.02)	−6.10*** (0.63)	−7.00** (2.30)	1.32 (0.71)	78.99*** (4.76)	109.34*** (11.71)
STAI-Trait	64.95*** (1.52)	−3.53*** (0.47)	−3.56* (1.72)	0.01 (0.53)	50.12*** (2.70)	77.10*** (7.16)
DERS	133.23*** (3.77)	−10.41*** (1.22)	−14.91*** (4.26)	2.80* (1.38)	309.13*** (17.57)	426.44*** (41.81)
DBT-WCCL	1.35*** (0.09)	0.14*** (0.03)	0.12 (0.10)	−0.04 (0.03)	0.12*** (0.01)	0.16*** (0.02)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Abbreviations: BDI-II, Beck Depression-Inventory-II; DERS, Difficulties in Emotion Regulation Scale; DBT-WCCL, DBT Ways of Coping Checklist—DBT Skills Subscale; EDE-Q, Eating Disorder Examination—Questionnaire; Sexor, sexual orientation; STAI-Trait, State-Trait Anxiety Inventory—Trait subscale.

patients reported significantly higher EDE-Q scores compared to non-SM patients at 1-month ($p = .04$) and there was a sexual orientation by time interaction for the DERS, at the level of significance ($p = .05$), while the patterns of means over time remained unchanged.

4 | DISCUSSION

The purpose of the present study was to examine differences in eating pathology, and broader mental health outcomes, between SM and heterosexual patients participating in an ED PHP. In our sample, 19.8% of patients identified as SM and 8.0% reported not identifying with any sexual orientation. Over half of those who identified as SM (66%) reported being “more straight” or “equally gay and straight.” There were no significant differences in ED diagnoses between groups. Consistent with our expectations and presuppositions from minority stress theory, SM patients had higher rates of comorbid major depressive disorder and panic disorder at admission than their heterosexual counterparts and were more likely to endorse current self-harm behaviors. Further, SM patients reported higher eating pathology, depression, anxiety, and emotion dysregulation at admission compared to heterosexual patients.

Regarding change over time, results are generally consistent with minimal disparities in outcomes for SM patients with EDs in higher levels of care. SM patients demonstrated a faster rate of improvement on eating pathology and emotion dysregulation over time, such that scores did not significantly differ between groups on eating pathology at one-month, discharge or 6-month follow up, and on emotion dysregulation at follow-up. Depression symptoms in SM patients reduced over time, such that there were no significant differences at discharge or follow-up. Anxiety symptoms in SM still differed significantly between groups at all timepoints. Finally, DBT skills use improved across patients over time and there were no significant differences between groups at any timepoint. While the current study detected significant differences between heterosexual and SM on a variety of indicators, these differences must be interpreted in the context of effect sizes (noted in Tables 1 and 2). Although the magnitude of differences in treatment outcomes between heterosexual and SM

patients were relatively modest, these findings still highlight important considerations for treatment providers when working with this population.

As recent United States demographic trends suggest that individuals who identify as a SM account for approximately 6.8% of young women and 3.9% of young men (Copen et al., 2016) our results suggest SM patients are more likely to present for ED treatment at a higher level of care. These findings are consistent with recent research supporting SM patients are more likely to present an ED specialty care program (Mensing et al., 2020). Accordingly, as our results suggest that ED clinicians are likely to encounter and treat SM patients, an increased understanding of issues unique to SM individuals (Isacco, Yallum, & Chromik, 2012; McKay, 2011), and specific training in best psychological practices for treating this population (e.g., Rosik, Jones, & Byrd, 2012), is warranted.

Consistent with minority stress theory (Meyer, 2003) and expectations regarding comorbidity, the current study found that SM patients had higher rates of major depressive disorder and panic disorder than their heterosexual counterparts and were more likely to report self-harm. These findings align with previous research demonstrating that SM have higher rates of broad-based psychopathology (Cochran et al., 2003; King et al., 2008; Ming et al., 2014). Similarly, these results align with previous research which suggests that stressors unique to SM individuals (e.g., concealment concerns) may put SM individuals at an elevated risk for various anxiety-related disorders, including panic disorder (Cohen et al., 2016).

However, divergent from previous findings, our results do not indicate that SM patients differ in rates of unhealthy weight control behaviors (e.g., self-induced vomiting, laxatives, diet pill use). This may be due to lower base rates for these behaviors in the present sample. Similarly, our results did not indicate differences in substance use disorder rates between heterosexual and SM patients. Our current findings are of note as research has documented higher substance use rates among SM individuals and have examined these disparities within minority stress frameworks (Goldbach et al., 2014). It may be the case that SM patients have higher substance use rates; however, the current study was not able to provide nuanced analyses of substance use rates and behaviors among patients. In addition, while our results were consistent

with Mensinger et al. (2020) recent research examining ED treatment outcomes among SM patients, we did not find similar differences in abuse history, with no differences in PTSD comorbidities. A similar explanation for this difference could be related to our study's approach in assessing for PTSD versus assessing for trauma and abuse.

Importantly, our results were consistent with recent findings on SM ED symptomatology at treatment intake and discharge (Mensingher et al., 2020). Although SM patients presented with higher rates of eating pathology, they demonstrated a faster rate of improvement in ED symptoms over time. It is unclear why SM patients improved at faster rates than their heterosexual counterparts. However, one probable explanation for this result is regression towards the mean (Bland & Altman, 1994). In addition, SM patients in the current sample received treatment from staff trained to be affirming of different gender and sexual identities. Although not assessed directly in the current study, Mensinger et al. (2020) hypothesize that these factors may account for faster treatment success in SM patients. Regarding broader health outcomes, SM patients demonstrated similar patterns of improvement in depressive symptoms and emotion dysregulation at follow-up. The lack of disparities across time for DBT skills use suggest that both heterosexual and SM patients effectively learned and utilized DBT skills and reduced emotional dysregulation in accordance with the DBT treatment model of the PHP. While results would need to be replicated in a controlled trial, this suggests that DBT may hold some promise for effectively treating a broad range of mental health outcomes in SM and heterosexual patients. Overall, these findings suggest minimal disparities in outcome for SM patients through follow-up; as such, existing ED treatments for SM patients may not necessarily need to be reworked in order to effectively treat eating pathology and related symptoms.

Conversely, anxiety symptoms in SM still differed significantly between groups at all time points, indicating that a more targeted intervention for anxiety may be required for this population. The current study did not directly assess whether variables related to minority stress theory accounted for increased rates of anxiety in SM patients. However, there is an extensive body of literature (e.g., DeBord, Fischer, Bieschke, & Perez, 2017; Williams, Mann, & Fredrick, 2017) citing minority stress as a contributing factor to a variety of psychosocial and physical health sequelae for SM individuals. Accordingly, minority stress theory provides a possible framework to understand the higher and more persistent rates of anxiety symptoms throughout treatment for SM patients in the current sample.

Although SM quality of life has improved by several metrics in recent decades, SM individuals still commonly encounter a variety of unique minority stressors (e.g., discrimination, homophobia, stigma and acceptance issues) and experiences (e.g., "coming out") that their heterosexual peers do not (DeBord et al., 2017; Williams et al., 2017). Such SM-specific issues were not directly targeted in the ED PHP treatment described in the current study. While depressive and other symptoms improved across all groups, underlying and untreated minority stress variables may have contributed to higher and more persevering anxiety symptoms in SM patients. However, further research in this area is needed to determine if increased mood and

anxiety symptoms noted in SM patients is related specifically to minority stress. If such results are found, it would provide stronger rationale for treatments incorporating specific strategies to reduce sexual minority stress (for review, see: Chaudoir, Wang, & Pachankis, 2017) into existing ED protocols in order to better address anxiety symptoms unique to SM patients.

The present study has several strengths, including the relatively large sample size and the use of multilevel modeling and FIML for handling missing data. Further, the naturalistic design and lack of specific exclusion criteria enhances the representativeness of the sample. Despite its strengths, the current study has several important limitations to consider. First, our measures of SM status were limited to self-report of identity thus, generalizability to a broader SM population may be limited. This study used a dimensional measure of identity that has had limited use in previous literature; as such, the distinction between "most" and "more" categories may have been difficult to parse. Further, 8% of our sample reported not identifying with a sexual orientation. While this is comparable to data from Mensinger et al. (2020) in a similar population, the nature of this response could refer to asexuality or being unsure about their orientation. The latter may be particularly true for some of the adolescents in the present sample, many of whom are at an age at which they still may be questioning their sexual orientation. Second, while our sample was large enough to demonstrate significant between-group differences, we were unable to analyze the SM group for within-group differences (e.g., differences in outcome between gay and bisexual patients). Similarly, literature indicates differences in ED etiology for transgender/nonbinary patients; however, our sample was not large enough to examine the intersectionality between sexual and gender minority status; thus, further research must be done to adequately address disparities experienced for gender minority patients. In regard to demographics, there were no significant racial/ethnic differences between groups, however, the sample was largely comprised of young, White patients, thus, results may not be generalizable to other cultural or generational groups. Notably, there was a substantial amount of missing data at follow-up, which is a common issue across multiple adult PHP program outcome studies of similar design (Brown et al., 2018; Reilly et al., 2020). While our data did not suggest biased attrition, we did not collect information as to why some patients did not complete the one-month or discharge assessments. Accordingly, results should be interpreted with the amount of missing data in mind. Further, we do not have data on potential treatments that patients engaged in after discharge, which could have influenced treatment effects at follow-up.

Overall, results from the present study suggest that while disparities in eating pathology and broader mental health outcomes exist for SM patients at admission to treatment, these disparities are minimized over the course of treatment and through follow-up in a higher level of care for EDs. Thus, findings suggest that SM patients also benefit from existing treatment protocols to reduce eating pathology; however, SM patients may still benefit from the inclusion of minority-stress informed interventions to target anxiety-related symptoms. Accordingly, ED clinicians may better serve a significant proportion of the patients they encounter by becoming familiar with issues specific to SM populations and incorporating interventions aimed at reducing minority stress into existing ED protocols.

CONFLICT OF INTEREST

The authors declare no conflict to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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