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# Minority Stress, Depression, Relationship Quality, and Alcohol Use: Associations with Overweight and Obesity Among Partnered Young Adult Lesbians

Tyler B. Mason, PhD<sup>1</sup> and Robin J. Lewis, PhD<sup>1,2</sup>

## Abstract

**Purpose:** Although lesbian women are more likely to be obese compared to heterosexual women, relatively little research has examined correlates of overweight and obesity among lesbians. The purpose of this study was to examine the association of minority stress and depression, relationship quality, and alcohol-use variables to overweight and obesity among lesbians in relationships.

**Method:** Self-identified lesbians ( $n = 737$ ) in current relationships completed measures of demographics, minority stress, depressive symptoms, relationship variables, and alcohol use.

**Results:** Overweight and obesity were associated with more public identification as a lesbian, more depressive symptoms, increased heavy drinking, longer relationship length, and lower relationship consensus.

**Conclusion:** Health promotion and weight loss intervention programs for lesbians should incorporate psychological, relationship, and alcohol use components to reduce overweight and obesity among lesbians.

**Key words:** body mass index (BMI), lesbian, minority stress, obesity.

## Introduction

OBESITY IS A SERIOUS HEALTH PROBLEM associated with a myriad of damaging conditions including hypertension, diabetes, cardiovascular disease, and cancer.<sup>1</sup> Population-based studies demonstrate that lesbians are more likely to be obese compared to heterosexual women.<sup>2-3</sup> Demographic characteristics typically associated with obesity in the general population (e.g., socioeconomic status, age, and race) are associated with obesity among lesbians as well.<sup>2,4-5</sup> Beyond these findings, little is known as to why lesbians are more likely to be obese and the limited research is primarily qualitative in nature. Importantly, partnership is associated with higher body mass index (BMI) among lesbians.<sup>6</sup> Therefore, it appears that lesbians are more likely to be obese, and partnered lesbians may have an even higher risk of obesity. This study examined variables that may be associated with overweight and obesity among partnered lesbians with the goal of increasing understanding of overweight and obesity among lesbians. The Institute of Medicine's (IOM)

cross-cutting perspectives of lesbian, gay, bisexual, and transgender (LGBT) health guided the decision of variables to include in the study.<sup>7</sup> Specifically, we chose variables that represent the minority stress and social-ecological perspectives.<sup>7</sup>

### *Minority stress perspective*

Minority stress includes discrimination, expectations of rejection due to minority status, and concealment of sexual identity. The 2011 IOM Report<sup>7</sup> called for research examining how minority stress is associated with health disparities among sexual minorities. A recent theoretical framework suggests that minority stress leads to unhealthy behaviors and negative physical health conditions through both adverse psychological and physiological stress responses.<sup>8</sup> Recent findings demonstrate an association between increased discrimination and overweight and obesity among lesbians.<sup>9</sup> Also, lesbians may engage in negative health behaviors to cope with minority stress and, in turn, these negative health

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behaviors are associated with overweight and obesity. For example in a study of lesbian and bisexual women, distal minority stressors (e.g., discrimination) were directly associated with increased binge eating.<sup>10</sup> Also, proximal minority stressors (i.e., internalized homophobia, stigma consciousness, and concealment of sexual identity) were associated with increased binge eating through maladaptive coping, social isolation, and negative affect.<sup>10</sup> Relatedly, in a qualitative study, lesbians mentioned that depression and minority stress interfered with their ability to eat healthy and exercise.<sup>11</sup> Taken together, these theoretical, quantitative, and qualitative findings suggest that minority stress and depression may be associated with obesity by promoting unhealthy eating behaviors.

### *Social-ecological perspective*

The social-ecological perspective involves individual and interpersonal factors that may influence health. Two understudied individual and interpersonal factors that may be associated with overweight and obesity among lesbians include alcohol consumption and intimate relationships.

**Alcohol consumption.** Alcohol use and heavy drinking occur more frequently in young adult lesbians compared to older lesbians, yet we know little about the association between lesbians' alcohol use and weight.<sup>12-13</sup> Among the general population, research is mixed on the degree to which alcohol consumption contributes to overweight and obesity. Specifically, one study reported an inverse relationship between alcohol consumption and BMI<sup>14</sup> and another study found an increased risk for weight gain associated with heavy drinking in women younger than 35 years.<sup>15</sup> Additionally, alcohol consumption appears to be a more important contributor to weight gain among individuals who consume a high-fat diet, and individuals who are overweight or obese.<sup>16</sup> In a study of lesbians specifically, current or former use of alcohol was not associated with BMI.<sup>5</sup> Thus, it is important to examine patterns of alcohol use (e.g., quantity, heavy drinking episodes) to determine whether they are differentially related to BMI among lesbians.

**Relationship quality.** Partnership is associated with weight gain among heterosexual women<sup>17</sup> and with increased BMI among lesbians.<sup>6</sup> Researchers have also found that lesbians and their partners reported similar BMI, weight status, and weight concern.<sup>18</sup> Although relationship status appears to be an important correlate of overweight and obesity, specific aspects of lesbians' relationships (e.g., length, quality) have not been investigated.

### *The Current Study*

Due to the paucity of literature regarding correlates of overweight and obesity among lesbians, and specifically partnered lesbians, the current study examined the associations of minority stress, depression, relationship quality, and alcohol-use variables with overweight and obesity. Our predictions were guided by the IOM's minority stress and social-ecological perspectives, the larger literature on heterosexual women, and the limited literature on lesbians. Minority stress (i.e.,

connection with the lesbian community, public identification as a lesbian, personal feelings about being a lesbian, and attitudes toward other lesbians) depressive symptoms, relationship quality (i.e., relationship satisfaction, relationship consensus, relationship cohesion, and relationship length), and alcohol consumption (i.e., drinking quantity, heavy drinking episodes, and hazardous alcohol use) were hypothesized to be associated with overweight and obesity among lesbians.

## **Method**

### *Participants*

Self-identified lesbians ( $n=814$ ) were recruited from online panels established by several market research firms. Panel members are recruited by the market research firms in several ways (e.g., advertising on popular websites and e-mail or postal invitations) to complete surveys on a wide variety of topics. Potential participants were sent e-mail invitations to complete the survey. Eligibility requirements included self-identification as lesbian, age between 18 and 35 years old, in a romantic or dating relationship with another woman for at least three months, and physically seeing their partner at least once a month. Eligible participants received incentives, established by the online panel, for completing the survey.

Participants who chose "Prefer not to answer" for demographic variables ( $n=60$ ) were removed from the sample. Underweight participants ( $BMI < 18.5$ ;  $n=17$ ) were also removed from the sample because underweight individuals constitute a separate at-risk group that should be investigated separately from normal weight individuals.<sup>19</sup> After these listwise deletions, the sample consisted of 737 lesbians. Patterns of missing data were examined: 9.09% of participants ( $n=67$ ) were missing at least one value and 4.9% of total values were missing. The expectation-maximization (EM) algorithm was used to replace missing values.<sup>20</sup>

### *Measures*

**Demographic questionnaire.** A demographic questionnaire gathered information about height, weight, age, race, education, income, number of children living in residence, and relationship length (years).

**Body mass index.** BMI is the most widely used measure of overweight and obesity among adults.<sup>21</sup> BMI was calculated with the standard formula (i.e.,  $BMI = \text{weight (kg)} / [\text{height (m)}]^2$ ) using participants' self-reported height and weight ( $\text{kg/m}^2$ ). Researchers reported that using self-reported height and weight to calculate BMI is a reliable and valid way to generate BMI.<sup>22</sup>

**Lesbian Internalized Homophobia Scale Short Form (S-LIHS).**<sup>23</sup> The 39-item S-LIHS was used to measure several dimensions of minority stress including connection with the lesbian community (e.g., "Attending lesbian events and organizations is important to me;"  $\alpha=.87$ ; 13-items), public identification as a lesbian (e.g., "I am comfortable being an 'out' lesbian;"  $\alpha=.90$ ; 16-items), personal feelings about being a lesbian (e.g., "I am proud to be a lesbian;"

$\alpha = .72$ ; 6-items), and attitudes toward other lesbians (e.g., "Lesbians are too aggressive;"  $\alpha = .75$ ; 4-items). Higher scores represent less connection to the lesbian community, less openness about sexual orientation, more shame about being a lesbian, and more negative attitudes toward other lesbians. Previous research established the S-LIHS good reliability ( $\alpha$ s from .89–.95) and validity (positive association with depression and negative association with self-esteem).<sup>23</sup>

Revised Dyadic Adjustment Scale (RDAS).<sup>24</sup> This 14-item scale measures three dimensions of dyadic relationship experiences including consensus ("Indicate the approximate extent of agreement or disagreement between you and your partner on making major decisions;"  $\alpha = .75$ ), satisfaction ("How often do you and your partner quarrel?";  $\alpha = .81$ ), and cohesion ("Do you and your partner engage in outside interests together?";  $\alpha = .73$ ). Consensus scores reflect partner agreement on various aspects such as religious beliefs, sex relations, or major decisions; satisfaction reflects overall relationship satisfaction; and cohesion reflects the extent to which partners work together and discuss ideas. The RDAS demonstrated adequate concurrent validity among couples.<sup>24</sup>

Center for Epidemiologic Studies Depression Scale (CES-D).<sup>25</sup> The 10-item CES-D short form assessed participants' depressive symptoms. Using response choices ranging from 0 (rarely or none of the time) to 3 (most or all of the time), participants reported how frequently they experienced 10 behaviors/thoughts (e.g., "I felt that everything I did was an effort" and "I felt fearful") during the past week. The CES-D has good psychometric properties.<sup>26</sup> The Cronbach's  $\alpha$  in the current study was .84.

Daily Drinking Questionnaire (DDQ).<sup>27</sup> Participants used a 7-day grid to provide the number of "standard" drinks typically consumed weekly over the past 90 days. A standard drink is defined as one 12 oz. beer, 1 ½ oz. of liquor, or 5 oz. of wine. "Drinking quantity" was calculated as the sum of drinks reported weekly. "Heavy drinking" was calculated as the number of days that at least 4 or more drinks were consumed in one day.<sup>28</sup> Heavy drinking is similar to binge drinking; however, according to NIAAA,<sup>28</sup> for a drinking episode to be considered binge drinking, the four alcoholic drinks must be consumed in a two hour time period. Thus, binge drinking is considered heavy drinking, but heavy drinking is not necessarily binge drinking. Because all studies do not follow NIAAA definitional guidelines, there is some variation in the definition of binge and heavy drinking in the literature. The DDQ has convergent validity with other measures of alcohol use.<sup>27,29</sup>

Alcohol Use Disorders Identification Test (AUDIT).<sup>30</sup> The 10-item AUDIT was used to measure hazardous alcohol use. The first eight items are scored on a scale from 0 (never) to 4 (4 or more times a week) and the remaining two items are scored as 0 (no), 2 (yes, but not in the last year), and 4 (yes, during the last year). Higher scores reflect more hazardous alcohol use. The AUDIT was strongly associated with

other measures of problematic drinking.<sup>31</sup> The Cronbach's  $\alpha$  in this study was .81.

## Results

The mean BMI of the sample was 28.34 kg/m<sup>2</sup> (SD = 7.61). Divided into weight categories, 310 (42%) participants were normal weight ( $18.5 \leq \text{BMI} \leq 24.9$ ), 190 (25.8%) were overweight ( $25 \leq \text{BMI} \leq 29.9$ ), and 237 (32.2%) were obese ( $\text{BMI} \geq 30$ ). Using cutoff criteria for the AUDIT (score  $\geq 8$ ), 131 (15%) participants met criteria for hazardous alcohol use. Table 1 displays descriptive information for study variables by weight group. Participants answered questions about three aspects of sexual orientation: sexual identity, sexual attraction, and past-year sexual behavior (see Table 1). Almost all participants identified as "only lesbian" or "mostly lesbian" reported they were attracted to "only" or "mostly" women and that they had sex with "only women" in the past year.

Multinomial logistic regression analyses were performed to examine predictors of overweight and obesity (see Table 2). Continuous predictors were standardized. In comparing normal weight lesbians to overweight lesbians, drinking quantity and relationship consensus were associated with less likelihood of being overweight and a graduate degree was marginally associated with greater likelihood of being overweight. In comparing normal weight lesbians to obese lesbians, drinking quantity, relationship consensus, and less public identification as a lesbian were associated with less likelihood of being obese while higher age, some college, depressive symptoms, relationship length, and heavy drinking were associated with greater likelihood of being obese. In comparing overweight lesbians to obese lesbians, depressive symptoms and relationship length were associated with greater likelihood of being obese; age and heavy drinking were marginally associated with likelihood of being obese; graduate school education was associated with less likelihood of being obese; and other race and less public identification as a lesbian were marginally associated with less likelihood of being obese.

A hierarchical linear regression was then performed to examine predictors of BMI (see Table 3). Race was dummy coded with Caucasian as the comparison group and education was dummy coded with bachelor's degree as the comparison group. Independent variables were added in four blocks. The first block included demographic variables, the second block included minority stressors and depression, the third block included relationship variables, and the fourth block included alcohol-use variables. We examined the variance inflation factor (VIF) to detect multicollinearity using a criterion of VIF  $> 5$ .<sup>32</sup> All VIF values were less than five with the highest value being 3.86. Thus, we determined that multicollinearity was not present.

Significance testing was done using 95% bias-corrected (BC) confidence intervals (CIs) generated from 2,000 bootstrap samples. If bootstrapped confidence intervals did not include 0 then the variable was significant. Each step explained additional variance in BMI and several variables in each step significantly predicted BMI. Step 1 (i.e., demographic variables) accounted for the largest portion of variance in BMI,  $R^2 = .11$ . The final model accounted for 18%

TABLE 1. SAMPLE CHARACTERISTICS OF LESBIANS BY WEIGHT GROUP

	<i>Normal Weight</i> (n = 310)	<i>Overweight</i> (n = 190)	<i>Obese</i> (n = 237)	<i>Total Sample</i> (n = 737)	F	p
	M (SD)	M (SD)	M (SD)	M (SD)		
Age	28.50 (4.20)	28.94 (4.28)	29.71 (4.03)	29.00 (4.19)	5.66	.004
Connection to the Lesbian Community	29.63 (11.48)	29.83 (11.65)	29.12 (12.17)	29.52 (11.74)	.21	.81
Personal Identification as a Lesbian	34.41 (15.47)	33.25 (15.95)	30.48 (14.66)	32.85 (15.42)	4.51	.01
Personal Feelings as a Lesbian	10.00 (5.01)	9.86 (4.80)	9.44 (4.76)	9.78 (4.88)	.90	.41
Attitudes Toward Other Lesbians	13.00 (5.98)	13.23 (6.10)	12.34 (5.96)	12.85 (6.01)	1.34	.26
Depressive Symptoms	6.66 (5.12)	6.85 (5.11)	8.02 (5.36)	7.15 (5.22)	5.02	.007
Relationship Consensus	24.09 (3.73)	22.99 (4.15)	22.82 (4.42)	23.40 (4.11)	7.85	<.001
Relationship Satisfaction	15.89 (2.74)	15.72 (2.46)	15.63 (2.71)	15.76 (2.66)	.71	.49
Relationship Cohesion	12.70 (3.21)	12.46 (2.91)	12.62 (3.21)	12.61 (3.13)	.35	.71
Relationship Length	3.47 (2.97)	3.46 (3.08)	4.52 (3.43)	3.80 (3.19)	8.90	<.001
Drinking Quantity	8.19 (8.39)	7.38 (7.45)	6.87 (8.49)	7.56 (8.20)	1.81	.17
Heavy Drinking	.62 (1.17)	.57 (1.17)	.60 (1.14)	.60 (1.16)	.09	.91
Hazardous Alcohol Use	5.02 (4.23)	5.36 (4.69)	4.61 (4.54)	5.01 (4.53)	1.49	.23
Children	.20 (.60)	.25 (.56)	.40 (.83)	.27 (.67)	6.01	.003
Median Income <sup>a</sup>	\$50,000–\$59,999	\$60,000–\$74,999	\$45,000–\$49,999	\$50,000–\$59,999		
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	$\chi$	<i>p</i>
Race						
White	248 (80.0%)	146 (76.8%)	189 (79.7%)	583 (79.1%)	5.21	.52
Black	28 (9.0%)	23 (12.2%)	30 (12.7%)	81 (11.0%)		
Asian	18 (5.8%)	9 (4.7%)	11 (4.6%)	38 (5.2%)		
Other	16 (5.2%)	12 (6.3%)	7 (3.0%)	35 (4.7%)		
Education						
High School	10 (3.2%)	11 (5.8%)	18 (7.6%)	39 (5.3%)	28.54	<.001
Some College	82 (26.5%)	54 (28.4%)	96 (40.5%)	232 (31.5%)		
Bachelor's Degree	134 (43.2%)	62 (32.6%)	80 (33.8%)	276 (37.4%)		
Graduate Degree	84 (27.1%)	63 (33.2%)	43 (18.1%)	190 (25.8%)		
Community						
Urban	135 (43.7%)	82 (43.2%)	84 (35.4%)	301 (40.9%)	11.30	.02
Suburban	152 (49.2%)	90 (47.4%)	117 (49.4%)	359 (48.8%)		
Rural	22 (7.1%)	18 (9.4%)	36 (15.2%)	76 (10.3%)		
Sexual Identity						
Only lesbian	230 (74.2%)	132 (69.5%)	178 (75.1%)	540 (73.3%)	4.75	.31
Mostly lesbian	75 (24.2%)	57 (30.0%)	54 (22.8%)	186 (25.2%)		
Other	5 (1.6%)	1 (.5%)	5 (2.1%)	11 (1.5%)		
Sexual Attraction						
Only women	182 (58.7%)	110 (57.9%)	138 (58.2%)	430 (58.3%)	5.69	.22
Mostly women	120 (40.0%)	80 (42.1%)	99 (41.8%)	303 (41.1%)		
Prefer not to answer	4 (1.3%)	—	—	4 (.5%)		
Sexual Behavior (past year)						
Only women	303 (97.7%)	180 (94.8%)	228 (96.3%)	711 (96.5%)	6.66	.35
Women and men	6 (2.0%)	9 (4.7%)	6 (2.5%)	21 (2.8%)		
No one	—	1 (.5%)	2 (.8%)	3 (.4%)		
Prefer not to answer	1 (.3%)	—	1 (.4%)	2 (.3%)		

<sup>a</sup>Income included 17 different categories: less than \$15,000; \$15,000 to \$19,999; \$20,000 to \$24,999; \$25,000 to \$29,999; \$30,000 to \$34,999; \$35,000 to \$39,999; \$40,000 to \$44,999; \$45,000 to \$49,999; \$50,000 to \$59,999; \$60,000 to \$74,999; \$75,000 to \$84,999; \$85,000 to \$99,999; \$100,000 to \$124,999; \$125,000 to \$149,999; \$150,000 to \$174,999; \$175,000 to \$199,999; \$200,000 and above.

of the variance in BMI among lesbians. In terms of demographic variables, participants who were older, earning a lower income, and with some college education reported higher BMIs while graduate education was associated with a lower BMI. Participants who were less comfortable being open about their sexual orientation reported a lower

BMI whereas depressive symptoms were associated with a greater BMI. Increased relationship length and experiencing less agreement with partners were associated with a higher BMI. Finally, lesbians who consumed more alcohol reported a lower BMI whereas heavy drinking was associated with a higher BMI.

TABLE 2. PREDICTORS OF OVERWEIGHT AND OBESITY AMONG LESBIANS

	AOR (95% CI)		
	Normal Weight vs. Overweight	Normal Weight vs. Obese	Overweight vs. Obese
Age, in Years	1.18 (.94, 1.48)	1.51 (1.20, 1.88)*	1.24 (.97, 1.60) <sup>†</sup>
Income	1.00 (.79, 1.24)	.84 (.68, 1.05)	.92 (.71, 1.19)
Education			
High School	2.21 (.85, 5.77)	1.96 (.79, 4.90)	.85 (.34, 2.09)
Some College	1.46 (.89, 2.39)	2.00 (1.27, 3.17)*	1.35 (.80, 2.31)
Bachelor Degree	1.00	1.00	1.00
Graduate Degree	1.57 (.99, 2.49) <sup>†</sup>	.68 (.42, 1.11)	.42 (.24, .73)*
Race			
Caucasian	1.00	1.00	1.00
African American	1.58 (.84, 2.97)	1.39 (.74, 2.59)	.94 (.48, 1.80)
Asian American	1.01 (.43, 2.37)	.88 (.38, 2.03)	.90 (.34, 2.39)
Other	1.50 (.66, 3.41)	.55 (.20, 1.46)	.40 (.14, 1.14) <sup>†</sup>
Children	1.06 (.85, 1.31)	1.17 (.96, 1.42)	1.12 (.91, 1.38)
Public Identification as a Lesbian	.87 (.68, 1.11)	.68 (.53, .88)*	.79 (.60, 1.04) <sup>†</sup>
Connection to Lesbian Community	1.04 (.84, 1.31)	1.03 (.83, 1.29)	1.01 (.79, 1.30)
Personal Feelings as a Lesbian	.94 (.73, 1.21)	1.01 (.78, 1.31)	1.10 (.81, 1.48)
Attitudes Toward Other Lesbians	1.10 (.88, 1.38)	1.00 (.80, 1.26)	.92 (.70, 1.19)
Depressive Symptoms	.95 (.76, 1.19)	1.29 (1.05, 1.58)*	1.32 (1.04, 1.69)*
Relationship Length	.92 (.73, 1.15)	1.25 (1.02, 1.53)*	1.39 (1.10, 1.77)*
Relationship Consensus	.66 (.52, .85)*	.65 (.51, .83)*	.96 (.75, 1.23)
Relationship Satisfaction	1.12 (.88, 1.42)	1.17 (.93, 1.48)	1.06 (.82, 1.37)
Relationship Cohesion	1.05 (.85, 1.29)	1.14 (.92, 1.40)	1.05 (.83, 1.33)
Drinking Quantity	.68 (.47, .99)*	.55 (.37, .82)*	.84 (.56, 1.26)
Heavy Drinking	1.15 (.81, 1.63)	1.57 (1.10, 2.23)*	1.47 (.99, 2.17) <sup>†</sup>
Hazardous Alcohol Use	1.21 (.94, 1.56)	.98 (.75, 1.29)	.58 (.31, 1.08) <sup>†</sup>

\* $p < .05$ ; <sup>†</sup> $p < .10$ .

AOR, adjusted odds ratio; CI, confidence interval.

TABLE 3. PREDICTORS OF BMI AMONG LESBIANS WITH BOOTSTRAPPED CONFIDENCE INTERVALS

	B	$\beta$	CI	R	R <sup>2</sup>	F	p
Step 1				<b>.33</b>	<b>.11</b>	<b>9.77</b>	<b>.001</b>
Age	.32*	.18	[.17, .49]				
Income	-.21*	-.11	[-.36, -.07]				
High School	.55	.02	[-1.63, 2.66]				
Some College	2.72*	.17	[1.30, 4.26]				
Graduate Degree	-1.30*	-.08	[-2.43, -.09]				
African American	1.90	.08	[-.01, 3.89]				
Asian American	-.27	-.01	[-2.60, 2.34]				
Other	-1.22	-.03	[-3.64, 1.14]				
Children	.45	.04	[-.38, 1.21]				
Step 2				<b>.36</b>	<b>.13</b>	<b>7.71</b>	<b>.001</b>
Public Identification as a Lesbian	-.08*	-.16	[-.12, -.04]				
Connection to Lesbian Community	.01	.02	[-.05, .07]				
Personal Feelings as a Lesbian	.06	.04	[-.11, .21]				
Attitudes Toward Other Lesbians	-.01	-.01	[-.12, .08]				
Depressive Symptoms	.14*	.09	[.01, .26]				
Step 3				<b>.40</b>	<b>.16</b>	<b>7.54</b>	<b>.001</b>
Relationship Length	.28*	.12	[.09, .48]				
Relationship Consensus	-.30*	-.16	[-.46, -.14]				
Relationship Satisfaction	.09	.03	[-.17, .33]				
Relationship Cohesion	.08	.03	[-.11, .26]				
Step 4				<b>.42</b>	<b>.18</b>	<b>7.35</b>	<b>.001</b>
Drinking Quantity	-.17*	-.19	[-.37, -.01]				
Heavy Drinking	1.06*	.16	[.18, 2.08]				
Hazardous Alcohol Use	-.14	-.08	[-.31, .04]				

B,  $\beta$ , and CI results are presented for the full model; R, R<sup>2</sup>, F, and p-values are for each step.

\*Significance based on 95% bootstrapped CI.

Statistically significant values are highlighted in bold.

## Discussion

This study examined the multivariate relationship between minority stress and depressive symptoms, relationship quality, alcohol use and overweight, obesity, and BMI among partnered lesbians. As expected, and consistent with previous research with lesbians,<sup>2</sup> increased age, lower income, and lower educational attainment were risk factors for increased BMI, and obesity. However, demographic variables were not associated with overweight.

### *Minority stress, depressive symptoms, and overweight, obesity, and BMI*

Depressive symptoms were associated with increased BMI and being obese. In previous qualitative research, lesbians mentioned that depressive symptoms negatively impacted their ability to eat healthy and exercise.<sup>11</sup> Previous quantitative findings also confirmed an association between depressive symptoms and increased binge eating in lesbian and bisexual women.<sup>10</sup> Thus, it is possible that depressive symptoms may be associated with increased BMI through negative eating behaviors such as binge eating. In the current study, the only minority stressor associated with overweight or obesity was public identification as a lesbian such that more openness about sexual identity was associated with a higher BMI and likelihood of being obese. Previous research suggests that larger bodies may be acceptable in lesbians' social groups and relationships, potentially contributing to the high prevalence of obesity among lesbians.<sup>6,33</sup>

The relationship between minority stress and overweight and obesity is likely very complex. For example, minority stress may be associated with overweight and obesity through mediating variables of body image, or internalization of cultural ideals regarding beauty and thinness. Perhaps lesbians who are less "out," or feel more discomfort about being a lesbian may not internalize the lesbians' cultural ideals of a larger body or may actively work to not look like her perception of a "stereotypical lesbian woman." Furthermore, minority stress may be associated with negative eating behaviors used to cope with stress that may lead to weight gain over a longer period of time.

### *Relationship quality and overweight, obesity, and BMI*

Previous research demonstrates that being in a relationship is associated with increased BMI in both heterosexuals<sup>17</sup> and lesbians.<sup>6</sup> The results of the current study add that longer relationships and relationships low in perceived consensus (i.e., partner agreement) are also associated with overweight and obesity. It is possible that being in a relationship may be associated with more unhealthy behaviors such as eating out or lack of physical activity,<sup>6</sup> which may lead to increased weight gain over a longer relationship period. In addition, lesbians report that their partner is influential on their eating and physical activity behaviors.<sup>6</sup> Furthermore, lesbians report having a similar BMI and weight status as their partner.<sup>18</sup> The precise mechanism by which consensus is related to overweight and obesity is not discernible from our findings. Perhaps BMI benefits result specifically from relationship consensus about health promotion activities, physical exercise, and weight. Overall, our results demonstrate that lesbians' relationships may be important in influ-

encing health behaviors and point to the need to understand why longer relationships and lower consensus are associated with overweight and obesity.

### *Alcohol use and overweight, obesity, and BMI*

Consistent with previous research among heterosexual men and women,<sup>14-15</sup> drinking quantity was associated with lower BMI and lower likelihood of being obese. In contrast, heavy drinking was associated with a higher BMI and higher likelihood of being obese. As others have suggested,<sup>14-15</sup> drinking alcohol may lower lesbians' risk for overweight and obesity unless they engage in heavy and/or binge drinking. In a previous population-based study, heterosexual men and women reporting 1-2 drinks per day were less likely to be obese. However, those reporting heavy drinking (i.e., five or more drinks per day) were more likely to be obese.<sup>34</sup> Evidence suggests that low daily alcohol consumption (i.e., 1-2 drinks a day) is a protective factor for a myriad of health conditions including obesity.<sup>35</sup> The explanation of why heavy drinking is a risk factor for obesity is not known, but researchers have hypothesized that unhealthy eating behaviors associated with heavy drinking may explain the heavy drinking-obesity relationship.<sup>36</sup> Additionally, a recent study found that binge drinking induces insulin resistance in rats,<sup>37</sup> which in turn, could lead to increased risk for obesity.<sup>38</sup> Ultimately, increased heavy drinking among lesbians, compared to heterosexual women,<sup>39-40</sup> may partially explain disparities in obesity.

### *Limitations*

Lesbians are a difficult population to recruit for research due to challenges associated with defining this population (i.e., a variety of identity labels or no identity labels) and possible reluctance of lesbian, gay, bisexual, and transgender individuals to disclose their sexual identity to researchers.<sup>41</sup> Also, lesbians in this sample were recruited online, were generally open about their sexual orientation, and self-reported their height and weight. Thus, the degree to which these results generalize to other samples of lesbians, bisexual women, and those who are less open about their sexual orientation must be determined in future research. Although all of the measures used in the study had Cronbach's alphas  $\geq .70$ , the lower relative reliabilities of some of the measures may have contributed to difficulty finding existing associations between variables.

### **Conclusion**

Since our results are based on cross-sectional data, future longitudinal studies are needed to determine the impact of minority stress, depressive symptoms, relationship quality, and alcohol use on weight gain and change in BMI over time. Eating behaviors and physical activity may serve as potential mediators of the relationship between minority stress, depressive symptoms, relationship variables, and BMI. Delineating how eating behaviors and physical activity relate to depressive symptoms, minority stress, and lesbians' relationships will provide tangible areas for researchers and health professionals to include in treatment and intervention programs for lesbians.

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### Author Disclosure Statement

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