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Sexual Abuse, Sexual Orientation, and Obesity in Women

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Abstract

Background: Among adult women an association between childhood sexual abuse (CSA) and obesity has been observed. Research with lesbian women has consistently identified high rates of obesity as well as frequent reports of CSA, but associations between sexual abuse and obesity have not been fully explored. Our aim was to investigate the relationship between sexual abuse (SA) history and obesity among heterosexual ($n = 392$) and lesbian ($n = 475$) women (age 35–64) who participated in the Epidemiologic STudy of HEalth Risk in Women (ESTHER) Project in Pittsburgh, Pennsylvania.

Methods: Obesity was defined as body mass index (BMI) ≥ 30. Covariates included self-reported SA, sexual orientation, demographic factors, and history of a depression or anxiety diagnosis. SA history was assessed by three factors: (1) SA experienced under the age of 18 by a family member or (2) by a nonfamily member and (3) forced, unwanted sexual experience(s) at age ≥ 18. Data were analyzed using chi-square tests and logistic regression models.

Results: Multiple logistic regression analyses revealed that obesity was associated with African American race, lesbian sexual orientation, intrafamilial CSA, and history of mental health diagnosis. Protective factors were having a household income of at least $75,000 and having a bachelor's degree or higher.

Conclusions: Results suggest that lesbian women may be at greater risk of obesity than heterosexual women and that intrafamilial CSA—regardless of sexual orientation—may play a role in the development of obesity.

Introduction

Obesity rates among adults in the United States increased from 13.4% to 33.8% between the 1960s and 2008[1,2] but began to stabilize between 2003 and 2006.[1,3] Although adulthood obesity rates in the United States have not substantially increased in recent years, over one-third of the U.S. adult population is obese,[1–3] accounting for approximately 9.1% of all medical expenditures in 2006.[4] Obesity is the second leading cause of preventable death in the United States[5] and is associated with such health conditions as hypertension, cardiovascular disease (CVD), diabetes mellitus (DM), and some cancers.[6,7] The etiology of obesity is multidimensional, involving genetic, environmental, and individual factors. Psychosocial factors associated with obesity include a history of depression, anxiety, suicidality and ideation, and disordered eating.[8] Early exposure to traumatic events, such as sexual abuse (SA),[8–11] physical abuse,[10,12] or neglect,[13] may contribute to the development of obesity later in life. Research suggests that there is a relationship between physical and sexual abuse and extreme obesity. For example, women who are class III obese are more likely than women who are class I and II obese to report physical and sexual abuse.[14]

Most published research on obesity and psychological trauma has focused on the relationship between adulthood obesity and childhood sexual abuse (CSA), in which there is an overall consensus that a small, positive correlation exists.[8–11] Little is known about the relationship between obesity and adulthood sexual abuse (ASA); further investigation is needed to understand how ASA influences adulthood obesity.

Some researchers have suggested theories as to why SA may contribute to obesity.[8,15] One theory proposes that obesity may be employed by female SA survivors as an adaptive strategy to avoid sex in relationships or to deter potential sexual predators. It is hypothesized that a higher body weight is maintained because the SA survivor does not want to be viewed as a sexual object.[8,15] In support of this theory, researchers have found that some women with SA histories have a barrier weight, where weight is gained to become less

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attractive or to have a different sized body than the one they had at the onset or time of sexual victimization. Some women with SA histories who begin to lose weight experience posttraumatic stress disorder (PTSD) symptoms as they approach the weight they were when they were sexually abused, which may interfere with weight loss attempts.[8,15] If the theory that obesity is used as an adaptive strategy by SA survivors is correct, obese women with SA histories may be less motivated to lose weight, which could contribute to reduced or unsuccessful weight loss attempts.[8]

A number of researchers have found that lesbians have higher rates of obesity than heterosexual women.[16–18] Furthermore, lesbians have reported higher rates of CSA[19,20] and ASA[19] than heterosexual women. In a community sample of lesbians, Aaron and Hughes[9] found that CSA was significantly associated with body weight. After adjusting for age, race/ethnicity, and education, women who experienced CSA were more likely to be obese (body mass index [BMI] 30.0–39.9) or severely obese (BMI $\geq$40) than women who did not report a history of CSA. Although this study did not include a heterosexual comparison group, it is the only published study identified that examined the association of CSA and obesity among lesbians.

To our knowledge, no published reports directly examine the association among CSA, ASA, and adulthood obesity in a large population of lesbian and heterosexual women. The purpose of our analysis was to determine if sexual orientation or history of sexual abuse was related to adulthood obesity among lesbian and heterosexual women enrolled in the Epidemiologic STudy of HEalth Risk (ESTHER) Project. Our aims were to (1) determine if differences in adult obesity exist by sexual orientation (2) examine the relation of SA history to current adulthood obesity, and (3) determine correlates of current adulthood obesity adjusting for sexual orientation, SA history, and other covariates.

Materials and Methods

Study design and data collection

Secondary data analysis was performed using information collected from heterosexual ($n = 581$) and lesbian ($n = 503$) women enrolled in the ESTHER Project at the University of Pittsburgh between 2003 and 2006. The ESTHER Project was a cross-sectional study that analyzed heart disease risk factors among women living in the Pittsburgh, Pennsylvania area. Women met eligibility criteria for the ESTHER Project if they self-identified as a lesbian or heterosexual woman, were at least 35 years of age, and had no previous history of heart disease (angina, heart attack, or stroke). Bisexual women were not eligible to participate in the ESTHER Project.

Participants were recruited using a variety of methods shown to be successful with hard-to-reach populations, such as local newspaper and radio advertisements; community health events; lesbian, gay, bisexual, and transgender (LGBT) events and social engagements; and The University of Pittsburgh broadcast phone-message system. Recruitment/screening calls were performed by trained research staff. Women who met study eligibility criteria were scheduled for two clinic visits at the University of Pittsburgh. At the first visit, participants completed study questionnaires and physical activity and medical history interviews and underwent a fasting venipuncture. At the second clinic visit, participants reviewed their completed food diaries with research staff and underwent a dual energy x-ray absorptiometry (DXA) scan of the hip, spine, and whole body. For our analytical purposes, information was selected from study recruitment forms, questionnaires, and clinical measurements (height, weight, and BMI). Participants were reimbursed $50 for their time and participation. Study instruments and protocol were approved by the University of Pittsburgh's Institutional Review Board. Signed consent forms were obtained from each participant.

Because the convenience sampling methods employed resulted in unequal proportions of women based on age, race, and sexual orientation, data reduction was performed to address issues of skewed demographics. Because of a highly skewed distribution of older heterosexuals compared with older lesbians, women over the age of 65 were excluded from analysis, leaving 1008 participants. Women who did not identify as African American or Caucasian were removed from analysis because there was insufficient power to detect differences between other racial groups ($n = 29$). African American heterosexuals ($n = 32$) were randomly selected in the same proportion that African American lesbians ($n = 38$) were recruited into the study to address the disproportionately low accrual rate of African American lesbians. In addition, women who were underweight (BMI < 18.5) were excluded ($n = 12$) from this analysis. Thus, the final sample for our analyses consisted of 867 women: 38 African American lesbians, 437 Caucasian lesbians, 31 African American heterosexuals, and 361 Caucasian heterosexuals.

Measures: Dependent variable

Obesity. The National Heart, Lung and Blood Institute (NHLBI)-defined cutoff categories were used to measure BMI: 18.5–24.9 (normal/healthy weight), 25.0–29.9 (overweight), 30.0–34.9 (mildly obese), 35.0–39.9 (severely obese), and ≥ 40 (morbidly obese).[6] For the purposes of our analyses, we compared women who were obese (BMI ≥ 30) to those who were not obese (BMI < 30). BMI was calculated as weight (in light clothing without shoes) in kilograms divided by the square of height in meters [weight (kg)/height $(m)^2$]. The height and weight measurements used to calculate BMI were taken at the first clinic visit.

Measures: Independent variables

Demographics. Demographic factors considered for analysis included age (years), race (African American, Caucasian), total household income, years of education (highest level completed), and current relationship status.

Sexual orientation. Heterosexuals self-identified as being heterosexual/straight and reported only having male partners since age 18. Lesbians did not identify as heterosexual and reported only or primarily having emotional, physical, and romantic attraction toward women within the past 5 years or were in relationships with only or primarily women within the past 5 years.

Sexual abuse. SA was assessed by self-report through three questions in a written questionnaire: Do you feel that you were sexually abused by a family member when you were growing up (before age 18)?(intrafamilial CSA). Do you feel that you were sexually abused by someone other

Table 1. Sample Characteristics by Sexual Orientation: Women Enrolled in ESTHER Project, Pittsburgh, PA, 2003–2006

Variable	BMI (kg/m^2) Heterosexual (n = 392) n (%)	BMI (kg/m^2) Lesbian (n = 475) n (%)	p
Age[a] ($n = 867$)	47.9 (±7.6)	47.4 (±7.1)	0.295
34–39	55 (14.0)	67 (14.1)	0.349
40–44	89 (22.7)	114 (24.0)	
45–49	93 (23.7)	120 (25.3)	
50–54	64 (16.3)	90 (19.0)	
55–64	91 (23.2)	84 (17.7)	
Race ($n = 867$)			0.960
Caucasian American	361 (92.1)	437 (92.0)	
African American	31 (7.9)	38 (8.0)	
Currently obese ($n = 867$)			0.003
Not obese (BMI <30)	273 (69.6)	284 (59.8)	
Obese (BMI ≥30)	119 (30.4)	191 (40.2)	
NHLBI BMI ($n = 867$)			0.041
Normal/healthy weight (BMI 18.5–24.9)	146 (37.2)	157 (33.1)	
Overweight (BMI 25–29.9)	127 (32.4)	127 (26.7)	
Mildly obese (BMI 30–34.9)	58 (14.8)	95 (20.0)	
Severely obese (BMI 35–40)	36 (9.2)	50 (10.5)	
Morbidly obese (BMI > 40)	25 (6.4)	46 (9.7)	
Education ($n = 867$)			0.022
High school or less	55 (14.0)	37 (7.8)	
Some college	94 (24.0)	116 (24.4)	
Bachelors degree	98 (25.0)	119 (25.1)	
Graduate degree	145 (37.0)	203 (42.7)	
Household income ($n = 851$)			0.425
<$25,000	58 (15.3)	63 (13.4)	
$25,000–$39,999	65 (17.1)	79 (16.8)	
$40,000–$59,999	85 (22.4)	105 (22.3)	
$60,000–$74,999	40 (10.5)	70 (14.9)	
$75,000+	132 (34.7)	154 (32.7)	
In a committed relationship ($n = 866$)			0.012
Yes	261 (66.8)	352 (74.1)	
No	130 (33.3)	123 (25.9)	
Previous mental health diagnosis (depression, anxiety) ($n = 865$)			0.0001
No	240 (61.4)	229 (48.3)	
Yes	151 (38.6)	245 (51.7)	
Lifetime SA ($n = 809$)			<0.0001
No	223 (60.3)	181 (41.2)	
Yes	147 (39.7)	258 (58.8)	
Intrafamilial CSA ($n = 810$)			<0.0001
No	310 (83.8)	310 (70.5)	
Yes	60 (16.2)	130 (29.6)	
Extrafamilial CSA ($n = 811$)			<0.0001
No	318 (85.7)	305 (69.3)	
Yes	53 (14.3)	135 (30.7)	
ASA ($n = 809$)			0.0001
No	269 (72.7)	263 (59.9)	
Yes	101 (27.3)	176 (40.1)	

[a]Mean (standard deviation).

ESTHER, Epidemiologic STudy of HEalth Risk in Women; BMI, body mass index; Lifetime SA, lifetime history of sexual abuse; Intrafamilial CSA, sexual abuse at <18 years by a family member; Extrafamilial CSA, sexual abuse at <18 years by a nonfamily member; ASA, adulthood sexual abuse; NHLBI, National Heart, Lung and Blood Institute.

than a family member when you were growing up (before age 18)? (extrafamilial CSA). Since the age of 18, was there a time when someone forced you to have sexual activity that you really did not want? This might have been intercourse or other forms of sexual activity, and might have happened with a partner, spouse, lover, friend, as well as more distant persons or strangers (adulthood sexual abuse, ASA). From these SA history measures, a fourth dichotomous SA variable was created, lifetime history of SA (lifetime SA). If a participant answered affirmatively to any of the three SA questions, she was categorized as having a lifetime history of SA.

Table 2. Current Obesity Status by Demographic and Mental Health Diagnosis Among Women Enrolled in the ESTHER Project, Pittsburgh, PA, 2003–2006: Unadjusted Odds Ratios

	BMI (kg/m^2)			
Variable	*BMI <30* (n = *557*) n *(%)*	*BMI ≥ 30.0* (n = *310*)[a] n *(%)*	*Unadjusted OR for obesity (95% CI)*	p
Age[b]	46.7 (7.4)	47.5 (7.3)	0.997 (0.98-1.02)	0.778
34–39	79 (14.2)	43 (13.9)	Reference	0.828
40–44	130 (23.3)	73 (23.6)	1.03 (0.65-1.65)	
45–49	136 (24.4)	77 (24.8)	1.04 (0.65-1.66)	
50–54	94 (16.9)	60 (19.4)	1.17 (0.72-1.92)	
55–64	118 (21.2)	57 (18.4)	0.89 (0.54-1.45)	
Race				<0.0001
Caucasian American	536 (96.2)	262 (84.5)	Reference	
African American	21 (3.8)	48 (15.5)	4.68 (2.74-7.97)	
Sexual orientation				0.003
Heterosexual	273 (49.0)	119 (38.4)	Reference	
Lesbian	284 (51.0)	191 (61.6)	1.54 (1.16-2.05)	
Education				<0.0001
High school or less	51 (9.2)	41 (13.2)	Reference	
Some college	106 (19.0)	104 (33.6)	1.22 (0.75-2.00)	
Bachelors degree	149 (26.8)	68 (21.9)	0.57 (0.34-0.94)	
Graduate degree	251 (45.1)	97 (31.3)	0.48 (0.30-0.77)	
Household Income				<0.0001
<$25,000	61 (11.1)	60 (19.9)	Reference	
$25,000–$39,999	89 (16.2)	55 (18.2)	0.63 (0.39-1.03)	
$40,000–$59,999	117 (21.3)	73 (24.2)	0.63 (0.40-1.006)	
$60,000–$74,999	64 (11.7)	46 (15.2)	0.73 (0.43-1.23)	
$75,000+	218 (39.7)	68 (22.5)	0.32 (0.20-0.50)	
In a committed relationship				0.461
Yes	399 (71.6)	214 (69.3)	Reference	
No	158 (28.4)	95 (30.7)	1.12 (0.83-1.52)	
Previous mental health diagnosis (depression, anxiety)				0.0002
No	327 (58.9)	142 (45.8)	Reference	
Yes	228 (41.1)	168 (54.2)	1.70 (1.28-2.25)	
Lifetime SA				0.011
No	280 (53.2)	124 (43.8)	Reference	
Yes	246 (46.8)	159 (56.2)	1.46 (1.09-1.95)	
Intrafamilial CSA				<0.0001
No	428 (81.2)	192 (67.8)	Reference	
Yes	99 (18.8)	91 (32.2)	2.05 (1.47-2.86)	
Extrafamilial CSA				0.007
No	421 (79.7)	202 (71.4)	Reference	
Yes	107 (20.3)	81 (28.6)	1.58 (1.13-2.20)	
ASA				0.029
No	360 (68.4)	172 (60.8)	Reference	
Yes	172 (31.6)	111 (39.2)	1.40 (1.04-1.89)	

[a]Numbers do not add up to 310 because of missing values for the SA variables.
[b]Mean (standard deviation).
CI, confidence interval; OR, odds ratio.

Past history of mental health diagnoses. Respondents were asked two questions about whether they had ever been diagnosed by a medical professional with depression or anxiety. For the purpose of this analysis, the two questions were combined into one dichotomous variable of ever having been diagnosed with a mental health disorder (yes/no).

Statistical analysis

Categorical variables were analyzed using chi-square and Fisher's exact tests, and continuous variables were examined using *t* tests. The collinearity tests performed resulted in low variance inflation factors (VIF). No variables were removed because of collinearity. Multiple logistic regression models were used to determine the correlates of obesity (BMI $\geq$ 30). Statistical significance for multiple logistic regression models was defined as $p < 0.05$. Tests for interaction were performed among sexual orientation, the SA variables, and all variables. No significant interactions were found. The Hosmer-Lemeshow statistic was used to evaluate the overall model fit. All statistical analyses were performed using the SAS system for Windows, version 9.2 (SAS Institute, Cary, NC).

Results

Overall, the sample was highly educated; 65.2% ($n = 565$) had completed a bachelors degree or higher. Almost half (46.5%, $n = 396$) had a household income of ≥$60,000 (Table 1). The mean age of the sample was 47.6 (±7.3) years. The majority of women were Caucasian (92.0%, $n = 798$), and 8.0% ($n = 69$) were African American. Approximately half the sample identified as lesbian ($n = 475$, 54.8%), and the majority of women were in committed relationships (70.8%, $n = 613$). According to NHLBI BMI standard cutoff points, 35.8% ($n = 310$) of women in the ESTHER Project were obese (BMI ≥ 30) at the time of their first clinic visit. Approximately 23.5% ($n = 190$) of women reported intrafamilial CSA, 23.2% ($n = 188$) reported extrafamilial CSA, 34.2% ($n = 277$) reported ASA, and 50.1% ($n = 405$) reported lifetime SA.

Compared with heterosexuals, significantly more lesbians were in a committed relationship (74.1% vs. 66.8%, $p = 0.012$), and had a previous mental health diagnosis (51.7% vs. 38.6%, $p = 0.0001$). Also lesbians had completed significantly more years of education than heterosexuals ($p = 0.022$). Although heterosexuals had a higher rate of being overweight (32.4% vs. 26.7%), lesbians had a significantly higher rate of obesity (40.2% and 30.4%, $p = 0.003$). Lesbians also reported higher rates of SA compared with heterosexual women: lifetime SA (58.8% vs. 39.7%, $p < 0.0001$), intrafamilial CSA (29.6% vs. 16.2%, $p < 0.0001$), extrafamilial CSA (30.7% vs. 14.3%, $p < 0.0001$), and ASA (40.1% and 27.3%, $p = 0.0001$).

Unadjusted logistic regression analyses

Unadjusted logistic regression analyses (Table 2) showed that women who were obese (BMI ≥30) did not differ by age or relationship status compared with nonobese women. Obese women, however, were more likely to be lesbian (odds ratio [OR] 1.54, 95% confidence interval [CI] 1.16-2.05), African American (OR 4.68, CI 2.74-7.97), have fewer years of education ($p < 0.0001$), and have a household income of <$75,000 ($p < 0.0001$) than their nonobese counterparts. All SA variables were associated with obesity: lifetime SA (OR 1.46, CI 1.09-1.95]), intrafamilial CSA (OR 2.05, 1.47-2.86), extrafamilial CSA (OR 1.58, 1.13-2.20), and ASA (OR 1.40, 1.04-1.89). Obese women were also more likely than nonobese women to be have been diagnosed with a mental illness (OR 1.70, 1.28-2.25).

Multiple logistic regression analyses

A lesbian sexual orientation remained a predictor of obesity when also adjusting for each SA measure separately; however, not all SA measures were significantly associated with obesity (Table 3). Reported lifetime SA (adjusted OR [AOR] 1.37, CI 1.02-1.84), intrafamilial CSA (AOR 1.94, CI 1.39-2.72) and extrafamilial CSA (AOR 1.46, C1 1.04-2.06) were associated with being obese. ASA was not significantly related to obesity when also adjusting for sexual orientation.

Four multiple logistic regression models (Tables 4 and 5) were tested to determine if sexual orientation and SA variables were associated with obesity after adjusting for demographic and mental health variables. In all models, African American race, lesbian sexual orientation, and a previous mental health diagnosis were significantly associated with obesity. Likewise, each model revealed that women with a household income of at least $75,000 were less likely to be obese. Having a graduate degree was a protective factor in all models; having a bachelors degree was a protective factor in all models except when intrafamilial CSA was included in the model. Intrafamilial CSA was the only significant SA predictor of obesity (AOR 1.58, CI 1.10-2.27). For each model, the Hosmer-Lemeshow goodness of fit test showed that the main effects models were a good fit for the data.

Table 3. Obesity by Sexual Orientation and Type of Sexual Abuse, ESTHER Project, Pittsburgh, PA, 2003–2006: Adjusted Odds Ratios

Variable	*BMI (kg/m²) BMI ≥30 (%) (n = 310)*		*AOR (L:H) AOR (95% CI)*	p	*AOR (abused yes/no) AOR (95% CI)*	p
	Heterosexaul	*Lesbian*				
Lifetime SA[a]				0.022		0.037
No	62 (55.9)	62 (36.1)	Reference		Reference	
Yes	49 (44.1)	110 (64.0)	1.42 (1.05-1.91)		1.37 (1.02-1.84)	
Intrafamilial CSA[b]				0.037		0.0001
No	81 (73.0)	111 (64.5)	Reference		Reference	
Yes	30 (27.0)	61 (35.5)	1.37 (1.02-1.85)		1.94 (1.39-2.72)	
Extrafamilial CSA[c]				0.024		0.029
No	94 (84.7)	108 (62.8)	Reference		Reference	
Yes	17 (15.3)	64 (37.2)	1.14 (1.05-1.91)		1.46 (1.04-2.06)	
ASA[d]				0.014		0.066
No	77 (69.4)	95 (55.3)	Reference		Reference	
Yes	34 (30.6)	77 (44.8)	1.45 (1.08-1.95)		1.33 (0.98-1.81)	

[a]Model 1: Obesity adjusted for sexual orientation and reported lifetime sexual abuse (SA).
[b]Model 2: Obesity adjusted for sexual orientation and reported intrafamilial childhood sexual abuse (CSA).
[c]Model 3: Obesity adjusted for sexual orientation and reported extrafamilial childhood sexual abuse (CSA).
[d]Model 4: Obesity adjusted for sexual orientation and reported sexual abuse in adulthood (ASA).
AOR, adjusted odds ratio; L, lesbian; H, heterosexual.

Table 4. Correlates of Current Obesity, ESTHER Project, Pittsburgh, PA 2003–2006: Adjusted Odds Ratios (Models 1, 2, and 3)

	Model 1[a] *(AOR 95% CI)*	p	*Model 2*[b] *(AOR, 95% CI)*	p	*Model 3*[c] *(AOR, 95% CI)*	p
Age		0.801		0.773		0.745
35–39	Reference		Reference		Reference	
40–44	0.90 (0.53-1.53)		0.88 (0.52-1.48)		0.88 (0.52-1.49)	
45–49	0.85 (0.50-1.44)		0.80 (0.47-1.36)		0.80 (0.47-1.35)	
50–54	1.11 (0.64-1.94)		1.07 (0.61-1.85)		1.08 (0.62-1.88)	
55–64	0.85 (0.49-1.6)		0.83 (0.48-1.43)		0.83 (0.49-1.43)	
Race		0.0005		0.0002		0.0002
African American	2.94 (1.61-5.38)		3.09 (1.69-5.63)		3.11 (1.70-5.66)	
Caucasian American	Reference		Reference		Reference	
Sexual orientation		0.036		0.018		0.017
Heterosexual	Reference		Reference		Reference	
Lesbian	1.42 (1.02, 1.96)		1.48 (1.07-2.04)		1.48 (1.07-2.04)	
Education		0.008		0.003		0.003
High school or less	Reference		Reference		Reference	
Some college	1.03 (0.59-1.81)		1.04 (0.59-1.83)		1.04 (0.59-1.82)	
Bachelors degree	0.56 (0.31-1.002)		0.54 (0.30-0.96)		0.55 (0.31-0.98)	
Graduate degree	0.56 (0.32-0.98)		0.54 (0.31-0.94)		0.54 (0.31-0.94)	
Household income		0.005		0.008		0.006
<$25,000	Reference		Reference		Reference	
$25,000–$39,999	0.79 (0.46, 1.36)		0.78 (0.45, 1.34)		0.78 (0.45, 1.34)	
$40,000–$59,999	0.89 (0.53, 1.50)		0.88 (0.52, 1.48)		0.88 (0.52, 1.48)	
$60,000–$74,999	1.11 (0.61, 2.002)		1.08 (0.60, 1.95)		1.11 (0.61, 2.004)	
$75,000+	0.47 (0.28, 0.81)		0.48 (0.28, 0.82)		0.47 (0.28, 0.81)	
History of mental health diagnosis		0.048		0.031		0.031
No	Reference		Reference		Reference	
Yes	1.39 (1.003-1.92)		1.43 (1.03-1.98)		1.43 (1.03-1.98)	
Intrafamilial CSA		0.014				
No	Reference					
Yes	1.58 (1.10, 2.27)					
Extrafamilial CSA			Reference	0.521		
No			1.13 (0.78-1.64)			
Yes						
ASA					Reference	0.446
No					1.14 (0.82-1.58)	
Yes						

[a]Model 1: Adjusted for age, race, sexual orientation, education, household income, relationship status, history of previous mental health diagnosis, and intrafamilial CSA.
[b]Model 2: Adjusted for age, race, sexual orientation, education, household income, relationship status, history of previous mental health diagnosis, and extrafamilial CSA.
[c]Model 3: Adjusted for age, race, sexual orientation, education, household income, relationship status, history of previous mental health diagnosis, and ASA.

Discussion

The purpose of this analysis was to examine the correlates of obesity in a large community-based sample of lesbian and heterosexual women. Specifically, we assessed whether sexual orientation and history of sexual abuse were associated with obesity after adjusting for demographic and mental health variables.

We found that a lesbian sexual orientation was independently related to adulthood obesity after accounting for significant covariates. These results are consistent with the literature concluding that lesbians have higher rates of obesity than heterosexual women.[16–18,21] All SA measures were associated with obesity in unadjusted analyses. When obesity was adjusted for sexual orientation and each SA variable separately, lifetime SA ($p = 0.037$), intrafamilial CSA ($p = 0.0001$) and extrafamilial CSA ($p = 0.029$) were significantly related to obesity. In multivariate analysis that included other relevant demographics and previous mental health diagnosis, intrafamilial CSA was the only SA item independently associated with obesity ($p = 0.014$). Other published reports suggest that there is an association between CSA and obesity among women; however, these prior studies did not distinguish between intrafamilial and extrafamilial CSA.[8–11,22] Our findings stress that the relationship of the perpetrator to the CSA victim could help explain the association between CSA and adulthood obesity. The nonsignificant association between ASA and obesity may explain the lack of published literature on this topic. Further investigation is needed to understand the relationship between ASA and obesity.

Other results were consistent with those of previous studies, in that race,[1,3,6,23] socioeconomic status (years of educa-

Table 5. Correlates of Current Obesity, ESTHER Project, Pittsburgh, PA, 2003–2006: Adjusted Odds Ratios (Model 4)

	Model 4[a] *(AOR, 95% CI)*	p
Age		0.769
35–39	Reference	
40–44	0.88 (0.52-1.49)	
45–49	0.81 (0.48-1.37)	
50–54	1.08 (0.62-1.88)	
55–64	0.83 (0.49-1.43)	
Race		0.0002
African American	3.08 (1.69-5.62)	
Caucasian American	Reference	
Sexual orientation		0.022
Heterosexual	Reference	
Lesbian	1.46 (1.06-2.02)	
Education		0.004
High school or less	Reference	
Some college	1.04 (0.59-1.82)	
Bachelors degree	0.55 (0.31-0.98)	
Graduate degree	0.54 (0.31-0.95)	
Household income		0.006
<$25,000	Reference	
$25,000-$39,999	0.77 (0.52-1.47)	
$40,000–$59,999	0.87 (0.54-1.54)	
$60,000–$74,999	1.10 (0.61-1.98)	
$75,000+	0.47 (0.28-0.81)	
History of mental health diagnosis		0.036
No	Reference	
Yes	1.42 (1.02-1.96)	
Lifetime SA		0.336
No	Reference	
Yes	1.17 (0.85-1.62)	

[a]Model 4: Adjusted for age, race, sexual orientation, education, household income, relationship status, history of previous mental health diagnosis, and lifetime history of sexual abuse.

tion and household income),[23,24] and mental health history[22] were independently associated with obesity. Our analysis found that women who reported a household income of at least $75,000 or had a graduate degree were less likely to be obese. African American women and women who reported a history of a mental health diagnosis were more likely to be obese than Caucasian women or women who were never given a mental health diagnosis. We did not find an association between relationship status and obesity. Other studies have produced mixed results on the association between obesity and relationship/marital status.[25,26] Although age is a known risk factor for obesity,[23] we did not find an association, which may be explained by the restricted age range of our sample (35–65 years).

Comparing the relationship of SA history, lesbian sexual orientation, and adulthood obesity across studies is complex, largely because of varying definitions of SA and lesbian sexual orientation. Our findings related to SA are based on responses to two questions that asked about self-perceived SA by family and nonfamily members during childhood and one question about unwanted sexual experiences at age 18 or later. Interpretation of experiences during childhood and adulthood likely varied among participants. On the one hand, the relatively broad definition of SA used in the study may have led to inflated estimates of SA. On the other, it is possible that SA (especially CSA) may have been underreported because some women may not define their experience as abuse. Future research using more stringent definitions of SA, including more comprehensive indicators of severity (e.g., age of onset, duration of abuse), is needed. Despite the use of these broad questions to measure SA, it can be argued that if a woman reported SA in her lifetime, no matter the severity or duration of SA, her reported SA events may have some impact on her mental and physical health. Another bias, common across SA studies, is that not all women who have experienced SA may have felt comfortable reporting abuse, which means the prevalence of SA may actually be higher in this sample and the true relation of SA to obesity among women may be underestimated. Further research is needed to determine if exposure to nonsexual abuse in childhood (physical and verbal abuse, physical and emotional neglect) is also associated with obesity in adulthood.

The mental health assessment also had limitations. Those who reported having a mental health diagnosis (history of being diagnosed with depression or anxiety) represent individuals who have access to and use the healthcare system. The mental health assessment may have underestimated the rate of those with a history of a mental health diagnosis because individuals could have attained medication for depressive or anxious symptoms from their primary care physicians and may not consider themselves to be diagnosed with anxiety or depression. Furthermore, because not all people who have depression or anxiety are diagnosed, our results may underestimate the association between having a mental health diagnosis of depression or anxiety and obesity.

Several other important limitations should be considered when interpreting our findings. This analysis did not include information about lifetime history of obesity or when obesity developed in relation to SA. Longitudinal studies are needed to further explore the association between obesity and related factors over time. It is important to acknowledge that lesbians represented in this analysis are out to some degree; results describe women comfortable with reporting their sexual orientation. Conclusions are also limited to lesbian and heterosexual women; therefore, they do not represent women with questioning or bisexual sexual identities. Lastly, this sample mainly represents older adult women who are well educated and primarily Caucasian.

Conclusions

This study fills a gap in obesity research by being among the first to assess the relationship among obesity, SA, and sexual orientation in a large population of adult heterosexual and lesbian women. Importantly, we found that sexual orientation and intrafamilial CSA are both independent predictors of obesity after adjusting for demographics and previous mental health diagnosis of depression or anxiety. The effects of specific types of SA that may contribute to adulthood obesity are less understood. In unadjusted regression analyses, many of our SA measures were significantly associated with obesity; however, this was not the case after accounting for other covariates. Although lifetime SA, extrafamilial CSA, and ASA were not significantly associated with current adulthood obesity after adjusting for other factors, an

association may still exist. Findings suggest that in future weight reduction trials among women, an assessment of CSA history could identify a subgroup of women who might benefit from a psychosocial component to address the impact of their CSA history. Overall, results from this cross-sectional study suggest that lesbian women may be at greater risk of becoming obese than heterosexual women and that intrafamilial CSA, regardless of sexual orientation, may play a role in the development of obesity. Furthermore, results indicate that the type of sexual abuse (intrafamilial vs. extrafamilial CSA, and CSA vs. ASA) may have different effects on obesity risk, suggesting the need for longitudinal studies.

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Disclosure Statement

The authors have no conflicts of interest to report.

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