Association Between Body Mass Index, Sexually Transmitted Infections, and Contraceptive Compliance

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Abstract

Background: Recent studies have examined the relationship between body mass index (BMI) and sexual behaviors, but little information exists on this relationship among racially diverse, low-income women using objectively measured clinical data. The purpose of this study was to examine the association between BMI and sexual behaviors, rates of sexually transmitted infections (STIs) and unintended pregnancy, and contraceptive adherence among adolescent and young adult women.

Methods: As part of a larger study, 1,015 Hispanic (54.2%), Black (18.6%) and White (24.8%) women aged 16 to 24 years seeking family planning services at publicly funded reproductive health clinics provided data on their baseline sexual behaviors, and contraceptive use and pregnancy history over 12 months. Objective clinical data were available from medical records at baseline (i.e., height, weight, and Papanicolaou [Pap] smear results), and over a 12-month period (i.e., STI results). Multivariable analyses were used to compare sexual behaviors, STI rates, contraceptive compliance, and unintended pregnancy rates between obese, overweight, and normal weight participants after adjusting for age, race/ethnicity, and other confounders.

Results: Overall, 423 (36.6%), 304 (26.3%), and 288 (24.9%) participants were classified as normal weight, overweight, and obese, respectively. No statistically significant association was observed between BMI and sexual behaviors, STI rates (overweight odds ratio [OR] 0.67; 95% confidence interval [95% CI] [0.4, 1.08]; obese OR 0.68; 95% CI [0.42, 1.10]); contraceptive compliance (overweight OR 0.89; 95% CI [0.69, 1.16]; obese OR 0.89; 95% CI 0.68, 1.16), or unintended pregnancy (overweight OR 1.08 95% CI [0.73, 1.60]; obese OR 1.09; 95% CI [0.72, 1.63]).

Conclusion: STI history and contraceptive compliance did not vary by BMI. Therefore, all women should receive equal contraceptive counseling (including condoms) to reduce the risk of unplanned pregnancy and STIs.

Introduction

THERE HAS BEEN A DRAMATIC INCREASE IN OBESITY rates within the United States over the past twenty years, especially among women.¹ As the percentage of overweight women continues to increase, it is important to understand how this relates to critical health outcomes, and the behaviors leading to those outcomes. One understudied relationship is that between obesity status and sexual or contraceptive behaviors.

Prior studies have examined the relationship between body mass index (BMI) and sexual behaviors, but the findings have varied. Several researchers suggest under or normal weight

women are more sexually active than overweight and obese women,²⁻⁴ whereas others observed the contrary.^{5,6} One article observed little difference in sexual behaviors among women of varying BMIs.⁷ Furthermore, sexually transmitted infections (STIs) have been reported to be more prevalent in obese women.³ A major issue with all except one of these studies³ is the use of self-reported BMI and STI rates, which are subject to reporting bias. Current literature is also limited to White and Black women and small samples of Hispanic women, and does not include measures of sexual behavior outside of vaginal intercourse.

In addition, it has been suggested that an increased BMI is associated with an increased risk for contraceptive failure,

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nonuse, and pregnancy, and a decreased likelihood of contraceptive access.⁸⁻¹⁰ One mechanism speculated for increased contraceptive failure and pregnancy is that obesity decreases the effectiveness of hormonal birth control.¹¹ It is also possible that obesity may be related to compliance with reliable birth control, as observed by Westhoff et al. in their recent longitudinal study of women using oral contraceptives.¹² However, most other studies focusing on the relationship between BMI and contraceptive adherence or unintended pregnancy rates have been limited to cross-sectional comparisons.^{13,14} Therefore, additional information on these particular outcomes, using longitudinal methodology, is needed.

In summary, recent studies have examined the relationship between BMI and sexual behaviors, but little information exists on this relationship among racially diverse, low-income women using objectively measured height, weight, and STI data. Additionally, no study has examined the relationship between BMI and sexual behavior, STIs, contraceptive compliance, and unintended pregnancy in the same population. The purpose of this study was to prospectively assess this relationship among a racially diverse sample of low-income women using objective measures obtained in a clinical setting.

Materials and Methods

Data for the current paper were collected as part of a longitudinal study on adherence with oral contraceptives. Hispanic, non-Hispanic Black, and non-Hispanic White adolescent and young adult women aged 16 to 24 years who requested oral contraception at one of five publicly funded reproductive health clinics in the Texas Gulf Coast region between July 2006 and January 2011 were screened for eligibility. Parental permission was obtained for those under 18 years of age. Exclusion criteria included (1) currently pregnant or breastfeeding; (2) desire to become pregnant within the next 12 months; (3) medical contraindication to use of estrogen; and (4) lack of access to a telephone. Obesity was not a contraindication to participation. Research participants were reimbursed \$20 for the baseline visit and \$20 at each follow-up phone call at 3, 6, and 12 months.

Measures

Data on demographic characteristics, tobacco use, and reproductive health were obtained by self-report using a self-administered paper and pencil survey (Spanish or English) at baseline. Demographic characteristics examined included: race/ethnicity, age, marital status, education, weekly hours worked, household income, and parity. Acculturation was measured among Hispanic participants by asking if they were born in the United States, and using the Short Acculturation Scale for Hispanics (SASH).¹⁵ The five-item scale (e.g., language you spoke as a child; language you speak with your friends) includes a five-point response scale ranging from 1 (only Spanish) to 5 (only English). Item scores were averaged to create an acculturation mean score (≤ 2.99 = less acculturated; > 3.00 = more acculturated). SASH scores for the current study yielded a Cronbach's alpha of .97, indicating very good internal consistency.¹⁶

Sexual history at baseline was assessed by asking participants a series of questions pertaining to age at first vaginal intercourse (penetration of the vagina by the penis), giving oral sex (touching penis with your mouth), receiving oral sex

(partner's mouth or tongue touched your genitals), and anal intercourse (penetration of the anus by your partner's penis). Questions related to vaginal and anal intercourse, and oral sex, also addressed whether participants engaged in the behavior during the past 3 months (yes/no) and number of partners in the past 3 months (vaginal intercourse only), the past year (vaginal intercourse only), and lifetime. Questions on ever using a condom during vaginal intercourse and condom use during last vaginal intercourse were also asked.

Additionally, we reviewed medical records of all participants after study completion. Baseline height and weight were objectively measured by clinic personnel and retrieved from clinic medical records. BMI was calculated on all participants and each classified into one of three categories: normal weight ($\text{BMI} < 25 \text{ kg/m}^2$), overweight ($25 \leq \text{BMI} < 30 \text{ kg/m}^2$), and obese ($\text{BMI} \geq 30 \text{ kg/m}^2$). Papanicolaou (Pap) smear results at baseline were recorded, as well as results of STI tests performed at baseline and any additional clinic visit during the 12-month follow-up period. Gonorrhea and Chlamydia trachomatis were diagnosed by Gen-Probes, Trichomonas vaginalis by wet mount, Herpes simplex virus (HSV) by culture, syphilis by serologic testing, and human papillomavirus (HPV) and genital warts by Pap smear or visual inspection of warts. Since HPV, HSV, and syphilis are recurrent/chronic infections, only those with a new diagnosis of these disorders were included. Gonorrhea, chlamydia, and syphilis testing were done as part of standard care. Testing for herpes and trichomoniasis were performed if the patient had a lesion or discharge, respectively. HPV was diagnosed by Pap smear, and warts by visual inspection. Results of STI tests were available for 893 women.

Participants were contacted by telephone at the 3rd, 6th, and 12th month of study enrollment and asked if they were still using their prescribed oral contraceptives. Specific questions were asked regarding the number of pills missed in a pill pack, delayed start of pill pack, and approach taken if pills were missed. Correct use of oral contraceptives was defined as initiating each pack on time and not missing any pills. Additionally, participants were asked whether they had become pregnant or not, as well as their pregnancy intentions. In total, these questions were asked four times: baseline, and 3-, 6-, and 12-month follow-up.

At the conclusion of the study, we reviewed medical records to detect any unreported pregnancies over the enrollment period. We assumed most participants would return to one of the study clinics should a pregnancy occur, as few facilities in the area accept patients without insurance. Abortion care is not provided at these clinics; thus, these rates are unknown.

Data analyses

Univariable comparisons were performed using chi-square or one-way analysis of variance, as appropriate. We examined the effect modification of different interventions on the relationship between BMI categories and sexual behaviors, STI rates, contraceptive compliance, and unintended pregnancy rates. Since there was no effect modification ($p > 0.10$), we combined both interventions and control groups together and adjusted the effects of interventions in all multivariate models. Multivariable logistic regression was used to compare sexual behaviors, and STI and unintended pregnancy rates of obese and overweight women to normal weight women after

adjusting for age, race/ethnicity, and other confounders. Individual variables were screened prior to inclusion, with candidate variables indicating $p < 0.20$ included in each model.

We also examined interactions between race/ethnicity and BMI. In the case of significant interactions, we reported race-specific results. The Hosmer-Lemeshow test¹⁷ was used to assess the fit and predictive ability of the logistic regression models. Generalized estimating equations (GEE) procedures¹⁸ were used to examine the association of BMI status with contraceptive adherence variables after adjusting for confounders and effects of the contraceptive compliance intervention. In addition, Cox proportional hazards model was used to examine the association of BMI status with the incidence of pregnancy. Any variables that were unevenly distributed across BMI categories were controlled for in the multivariate statistical models. All analyses were performed using SPSS 19 or STATA 11.

Results

Overall, 1,638 adolescents and young women who attended the reproductive health clinics were eligible for

participation in the larger study. Overall, 483 (30%) declined participation and 1,155 women enrolled in the larger study. Those refusing to participate were older compared to those who did not (20.2 ± 2.4 vs. 19.9 ± 2.4 ; $p < 0.001$). Moreover, Hispanic females were significantly less likely to participate than White and Black females (65% vs. 80%; $p < 0.001$).

Of these 1,155 women, 1,015 had both height and weight recorded at their baseline visit. Since this information was critical, those who did not have these data recorded in their medical record were excluded from further analyses for this study.

The mean age of participants was 19.9 years (standard deviation [SD]=2.4; range=16 to 24). Of the 1,015 participants, 559 (55.1%) were 16–19 years old and 456 (44.9%) were 20–24 years old. Overall, 55.6% ($n=564$) self-identified as Hispanic, 18.6% ($n=189$) as Black, and 23.4% ($n=238$) as White. The majority of Hispanic participants (54.3%; $n=306$) were born outside of the United States, and 50% ($n=282$) classified as more acculturated. The mean BMI was 27.3 ($SD=6.7$; range=15.5 to 64.4) and 423 (41.7%), 304 (30.0%), and 288 (28.4%) participants were classified as normal weight, overweight, and obese, respectively.

TABLE 1. DEMOGRAPHIC AND RISK BEHAVIORS ASSOCIATED WITH BEING NORMAL WEIGHT VERSUS OVERWEIGHT OR OBESE

	Total (N=1,015)	Normal weight (n=423)	Overweight (n=304)	Obese (n=288)	p
Race					<0.01*
Hispanic	564 (55.6)	209 (49.4)	191 (62.8)	164 (56.9)	
Black	189 (18.6)	88 (20.8)	43 (14.1)	58 (20.1)	
White	238 (23.4)	115 (27.2)	59 (19.4)	64 (22.2)	
Other	24 (2.4)	11 (2.6)	11 (3.6)	2 (0.7)	
Age (years)					<0.01*†
16 to 19	559 (55.1)	272 (64.3)	164 (53.9)	212 (73.6)	
20 to 24	456 (44.9)	151 (35.7)	140 (46.1)	75 (26.0)	
Marital status					<0.01*†
Single, never been married	788 (77.6)	351 (83.0)	225 (74.0)	212 (73.6)	
Married, separated, or divorced	222 (21.9)	70 (16.5)	77 (25.3)	75 (26.0)	
Hours worked in typical week					0.79
Does not work	640 (63.1)	271 (64.1)	191 (62.8)	178 (61.8)	
Works part- or full-time	371 (36.6)	150 (35.5)	111 (36.5)	110 (38.2)	
12mo household income					0.38
<\$29,999	332 (32.7)	129 (30.5)	102 (33.6)	101 (35.1)	
≥\$30,000	83 (8.2)	37 (8.7)	27 (8.9)	19 (6.6)	
Does not know	594 (58.5)	253 (59.8)	173 (56.9)	168 (58.3)	
Education					0.30
Didn't graduate HS or get GED	491 (48.4)	205 (48.5)	156 (51.3)	130 (45.1)	
HS graduate or GED or above	515 (50.7)	214 (50.6)	145 (47.7)	156 (54.2)	
Tobacco use					0.23
Yes	151 (14.9)	60 (14.2)	40 (13.2)	51 (17.7)	
No	738 (72.7)	311 (73.5)	227 (74.7)	200 (69.4)	
Lifetime pregnancies					<0.01*†
None	464 (45.7)	224 (53.0)	121 (39.8)	119 (41.3)	
One or more	547 (53.9)	199 (47.0)	182 (59.9)	166 (57.6)	

Listed as n (%).

To identify specific pairwise differences for categorical variables, we created separate 2×2 tables for each of the pairs and used chi-square tests. To adjust for multiple comparisons, $p < 0.0166$ (0.05/3) was used to indicate the statistical significance between any two contraceptive groups.

Frequencies that do not sum to total represent missing data (race=0; age=1; marital status=5, hours worked=4; income=6; education=9; tobacco use=126; pregnancy=4).

*Represents significant difference between normal weight and overweight.

†Represents significant difference between normal weight and obese.

GED, general educational development test (high school equivalency); HS, high school.

Of the 893 participants with STI test data, 128 (14.3%) tested positive for at least one STI during study enrollment, 13 (1.5%) of which had more than one concurrent STI. Types of STIs diagnosed included: *Chlamydia* ($n=87$; 68.0%), human papilloma virus (HPV)/genital warts ($n=23$; 18.0%), *Trichomonas* ($n=16$; 12.5%), herpes simplex virus (HSV) ($n=7$; 5.5%), *Gonorrhea* ($n=7$; 5.5%), and *Syphilis* ($n=1$; 0.8%).

Bivariate analyses showed that age, race/ethnicity, marital status, and gravity significantly differed by BMI categories,

while work hours, income, and education level did not (Table 1). Younger women were more likely to be either normal weight or obese, Hispanic women were more likely to be overweight, and married women and women with gravity ≥ 1 were more likely to be overweight or obese compared with their counterparts. Based on bivariate analyses, few sexual behaviors differed by BMI categories (Table 2). Those associations did not remain significant in the logistic regression analyses after adjusting for different covariates (Table 3).

TABLE 2. SEXUAL BEHAVIORS ASSOCIATED WITH BEING NORMAL WEIGHT VERSUS OVERWEIGHT OR OBESE

	Normal weight (n=423)	Overweight (n=304)	Obese (n=288)	p
Vaginal intercourse (VI), mean $\pm$ SD				
Age at first VI, years	16.04 $\pm$ 2.02	16.21 $\pm$ 2.30	16.08 $\pm$ 2.10	0.46
No. VI partners in last 3 months	1.09 $\pm$ 0.64	1.11 $\pm$ 0.74	1.08 $\pm$ 0.54	0.77
No. VI partners in last 12 months	1.66 $\pm$ 1.30	1.58 $\pm$ 1.29	1.52 $\pm$ 1.06	0.05
No. VI lifetime partners	3.95 $\pm$ 5.48	3.57 $\pm$ 5.29	3.89 $\pm$ 3.72	0.78
Ever used condom during VI, n (%)				0.69
Yes	379 (89.6)	265 (87.2)	254 (88.2)	
No	41 (9.7)	35 (11.5)	32 (11.1)	
Condom used during last VI, n (%)				0.04†
Yes	192 (45.4)	132 (43.4)	107 (37.2)	
No	189 (44.7)	157 (51.6)	158 (54.9)	
Giving oral sex (GOS)				
Ever GOS, n (%)				0.07
Yes	262 (61.9)	162 (53.3)	170 (59.0)	
No	158 (37.4)	139 (45.7)	118 (41.0)	
Age at first GOS (years), mean $\pm$ SD	17.12 $\pm$ 2.05	17.33 $\pm$ 2.46	17.34 $\pm$ 2.74	0.26
GOS in last 3 months, n (%)				0.13
Yes	182 (43.0)	112 (36.8)	105 (36.5)	
No	237 (56.0)	187 (61.5)	181 (62.8)	
No. GOS lifetime partners, mean $\pm$ SD	2.14 $\pm$ 2.44	2.04 $\pm$ 1.78	2.44 $\pm$ 3.53	0.31
Receiving oral sex (ROS), n (%)				
Ever ROS				0.04*
Yes	304 (71.9)	191 (62.8)	191 (66.3)	
No	117 (27.7)	110 (36.2)	96 (33.3)	
Age at first ROS, mean $\pm$ SD	16.77 $\pm$ 2.13	17.12 $\pm$ 2.23	17.05 $\pm$ 2.40	0.17
ROS in past 3 months, n (%)				0.18
Yes	190 (44.9)	104 (34.2)	114 (39.6)	
No	112 (26.5)	87 (28.6)	77 (26.7)	
No. ROS lifetime partners, mean $\pm$ SD	2.54 $\pm$ 3.55	2.32 $\pm$ 2.51	2.48 $\pm$ 2.83	0.79
Anal intercourse (AI)				
Ever had AI, n (%)				0.03
Yes	90 (21.3)	78 (15.8)	71 (24.7)	
No	332 (78.5)	255 (83.9)	217 (75.3)	
Age at first AI, mean $\pm$ SD	18.00 $\pm$ 2.39	17.67 $\pm$ 1.93	17.89 $\pm$ 2.76	0.06
No. AI lifetime partners, mean $\pm$ SD	1.31 $\pm$ 0.73	1.25 $\pm$ 0.53	1.34 $\pm$ 0.67	0.68
Current sexually transmitted infection, n (%)				0.07
Yes	66 (15.6)	32 (10.5)	30 (10.4)	
No	309 (73.0)	239 (78.6)	217 (75.3)	
Pap result, n (%)				0.31
Normal	293 (69.3)	181 (59.5)	178 (61.8)	
Abnormal	31 (7.3)	29 (9.5)	22 (7.6)	

Listed as mean $\pm$ SD or n (%).

One-way analysis of variance with Bonferroni correction was used for continuous variables and chi-square tests were used for categorical variables. To identify specific pairwise differences for categorical variables, we created separate 2×2 tables for each of the pairs and used chi-square tests. To adjust for multiple comparisons, $p < 0.0166$ (.05/3) was used to indicate the statistical significance between any two contraceptive groups.

Frequencies that do not sum to total represent missing data.

*Represents significant difference between normal weight and overweight.

†Represents significant difference between normal weight and obese.

SD, standard deviation; STI, sexually transmitted infection.

TABLE 3. ASSOCIATION OF BODY MASS INDEX (BMI) WITH SEXUALLY TRANSMITTED INFECTIONS (STI) AND SEXUAL BEHAVIORS BY RACE/ETHNICITY

Characteristics	Overall			White			Black			Hispanic		
	Overweight	Obese		Overweight	Obese		Overweight	Obese		Overweight	Obese	
Current STI	0.71 (0.37–1.35)	0.75 (0.38–1.48)		0.41 (0.11–1.54)	0.42 (0.11–1.61)		0.82 (0.33–2.05)	0.75 (0.33–1.75)		0.75 (0.39–1.43)	0.70 (0.34–1.41)	
Condom use during last vaginal intercourse	1.01 (0.73–1.41)	1.28 (0.91–1.79)		0.68 (0.35–1.33)	0.65 (0.34–1.26)		1.07 (0.46–2.49)	1.93 (0.88–4.23)		1.20 (0.77–1.86)	1.51 (0.94–2.44)	
Ever given oral sex	0.73 (0.52–1.01)	0.87 (0.62–1.21)		0.42 (0.19–0.91)	0.87 (0.36–2.07)		1.48 (0.69–3.20)	0.68 (0.34–1.39)		0.73 (0.48–1.12)	0.85 (0.54–1.32)	
Given oral sex in past 3 months	0.85 (0.61–1.18)	0.79 (0.57–1.10)		0.64 (0.33–1.23)	0.64 (0.33–1.24)		1.58 (0.71–3.51)	0.73 (0.33–1.61)		0.81 (0.52–1.27)	0.78 (0.49–1.24)	
Ever received oral sex	0.75 (0.53–1.06)	0.75 (0.53–1.07)		0.42 (0.18–0.99)	0.32 (0.14–0.76)		1.62 (0.58–4.54)	0.73 (0.32–1.68)		0.82 (0.53–1.27)	0.82 (0.52–1.30)	
Received oral sex in past 3 months	0.84 (0.57–1.24)	1.08 (0.73–1.62)		1.28 (0.60–2.72)	1.56 (0.72–3.38)		0.92 (0.37–2.27)	1.35 (0.55–3.32)		0.57 (0.32–1.00)	0.67 (0.37–1.20)	
Ever had anal intercourse	0.70 (0.46–1.04)	1.27 (0.88–1.83)		0.76 (0.37–1.56)	0.87 (0.44–1.74)		0.41 (0.13–1.32)	0.37 (0.13–1.11)		0.85 (0.49–1.50)	2.18 (1.30–3.65)	

Listed as odds ratio [OR] (95% confidence interval [95%CI]).

Normal weight women were used as the reference category. All models adjusted for age, race/ethnicity, marital status, lifetime pregnancy, and intervention group. Hispanic models were also adjusted for acculturation. Separate logistic regression models were used for each of the dependent variables listed in the table. Hosmer-Lemeshow goodness of fit test yielded p values ranging from 0.06 to 0.97.

Having STI testing or not during study enrollment did not significantly differ by BMI group ($p=0.20$), nor did time between baseline and STI follow-up testing ($p=.47$).

Logistic regression models listed in Table 3 yielded p values for the Hosmer-Lemeshow tests of 0.06 to 0.97 indicating good fit of all the models. As some of the interactions between race/ethnicity and BMI were statistically significant, we examined race/ethnicity-specific models for all dependent variables listed in Table 3. We observed, in comparison with White normal weight women, White overweight women were less likely to ever give (odds ratio [OR] 0.42; 95% confidence interval [CI] [0.19, 0.91]) or ever receive oral sex (OR 0.42; 95% CI [0.18, 0.99]). In addition, White obese women were also less likely to ever receive oral sex (OR 0.32; 95% CI [0.14, 0.76]). No significant associations were observed for Black women with regard to any of the dependent variables of interest. Overweight Hispanic women were less likely to receive oral sex during the past 3 months than their normal weight counterparts (OR 0.57; 95% CI [0.32, 1.00]). Moreover, obese Hispanic women were more likely to have anal intercourse (OR 2.18; 95% CI [1.30, 3.65]) compared with normal weight Hispanic women.

To examine the effect of acculturation on the association of BMI with STI and sexual behaviors, this variable was included in logistic regression analyses solely for Hispanic women. More acculturated Hispanic women were more likely to ever give oral sex (OR 1.98; 95% CI [1.33, 2.95]), give oral sex during the past three months (OR 1.73; 95% CI [1.13, 2.66]), ever receive oral sex (OR 2.46; 95% CI [1.63, 3.71]), and receive oral sex during the past three months (OR 1.71; 95% CI [1.01, 2.92]).

Bivariate analysis showed BMI categories were not associated with almost any of the contraceptive behaviors at any follow-up point (Table 4). Over the 12-month period, 14.4% ($n=146$) women became pregnant, but rates did not differ by BMI categories (normal weight: 13.7%; overweight: 15.5%; obese: 14.2%; $p=0.80$). Multivariable analyses based on GEE models, after adjusting for covariates, also confirmed the findings of the bivariate analyses (Table 5). Further, based on a Cox proportional hazard model, the risk of pregnancy during the 12-month period did not differ by BMI.

Discussion

To minimize potential adverse clinical outcomes, it is important for health and medical professionals to understand the myriad of factors influencing a woman's sexual behaviors, contraceptive compliance, and risk for STIs and unintended pregnancy. The current study sought to identify BMI as a correlate of various sexual and reproductive health behaviors and outcomes among women of varying demographics.

Previous studies identifying the relationship between BMI and STI rates have varied in their results. Our study found that when adjusted for demographic factors, participants with a higher BMI were no more likely to be diagnosed with an STI than those with a lower BMI. However, these findings are in contrast to those reported by Kershaw et al.³ and Leech et al.,² who found that overweight women were more likely to have a history of STIs than their normal weight counterparts.

We failed to observe notable racial/ethnic differences regarding the association between BMI categories and STIs and measured sexual behaviors, other than oral sex and anal

TABLE 4. CONTRACEPTIVE BEHAVIORS AMONG ORAL CONTRACEPTIVE USERS OVER 12 MONTHS OF FOLLOW-UP

	<i>Normal weight</i> (n=423)	<i>Overweight</i> (n=304)	<i>Obese</i> (n=288)	p
Continued oral contraceptive (OC)				
3 months	244 (57.7)	159 (52.3)	159 (55.2)	0.35
6 months	163 (38.5)	110 (36.2)	107 (37.2)	0.81
12 months	78 (18.4)	71 (23.4)	56 (19.4)	0.25
Adopted another method				
3 months	57 (13.5)	47 (15.5)	43 (14.9)	0.73
6 months	75 (17.7)	51 (16.8)	54 (18.8)	0.82
12 months	76 (18.0)	53 (17.4)	60 (20.8)	0.51
Not using any contraceptive				
3 months	23 (5.4)	32 (10.5)	29 (10.1)	0.02*
6 months	47 (11.1)	49 (16.1)	47 (16.3)	0.07
12 months	73 (17.3)	51 (16.8)	53 (18.4)	0.87
Discontinued the study				
3 months	84 (19.9)	57 (18.8)	48 (16.7)	0.56
6 months	128 (29.5)	88 (29.0)	77 (26.7)	0.60
12 months	186 (44.0)	125 (41.1)	118 (41.0)	0.65
Condom use at last vaginal intercourse				
3 months	146 (34.5)	100 (32.9)	104 (36.1)	0.71
6 months	128 (30.3)	95 (31.3)	91 (31.6)	0.92
12 months	109 (25.8)	75 (24.7)	71 (24.7)	0.92
Dual use of condom and OC				
3 months	76 (18.0)	47 (15.5)	54 (18.8)	0.54
6 months	66 (16.0)	47 (16.1)	47 (17.1)	0.92
12 months	60 (14.4)	38 (12.8)	45 (16.0)	0.56

Listed as n (%). To identify specific pairwise differences for categorical variables, we created separate 2×2 tables for each of the pairs and used chi-square tests. To adjust for multiple comparisons, $p < 0.0166$ (.05/3) was used to indicate the statistical significance between any two contraceptive groups.

*Indicates that difference between normal weight and overweight is statistically significant.

intercourse. When comparing oral sex behaviors across BMI and race/ethnicity, we observed overweight White women were less likely to give or receive oral sex than their normal weight counterparts. The same scenario was also true for overweight Hispanic women regarding receiving oral sex during past three months. With regards to anal intercourse, we found obese Hispanic women were more likely to engage in this behavior than those classified as normal weight. As anal intercourse is considered a risky sexual behavior, our

results contradict the findings of Kaneshiro⁷ who reported that overweight and obese women do not engage in riskier sexual behaviors than normal weight women.

A likely explanation for the differences between our study and past studies may be due to differences in populations or data acquisition. For example, the studies by Kershaw et al.³ and Leech et al.² included only black and white women while our population also included a large proportion of Hispanic women. Moreover, a few associations between BMI categories and measured behaviors differed by race/ethnicity. Additionally, some of these behaviors differed among Hispanics based on level of acculturation. This further supports the need for additional research among Hispanic populations regarding sexual behaviors and STI acquisition.

Moreover, in contrast to Leech et al.² who relied on self-reporting, we used objective measures for BMI, which have greater validity and reliability,¹⁹ and STI rates. Overall, the objective measures used in our study lend support to the argument that BMI does not influence risky sexual behaviors or STI rates. Furthermore, our outcomes suggest that BMI is not related to contraceptive failure or unintended pregnancy rates. However, further research specifically investigating this relationship is needed, since others studies found the contrary.^{11–12}

This study had several limitations. First, it was limited to low-income adolescents and women already accessing reproductive health care and seeking contraception, which limits the generalizability of the results. Additionally, data was collected in the Texas Gulf Coast region and may not be generalizable to other demographically or geographically dissimilar populations. Next, the measurement tool was not designed to solely investigate sexual and reproductive health behavior, but rather was nested in a questionnaire examining contraceptive and condom use. Therefore, correlates examined were based on convenience. Last, given that survey questions covered topics sensitive topics and data were, in part, obtained through self-administered questionnaires, it is difficult to determine the accuracy of our assessments. However, conducting this study in a clinical sample allowed us to use objective measurements for height, weight, STIs, Pap smear results, and pregnancy rates, which has not been done in previous studies on this topic.

Overall, we did not find a relationship between BMI and STI history or contraceptive compliance. Therefore, all women should receive equal contraceptive counseling, including condoms, to reduce the risk of unplanned pregnancy and STIs.

TABLE 5. ASSOCIATION OF BODY MASS INDEX WITH CONTRACEPTIVE BEHAVIORS AND UNINTENDED PREGNANCY

	Overweight OR (95% CI)	Obese OR (95% CI)
Continued OC	0.89 (0.69–1.16)	0.89 (0.68–1.16)
Adopted another method	1.00 (0.74–1.34)	1.09 (0.81–1.47)
Not using any contraceptive	1.25 (0.90–1.74)	1.32 (0.94–1.85)
Discontinued the study	0.94 (0.70–1.25)	0.93 (0.69–1.25)
Condom use at last sexual intercourse	1.06 (0.80–1.41)	0.97 (0.73–1.29)
Dual use of condom and OC	0.94 (0.69–1.29)	1.09 (0.81–1.49)
Unintended pregnancy	1.08 (0.73–1.60)	1.09 (0.72–1.63)*

Normal weight women were used as the reference category. All models adjusted for age, race/ethnicity, marital status, lifetime pregnancy, and intervention group. Separate logistic regression models were used for each of the dependent variables listed in the table.

*Based on Cox proportional hazard model and should read as hazards ratio.

Acknowledgments

Federal support for this study was provided by the Maternal and Child Health Bureau of the Health Resources and Services Administration (HRSA/MCHB R40MC06634, PI: Berenson) and the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the National Institutes of Health (NIH/NICHD K24HD04365, PI: Berenson). Dr. DeMaria was supported by an institutional training grant (NIH/NICHD National Research Service Award T32HD055163, PI: Berenson). The content is solely the responsibility of the authors and does not necessarily represent the official views of the MCHB, HRSA, NICHD, or the NIH.

Disclosure Statement

No competing financial interests exist.

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