Body Image and Attitude toward Obesity in an Historically Black University

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Introduction: The obesity epidemic is a major problem in the United States, particularly among black women. Body image and attitudes toward obesity are important areas to understand and address in any comprehensive approach to this epidemic.

Methods: From an initial evaluation of 200 college students (25 male and 25 female freshmen, sophomores, juniors and seniors each) attending an historically black university, we selected those students who identified themselves as black for data analysis (n=191). All students underwent height and weight measurement from which body mass index (BMI) was calculated. Each student answered two questions related to nine silhouettes for each sex that progressively moved from extreme thinness to extreme obesity. Also, each student answered 20 questions describing attitudes about obesity.

Results: Black college students placed between the 62nd and 72nd percentiles of national BMI data for adolescents. Black female students were more likely than their black male counterparts to be obese. BMI did not vary by sex or grade level. Students of both sexes generally preferred "trim" silhouettes with the caveat that students with BMIs <25 kg/m^2 preferred smaller silhouettes than did students with BMIs ≥25 kg/m^2. BMI and sex did not favor any particular set of attitudes toward obesity.

Conclusion: Black male and female college students from an historically black university were largely in the "normal" range of BMI percentiles for sex and age. Our black female students were more likely to be obese than our black male students. Our findings suggest that young black women are tolerant of a variety of body sizes. Based on findings from our Attitudes Toward Obese Persons scale, body size sense of self and sex do not influence attitudes toward obese persons. Further studies are needed.

Key words: blacks ■ body image ■ body mass index ■ historically black university ■ obesity

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INTRODUCTION

The epidemic of obesity is of major concern in the United States.[1-7] Allison and Saunders[8] in their 2000 publication reported that 60.6% of white, non-Hispanic adult men were overweight or obese. A comparable figure for black, non-Hispanic adult men was 56.7% and for Mexican-American adult men was 63.9%. For adult women, prevalence rates of overweight or obesity were as follows: white, non-Hispanic—47.4%; black, non-Hispanic—66%; and Mexican-American—65.9%. Thus, among the three largest racial and ethnic segments of the U.S. population, black women and Hispanics of both sexes have the highest rates of overweight and obesity.[8] Melnyk and Weinstein[9] stressed the importance of eliminating a predominantly white, Anglo-Saxon, ethnocentric perspective to understand, prevent and treat obesity in black female adolescents in the United States.

Fontaine et al.[10] studied years of life lost due to obesity. They noted that obesity markedly lessens life expectancy, especially among younger adults. Younger black Americans with severe obesity had a maximum years of life lost of 20 years for men and five years for women.

The concept of body mass index (BMI) is core to understanding obesity in children, adolescents and adults. BMI is defined as weight (kilograms) divided by height squared (meters^2). If one uses the English system of measurement instead of the metric system, then BMI = [weight (pounds) / height (inches^2)] x 703 (to convert to kg/m^2).

For children and adolescents, tables are available for BMI percentiles for sex and age.[11] These tables should be employed rather than using absolute measurements of BMI to define obesity in youths. Among youths, the Centers for Disease Control and Prevention (CDC) does not use the term obesity. Rather, they define youths with BMI between the 85th percentile to <95th percentile for sex and age as at risk for overweight. Youths are overweight when the BMI for sex and age ≥95th percentile. Adults with a BMI of 25–29.9 kg/m^2 are considered overweight; those with

a BMI of 30 kg/m^2 or more are considered obese. In our paper, whenever possible, we use specific BMI measurements to describe our findings rather than less clear terms, such as "overweight" and "obese."

Obesity-related health risk factors include diabetes mellitus, hypertension, high cholesterol, asthma, arthritis and poor health status.[7] Obesity is rapidly overtaking smoking as the leading cause of death in the United States.[12] Body image perceptions and attitudes about obesity may help us better elucidate the origins and management of this major health problem.

For nearly a century, writers, artists, mental health professionals, philosophers and other scholars have sought to understand and describe "body image."[13] Some separate this concept into perceptual body image (how we see our bodies) and attitudinal body image (how we feel about our bodies).[14] Investigators have shown that ethnic groups are generally similar in defining their ideal body image traits, while embracing differences in such parameters as skin color and breast size.[15]

Jackson and McGill[16] argue that black males prefer larger body types for females, while black females prefer slightly thinner body types for males. They suggested that there are race-specific standards of attractiveness within cultures, with black men preferring larger women than white men. The authors postulated that within the larger U.S. culture, black men valued wide hips and round buttocks, and black women valued full lips and muscular legs.

In a sample of black and white female dieters, Caldwell et al.[17] looked at the relationships of weight, body dissatisfaction and self-esteem. Study subjects were overweight and of middle-to-high socioeconomic status. Race did not predict differences in body dissatisfaction, self-esteem, discrepancies between actual and ideal shape and weight, or the relationship between self-esteem and body dissatisfaction. BMI contributed more to body satisfaction scores in white than black women. The authors concluded that socioeconomic class was more predictive than race in identifying important body image factors for black and white women.

Thompson et al.[18] reported black and white male adolescent perceptions of ideal body size. They employed a questionnaire and a series of nine male and female body size drawings. The authors found that black male adolescents preferred a heavier ideal female body size than their white counterparts. These black male adolescents compared with their white counterparts also believed that their parents and female and male friends would select as ideal heavier female body size. Specifically, black male adolescents were almost twice as likely as white male adolescents to select a larger ideal female hip/buttocks size and larger ideal female thigh size. Thompson et al.[18] concluded that black male adolescents were more likely than their white counterparts to approve of and find socially acceptable a larger body size for black females.

In some settings, overweight and obesity are seen in largely positive terms. Simeon et al.[19] looked at body image of adolescents in a multiethnic Caribbean population. A cross-sectional survey was conducted in the secondary schools in Trinidad (stratified random sample of 1,139 youths, ages 14–17 years). Ethnic groups included South Asians (49%), Africans (25%) and

Table 1a. BMI Measurements by Sex

BMI measurement (kg/m^2)	Men (n=96)	Women (n=95)
Mean	26.026	24.660
Standard error	0.5943	0.5159
Upper 95% CI	27.206	25.685
Lower 95% CI	24.846	23.636
Range	16.133–48.817	17.473–39.931

Table 1b. BMI Measurements by Grade Level

BMI measurement (kg/m^2)	Freshman (n=45)	Sophomore (n=48)	Junior (n=50)	Senior (n=48)
Mean	25.265	25.510	25.218	25.395
Standard error	0.7469	0.9084	0.8064	0.7062
Upper 95% CI	26.771	27.338	26.838	26.815
Lower 95% CI	23.760	23.683	23.597	23.974
Range	18.024–41.367	16.133–48.817	17.473–43.451	17.944–36.978

Table 1c. BMI Category by Sex

Sex	<25 kg/m^2	≥25 kg/m^2	Total
Men	48	48	96
Women	60	35	95

youths of mixed ethnicity (23%). BMI measurements showed that 14% were thin, 73% normal and 13% overweight. South-Asian male adolescents were preponderantly thin (28%) and more likely to overestimate their body size than other adolescents. Thin South Asians compared with other thin adolescents were more likely to be satisfied with their body size. Overweight African adolescents compared with other overweight adolescents were more likely to be satisfied with their body size. The majority of the study sample associated normal body size with good health and associated overweight and obese silhouettes with wealth. In 40% of the study subjects, male overweight and obese silhouettes were associated with happiness. The authors expressed concern that many of the Trinidad adolescents associated obesity with wealth and happiness. They also worried that overweight African female adolescents were satisfied with their body size.

Adkins[20] used female college students to assess race as a predictor of body image satisfaction and body size preference. Thirty black female students and 55 white female students completed various measures of body image satisfaction, including line drawings to assess current and ideal body size. Although there were no significant racial differences in perceived current body size or self-reported weight, black female students described less body dissatisfaction, a lesser drive for thinness and less fear of body fat than their white counterparts. Compared with white female students, black female students selected a larger ideal body size from the line drawings.

During the course of four years, college students transition from late adolescents to early adulthood. Most commonly this is done in a multiracial setting

MALE student responses to silhouettes in Appendix A
Question 1: Which body number best shows who you ARE now?
Table 2.I.1a

Figure	BMI <25	BMI ≥25	Total
1	2	0	2
2	8	0	8
3	30	9	39
4	8	21	29
5	0	12	12
6	0	2	2
7	0	4	4

Pearson's chi square value = 45.135, df = 6, p value <0.001

Table 2.I.1b

Figure	Frequency	Mean	Standard Error	Lower 95%	Upper 95%
1	2	21.5608	2.5007	16.592	26.530
2	8	20.9558	1.2503	18.471	23.440
3	39	23.2053	0.5663	22.080	24.330
4	29	26.4490	0.6567	25.144	27.754
5	12	31.2077	1.0209	29.179	33.236
6	2	37.7368	2.5007	32.768	42.706
7	4	41.4440	1.7683	37.931	44.958

Standard error uses a pooled estimate of error variance; The ANOVA shows an F(0.95; 6, 89) = 28.0960, with a P-value <0.0001, and Power of 1.00.

Comparison for all pairs using Tukey-Kramer HSD

Abs(Dif)-LSD	7	6	5	4	3	1	2
7	-7.5442	-5.5325	4.0765	9.3045	12.6373	10.6435	13.9548
6	-5.5325	-10.6691	-1.6195	3.4879	6.7964	5.5070	8.3464
5	4.0765	-1.6195	-4.3556	1.0966	4.4804	1.4982	5.3821
4	9.3045	3.4879	1.0966	-2.8018	0.6276	-2.9118	1.2324
3	12.6373	6.7964	4.4804	0.6276	-2.4161	-6.0907	-1.8915
1	10.6435	5.5070	1.4982	-2.9118	-6.0907	-10.6691	-7.8297
2	13.9548	8.3464	5.3821	1.2324	-1.8915	-7.8297	-5.3345

Positive values show pairs of means that are significantly different.

Comparison of mean BMI for all pairs using the Tukey-Kramer HSD procedure shows figures 6 and 7 were not different from each other but both were significantly different from figures 1, 2, 3, and 4. Figure 7 was also significantly difference from figure 5. Figures 1,2, and 3, were not different from each other. The mean BMI for figure 5 was significantly different from the mean BMI values for figures 1, 2, 3, and 4, but not with Figure 6.

in the United States. An historically black university provides a less commonly available model to assess attitudes towards and perceptions about body image and obesity among young, educated black men and women during their formative years. To further study this important topic, we measured BMI; used silhouettes of different body sizes to identify self and personal preferences; and sought attitudes and perceptions about obesity among freshman, sophomores, juniors and seniors at Virginia State University. This study is one more step to help us to better understand and improve our management of obesity among young black Americans in the United States.

Methods

Following protocol approval by the Institutional Review Boards of Virginia State University and Virginia Commonwealth University, 200 students (25 male freshmen, 25 female freshmen, 25 male sophomores, 25 female sophomores, 25 male juniors, 25 female juniors, 25 male seniors and 25 female seniors) underwent measurement of height and weight and completed two interview forms (Appendices A and B) on November 21, 2003 at Virginia State University, Petersburg, VA. We posted flyers in classrooms, hallways, the student center and on bulletin boards. We also made announcements in classrooms throughout the campus. No effort was made to randomly select students. Rather, we took a convenience sample in response to announcements about this study. Each student called and scheduled an appointment day and time. When each student called, we asked if they were classified as a freshman, sophomore, junior or senior. Once we reached 25 men and 25 women for each class level, we turned away additional callers.

A budget of $1,000 and a decision to pay each student $5 to participate dictated a selection of 200 students to participate in this study. We measured height and weight (counterweight scales) in one of the health, physical education and recreation classrooms on campus. Each student was a number between 1 and 200 to ensure privacy and confidentiality.

All students completed a 10-minute survey. Each participate was a "traditional" student. Each student encounter took about 30 minutes. Information obtained from each student included: 1) date of birth, 2) date of measurement, 3) sex, 4) race, 5) year in school, 6) height and 7) weight. We made no

MALE students responses to silhouettes in Appendix A
Question 2: Which body number best shows who you would LIKE to be?
Table 2.I.2a

Figure	BMI <25	BMI ≥25	Total
1	2	1	3
2	2	4	6
3	21	10	31
4	22	26	48
5	1	7	8

Pearson's Chi-squared value=9.737, df=4, p value=0.045

Table 2.I.2b

Figure	Number	Mean	Standard Error	Lower 95%	Upper 95%
1	3	24.0047	2.6719	18.697	29.312
2	6	25.5445	1.8893	21.792	29.297
3	31	24.2874	0.8312	22.636	25.938
4	48	25.3441	0.6680	24.017	26.671
5	8	37.9785	1.6362	34.728	41.229

Standard error uses a pooled estimate of error variance; The ANOVA shows an F(0.95; 4, 91) = 14.8551, with a p value <0.0001 and Power of 1.00.

Comparison for all pairs using Tukey-Kramer HSD

Abs(Dif)-LSD	5	2	4	3	1
5	-6.4401	5.4779	7.7158	8.5834	5.2539
2	5.4779	-7.4364	-5.3769	-4.4876	-7.5679
4	7.7158	-5.3769	-2.6292	-1.9111	-6.3259
3	8.5834	-4.4876	-1.9111	-3.2716	-7.5052
1	5.2539	-7.5679	-6.3259	-7.5052	-10.5166

Positive values show pairs of means that are significantly different; The Tukey-Kramer HSD procedure of multiple comparisons for all pairs shows mean BMI values for Figures 1, 2, 3 and 4 were not different from each other. All four figures had mean BMI values that were significantly different from the mean BMI for Figure 5.

effort to select students based on race. Each student wrote down what they considered their race to be in a blank space marked "race." We did not have a preformed list of races from which they could select. We used the racial descriptor "black" whether the student wrote down "black" or "African-American."

Appendix A shows the body image form each student completed. A "green" background for each body image eliminated skin color as a consideration in body image selection. Facial features were nondescript. Appendix B [Attitudes Toward Obese Persons scale (ATOP)][21] listed the 20 questions each student answered.

Study Sample

Eight of the students described themselves in a racial group other than black. One student did not complete all of the items on Appendix B. Therefore, we were left with data from 191 black students to analyze.

APPROACH TO DATA ANALYSIS AND RESULTS

Measures

We measured each student's height (inches) and weight (pounds). For students age 20 years and older, we calculated body mass index: BMI (kg/m^2) = [weight (pounds) / height^2 (inches^2)] x 703. For students under the age of 20 years, we used the Nutstat module of EpiInfo to determine BMI, BMI percentile and BMI z-score.[22]

Appendix A shows progressively more obese body images (silhouettes) of nine male figures and nine female figures. Each student selected the

FEMALE students responses to silhouettes in Appendix A
Question 1: Which body number best shows who you ARE now?
Table 2.II.1a.

Figure	BMI <25	BMI ≥25	Total
10	5	0	5
11	14	0	14
12	33	3	36
13	8	9	17
14	0	14	14
15	0	8	8
16	0	1	1

Pearson's Chi-squared value=64.980, df=6, p value <0.001

Table 2.II.1b

Figure	Number	Mean	Standard Error	Lower 95%	Upper 95%
10	5	18.4884	1.0610	16.380	20.597
11	14	20.1721	0.6340	18.912	21.432
12	36	22.6447	0.3954	21.859	23.430
13	17	24.9797	0.5754	23.836	26.123
14	14	29.8582	0.6340	28.598	31.118
15	8	33.9032	0.8388	32.236	35.570
16	1	38.7745	2.3724	34.060	43.489

Standard error uses a pooled estimate of error variance; The one-way ANOVA shows an F(0.95; 6, 88)=55.7133, with a p value <0.0001 and Power of 1.00.

Comparison for all pairs using Tukey-Kramer HSD

Abs(Dif)-LSD	16	15	14	13	12	11	10
16	-10.1243	-2.7220	1.5061	6.4283	8.8722	11.1922	12.4438
15	-2.7220	-3.5795	0.8722	5.8542	8.4604	10.5583	11.3336
14	1.5061	0.8722	-2.7058	2.2948	4.9587	6.9803	7.6401
13	6.4283	5.8542	2.2948	-2.4555	0.2283	2.2239	2.8492
12	8.8722	8.4604	4.9587	0.2283	-1.6874	0.2177	0.7395
11	11.1922	10.5583	6.9803	2.2239	0.2177	-2.7058	-2.0461
10	12.4438	11.3336	7.6401	2.8492	0.7395	-2.0461	-4.5277

Positive values show pairs of means that are significantly different; Comparison of mean BMI for all pairs using the Tukey-Kramer HSD procedure shows Figures 15 and 16 are not different from each other. Both are significantly different from Figures 10, 11, 12, 13 and 14. Figure 14 was significantly different from figures 10, 11, 12 and 13. Figure 13 was also different from figures 10, 11 and 12. Figures 10 and 11 were not different from each other but both were significantly different from Figure 12.

appropriate silhouette according to their perception of appropriate body image number for each of the two questions. The students received no further instructions for this appendix.

Appendix B asks 20 questions about attitudes toward obese persons. We employed a Likert scale ranging from +3 to -3 and omitted the neutral response "0." That is, we forced either an "agree" or "disagree" response. This ATOP scale appears in Allison's *Handbook of Assessment Methods for Eating Behaviors and Weight-Related Problems*.[23] Yuker et al.[21] adapted the ATOP scale from an earlier book on attitudes towards disabled persons. This scale flowed from a premise that obese persons face a severe degree of social discrimination.

JMP 4.0 and SPSS Version 12 for Windows were used for all statistical analyses. The tables were created using Microsoft Excel 2000.

Descriptive Analysis

An initial descriptive analysis reporting on the BMI (mean, standard error of the mean, 95% CI and range) was performed on the data stratified by sex (Table 1a). Table 1b shows the BMI measurements by grade level.

Because a BMI ≥25 kg/m² identifies adult subjects who are overweight, we used this value to separate our study sample into two groups (normal weight and overweight). Table 1c shows BMI measurements for our subjects separated into those <25 kg/m² (normal weight) and those ≥25 kg/m² (overweight).

Strata Analysis

For responses related to body silhouettes (Appendix A and Questions 1 and 2), the analysis was done using two approaches. For each approach, male and female students were analyzed separately.

Method 1: Recoding of BMI into two categories: 1) overweight or obese and 2) normal weight and reporting on the frequencies for different body selections. We reported Pearson's Chi-squared test of association for each table.

Method 2: In this approach, we conducted one-way ANOVA on the mean BMI for all the selected figures. The F-statistic, p values and Power analysis are reported for each table. To determine which of the responses had significantly different BMI values, we conducted a comparison using the Tukey-Kramer HSD procedure.

Appendix B lists the 20 questions we used to assess attitudes toward obese persons. All responses with positive integers (i.e., +3, +2, +1) were categorized as

FEMALE students

Question 2: Which body number best shows who you would LIKE to be?

Table 2.II.2a

Figure	BMI <25	BMI ≥25	Total
11	16	3	19
12	38	13	51
13	6	18	24
15	0	1	1

Pearson's Chi-squared value = 23.176, df = 3, p value <0.001

Table 2.II.2b.

Figure	Number	Mean	Standard Error	Lower 95%	Upper 95%
11	19	22.6560	1.0121	20.646	24.667
12	51	23.3476	0.6178	22.121	24.575
13	24	28.8593	0.9006	27.070	30.648
15	1	28.9101	4.4118	20.146	37.674

Standard error uses a pooled estimate of error variance; The one-way ANOVA shows an F(0.95; 3, 91) = 10.3680, with a p value <0.0001 and Power of 1.00.

Comparison for all pairs using Tukey-Kramer HSD

Abs(Dif)-LSD	15	13	12	11
15	-16.3292	-11.7338	-6.0967	-5.5924
13	-11.7338	-3.3332	2.6535	2.6576
12	-6.0967	2.6535	-2.2865	-2.4118
11	-5.5924	2.6576	-2.4118	-3.7462

Positive values show pairs of means that are significantly different; Comparison of mean BMI for all pairs using the Tukey-Kramer HSD procedure shows Figures 11 and 12 did not differ from each other but both were significantly different from Figure 13. Figure 15 did not differ from the other three figures.

"agree", and responses with negative integers (i.e., -3, -2, -1) were categorized as "disagree." Using the BMI categorization of overweight or obese and normal weight, and a stratification of the sexes into males and females, a Chi-squared test of association was conducted on the responses to each question (Table 3).

RESULTS

There were 96 male students [mean age 20.2 ± (SD) 2.7 years] and 95 female students [mean age 20.2 ± (SD) 1.4 years]. Of these 191 students, 45 were freshman, 48 sophomores, 50 juniors and 48 seniors.

The BMI determinations for the 96 male students was 26.0 ± [SEM] 0.6 kg/m^2 and for the 95 female students 24.7 ± [SEM] 0.5 kg/m^2 (Table 1a). By grade level, BMI measurements were freshman 25.3 ± 0.7 kg/m^2 (n=45); sophomores 25.5 ± 0.9 kg/m^2 (n=48); juniors 25.2 ± 0.8 kg/m^2 (n=50); and seniors 25.4 ± 0.7 kg/m^2 (n=48) (Table 1b). There were no significant differences in mean BMI measurements by sex or grade level (ANOVA).

In separating BMI category (normal weight and overweight) by sex (Table 1c), the men were evenly divided between these two groupings (n=48 for those men with BMI <25.0 kg/m^2 and for those men with BMI ≥25.0 kg/m^2). Most women (63.2%) had BMI measurements <25 kg/m^2 (normal weight).

Of the 96 men, 48 were under age 20 years and of the 95 women, 46 were under age 20 years. We selected these subsets of our sample for further study because national norms were available (2000 CDC Growth Charts[11]). Using the Nutstat module of Epi Info[22] for students under age 20 years, mean BMI, BMI percentiles and z-scores for the 48 men were 24.89 ± (SD) 5.50 kg/m^2, 60.75 ± (SD) 29.31, and 0.3236 ± (SD) 1.2046, respectively, and for the 46 women 25.32 ± 5.43 kg/m^2, 67.11 ± 27.15, and 0.5893 ± 0.9486, respectively. For these 48 men in a normal distribution, their mean z-score places them at the 62.69 BMI percentile. For these 46 women in a normal distribution, their mean z-score places them at the 72.31 BMI percentile.

Six (12.5%) of the 48 men under age 20 years had BMIs above the 95th percentile. Eight (17.4%) of the 46 women under age 20 years had BMIs about the 95th percentile. Thus, these 14 subjects were considered overweight using 2000 CDC nomenclature[11] and obese using the American Academy of Pediatrics nosology.[24]

For men for Question 1 of Appendix A (body silhouettes, Which body number best shows who you ARE now?), students of normal weight separated significantly (p<0.001) from those who were overweight or obese using the Pearson Chi-squared procedure (Table 2.I.1a). ANOVA also showed statistically significant differences (p<0.0001) and Power of 1.00 (Table 2.I.1b). The legend for Table 2.I.1b shows post-hoc findings.

For men for Question 2 of Appendix A (Which body number best shows who you would LIKE to be?), students of normal weight separated significantly (p=0.045) from those who were overweight or obese using the Pearson Chi-squared procedure (Table 2.I.2a). ANOVA also showed statistically significant differences (p<0.0001) and Power of 1.00 (Table 2.I.2b). The legend for Table 2.I.2b shows post-hoc findings. (The preferred figures, among both obese and normal weight male students, were 3 and 4.)

For women for Question 1 of Appendix A (body silhouettes, Which body number best shows who you ARE now?), students of normal weight separated significantly (p<0.001) from those who were overweight or obese using the Pearson Chi-squared procedure (Table 2.II.1a). ANOVA also showed statistically significant differences (p<0.0001) and Power of 1.00 (Table 2.II.1b). The legend for Table 2.II.1b shows post-hoc findings.

For women for Question 2 of Appendix A (Which body number best shows who you would LIKE to be?), students of normal weight separated significantly (p<0.001) from those who were overweight or obese using the Pearson Chi-squared procedure (Table 2.II.2a). ANOVA also showed statistically significant differences (p<0.0001) and Power of 1.00 (Table 2.II.2b). The legend for Table 2.II.2b shows post-hoc findings.

The questions on attitude toward obesity (Appendix B, Questions 1–20) did not separate using the BMI categorization of overweight or obese and normal weight when stratified by sex. That is, attitudes tended to be similar independent of weight and sex (Table 3).

DISCUSSION

Our study sample comprised 191 black men and women attending an historically black university. These subjects were comparably distributed by sex and college level. Each subject underwent BMI determination and selected body images that best represented who they thought they were and how they would like to be. Also, each subject answered 20 questions about attitudes toward obese persons.

BMI measurements of our black college students (Tables 1a, 1b, 1c) when grouped according to those who were of normal weight and those who were overweight or obese did not significantly separate by sex or grade level even though most of the 95 women had a BMI <25 kg/m^2 and the 96 men were evenly grouped into those with BMI <25 kg/m^2 (n=48) and those with a BMI ≥25 kg/m^2 (n=48). One-half of our study sample was under the age of 20 years. We used 2000 CDC growth charts to com-

pare these younger students to national norms.[11] Mean z-scores placed these 48 men [BMI 24.89 ± (SD) 5.50 kg/m^2] at the 62.69 BMI percentile of the 2000 CDC growth charts.[11] That is, about 37% of the "normal" U.S. male population for sex and age weighed more than our male students under the age of 20 years. Mean z-scores for the 46 female students under age 20 years [BMI 25.32 ± (SD) 5.43 kg/m^2] placed them at the 72.31 BMI percentile of the 2000 CDC growth charts.[11] That is, about 28% of the "normal" U.S. population for sex and age weighed more than our 46 female students under the age of 20 years. Based on national "norms," our female students were more likely to be overweight

Table 3. Responses to Obesity-Related Questions (Appendix B)

Responses were separated by sex and whether the BMI was < or ≥25 kg/m^2. Female analyses appear in parentheses. All responses with positive integers (i.e., +3, +2, +1) were categorized as "aagree". Responses with negative integers (i.e., -3, -2, -1) were categorized as "disagree". The choice "0" was not available. That is, we "forced" an "agree" or "disagree" response.

Question	Agree	Disagree	Chi-Square	P Value
1. Obese people are as happy as nonobese people				
BMI <25 kg/m^2	31 (34)	17 (26)		
BMI ≥25 kg/m^2	22 (23)	26 (12)		
Total	53 (57)	43 (38)	3.412 (0.754)	0.065 (0.385)
2. Most obese people feel they are not as good as other people				
BMI <25 kg/m^2	25 (43)	23 (17)		
BMI ≥25 kg/m^2	30 (20)	18 (15)		
Total	55 (63)	41 (32)	1.064 (2.087)	0.302 (0.149)
3. Most obese people are more self-conscious than other people				
BMI <25 kg/m^2	32 (47)	16 (13)		
BMI ≥25 kg/m^2	32 (26)	16 (9)		
Total	64 (73)	32 (22)	0.000 (0.204)	1.000 (0.652)
4. Obese workers cannot be as successful as other workers				
BMI <25 kg/m^2	21 (14)	27 (46)		
BMI ≥25 kg/m^2	14 (10)	34 (25)		
Total	35 (24)	61 (71)	2.203 (0.321)	0.138 (0.571)
5. Most nonobese people would not want to marry anyone who is obese				
BMI <25 kg/m^2	26 (33)	22 (27)		
BMI ≥25 kg/m^2	28 (20)	20 (15)		
Total	54 (53)	42 (42)	0.169 (0.041)	0.681 (0.839)
6. Severely obese people are usually untidy				
BMI <25 kg/m^2	25 (27)	23 (33)		
BMI ≥25 kg/m^2	23 (20)	25 (15)		
Total	48 (47)	48 (48)	0.167 (1.304)	0.683 (0.254)
7. Obese people are usually sociable				
BMI <25 kg/m^2	36 (42)	12 (18)		
BMI ≥25 kg/m^2	34 (27)	14 (8)		
Total	70 (69)	26 (26)	0.211 (0.567)	0.646 (0.451)
8. Most obese people are not dissatisfied with themselves				
BMI <25 kg/m^2	27 (29)	21 (31)		
BMI ≥25 kg/m^2	27 (20)	21 (15)		
Total	54 (49)	42 (46)	0.000 (0.687)	1.000 (0.407)
9. Obese people as just as self-confident as other people				
BMI <25 kg/m^2	31 (39)	17 (21)		
BMI ≥25 kg/m^2	25 (24)	23 (11)		
Total	56 (63)	40 (32)	1.543 (0.126)	0.214 (0.722)

than our male students.

Six male (12.5%) and eight female (17.4%) black students were both under the age of 20 years and had BMIs ≥95th percentile. The 1999–2000 NHANES findings showed that the prevalence of BMIs ≥95th percentile among youths aged 12–19 years was 15.5%.[6] Thus, our male students met national standards but our female students had a slightly increased prevalence of obesity (BMIs ≥95th percentile).

These serial observations about BMI among our black students in an historically black university tend to be consistent with acceptable and even desir-

10. Most people feel uncomfortable when they associate with obese people				
BMI <25 kg/m^2	23 (12)	25 (48)		
BMI ≥25 kg/m^2	15 (8)	33 (27)		
Total	38 (20)	58 (75)	2.788 (0.109)	0.095 (0.742)
11. Obese people are often less aggressive than nonobese people				
BMI <25 kg/m^2	27 (25)	21 (35)		
BMI ≥25 kg/m^2	18 (16)	30 (19)		
Total	45 (41)	51 (54)	3.388 (0.148)	0.066 (0.701)
12. Most obese people have different personalities than nonobese people				
BMI <25 kg/m^2	25 (25)	23 (35)		
BMI ≥25 kg/m^2	22 (9)	26 (26)		
Total	47 (34)	49 (61)	0.375 (2.448)	0.540 (0.118)
13. Very obese people are ashamed of their weight				
BMI <25 kg/m^2	28 (49)	20 (11)		
BMI ≥25 kg/m^2	34 (28)	14 (7)		
Total	62 (77)	34 (18)	1.639 (0.040)	0.200 (0.842)
14. Most obese people resent normal weight people				
BMI <25 kg/m^2	22 (35)	26 (25)		
BMI ≥25 kg/m^2	26 (22)	22 (13)		
Total	48 (57)	48 (38)	0.667 (0.188)	0.414 (0.664)
15. Obese people are more emotional than other people				
BMI <25 kg/m^2	26 (31)	22 (29)		
BMI ≥25 kg/m^2	28 (17)	20 (18)		
Total	54 (48)	42 (47)	0.169 (0.085)	0.681 (0.771)
16. Obese people should not expect to lead normal lives				
BMI <25 kg/m^2	18 (13)	30 (47)		
BMI ≥25 kg/m^2	12 (10)	36 (25)		
Total	30 (23)	66 (72)	1.745 (0.574)	0.186 (0.449)
17. Obese people are just as healthy as nonobese people				
BMI <25 kg/m^2	21 (17)	27 (43)		
BMI ≥25 kg/m^2	14 (14)	34 (21)		
Total	35 (31)	61 (64)	2.203 (1.369)	0.138 (0.242)
18. Obese people are just as sexually attractive as nonobese people				
BMI <25 kg/m^2	24 (26)	24 (34)		
BMI ≥25 kg/m^2	22 (17)	26 (18)		
Total	46 (43)	50 (52)	0.167 (0.245)	0.683 (0.621)
19. Obese people tend to have family problems				
BMI <25 kg/m^2	19 (16)	29 (44)		
BMI ≥25 kg/m^2	17 (15)	31 (20)		
Total	36 (31)	60 (64)	0.178 (2.636)	0.673 (0.104)
20. One of the worst things that could happen to a person would be for him/her to become obese				
BMI <25 kg/m^2	24 (32)	24 (28)		
BMI ≥25 kg/m^2	20 (21)	28 (14)		
Total	44 (53)	52 (42)	0.671 (0.398)	0.413 (0.528)

able body builds in the literature. Jackson and McGill[16] reported that black men preferred larger body types for women than their white counterparts. Fitzgibbon et al.[14] wrote that black women were more accepting of larger body builds than white women. Because we did not compare racial/ethnic groups in our study, we can only comment that relatively larger body builds may have occurred among our black female students than our black male students because of greater social acceptance, greater sexual attractiveness or both.

Among male students selecting the silhouette best representing their perception of their current body image (Appendix A and Table 2.I.1a), actual mean BMI measurements for silhouettes 1–7 were 21.6-, 21.0-, 23.2-, 26.4-, 31.2-, 37.7- and 41.4 kg/m^2, respectively. Most male students selected a silhouette with a group mean BMI measurement between 23.2- and 26.4 kg/m^2. This is consistent with the mean BMI of 26.0 kg/m^2 for all 96 male students.

Among male students selecting the silhouette best representing their perception of who they would like to be (Appendix A and Table 2.I.1b), actual BMI measurements of the student for each silhouette selection for silhouettes 1–7 were 22.4-, 20.7-, 23.4-, 26.0-, 29.4-, 31.1-, 37.5- and 37.2 kg/m^2, respectively. That is, heavier male students tended to select larger silhouettes.

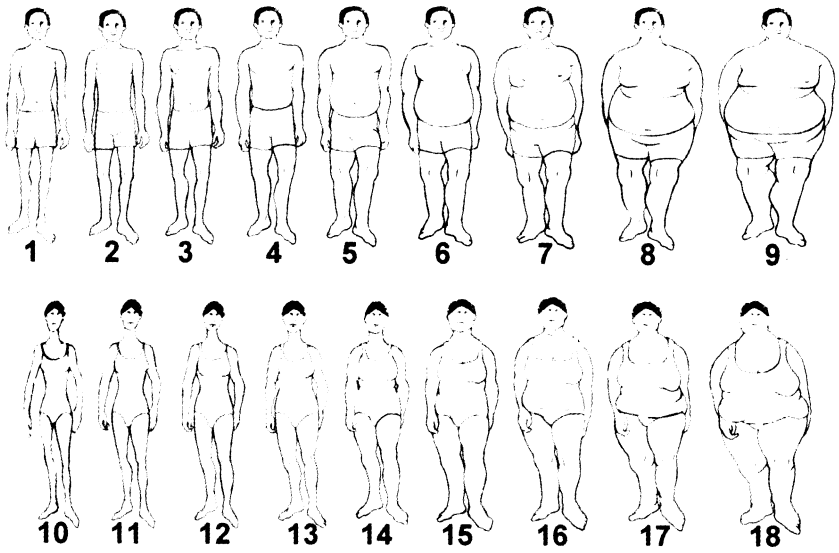
Among female students selecting the silhouette best representing their perception of their current body image (Appendix A and Table 2.II.1a), actual mean BMI measurements for silhouettes 10–16 were 18.5-, 20.2-, 22.6-, 25.0-, 29.9-, 33.9- and 38.8 kg/m^2, respectively. Most female students selected a silhouette with a group mean BMI measurement between 20.2- and 29.9 kg/m^2. This is consistent with the mean BMI of 24.7 kg/m^2 for all 95 female students.

Among female students selecting the silhouette best representing their perception of who they would like to be (Appendix A and Table 2.II.1b), actual BMI measurements of the student for each silhouette selection for silhouettes 11–13 and 15 were 22.7-, 23.3-, 28.9- and 28.9 kg/m^2, respectively. That is, heavier female students tended to select larger silhouettes.

Our findings about actual and desired silhouettes for our black students are consistent with our BMI findings. Adkins[20] noted that black female college students selected a larger ideal body size than white female college students from line drawings. We also know that black women and Hispanics of both sexes have the highest prevalence of obesity.[8] We do not know if the "tolerance" shown in our study for larger body sizes among our black female college students is a "chicken" or "egg" effect. That is, might black women have a tendency towards a larger body size than some other races/ethnic groups because black men find a larger body size attractive? OR, might black men find a larger body size attractive among black women because they observe it more commonly?

Responses in the ATOP scale (Appendix B and Table 3) failed to separate for men or women when BMI groupings were < or ≥25 kg/m^2. That is, none of the p values reached statistical significance. If one used the Bonferroni principle of dividing the level of significance (0.05) by the number of similar statistical tests performed (20), our p values moved even further away from meaningful differences. Perhaps, our findings reflect great tolerance for different body sizes by our study sample.

Appendix A.



1. ___ Which body number best shows who you ARE now?
2. ___ Which body number best shows who you would LIKE to be?

Bulik et al.[25] sought to establish BMI norms for standard figural stimuli. They also wanted this tool to separate thin and obese subjects. Using nine silhouettes similar to our own except for more Caucasian features, they surveyed all Caucasian twins born in Virginia between 1915 and 1971 and also used data from information gathered by the American Association of Retired Persons on individual twins. BMI and silhouette data were available on 11,366 men and 16,728 women rang-

ing in age from 18–100 years. Their data derived from weight and height reports rather than actual measurements. The authors[25] reported that Caucasian female twins preferred "smaller" sizes than Caucasian male twins. They concluded that figural stimuli are very useful in classifying individuals as obese or thin. Our findings raise serious questions for us about using silhouettes alone to estimate BMI and further separate subjects into obese and thin categories.

Thompson et al.[18] reported a stratified sample of 337 white and 159 black male adolescents using a questionnaire and nine male and female silhouettes proportioned similar to our silhouettes (Appendix A). As we did, the authors used the Nutstat module of Epi Info[22] to calculate BMI measurements. However, they did not estimate BMI percentiles or z-scores for sex and age. They simply used BMI measurements in their statistical analysis. Inspection of the 2000 CDC growth charts for children and adolescents[11] will reveal how unsatisfactory this methodology is. During childhood and adolescents, "normal" and "abnormal" BMI measurements vary greatly for sex and age. The clinician or investigator studying youths should convert BMI measurements to BMI percentiles and z-scores before embarking on statistical analysis.

Thompson et al.[18] reported a mean age of 15.14 years and mean BMI of 22.67 kg/m^2 for the 337 white male adolescents. Similar determinations for the 159 black male adolescents were 15.68 years and 22.69 kg/m^2. Using the 2000 CDC growth charts for male subjects, the group black male BMI value was at the 76th percentile (compared with our study value of 62.69 BMI percentile). That is, 24% of their U.S. adolescents would have greater BMIs (compared with 37% of such U.S. adolescents in our study). This would suggest that obesity was a greater problem for their black male adolescents than for ours. However, their estimate of the BMI distribution (as mentioned above) may be much less accurate than our estimate leaving their data suspect.

The findings of Thompson et al.[18] suggested that black male adolescents were more likely than their white male counterparts to approve and socially accept a larger body size for females. We did not compare our findings to a white group of college students.

Fitzgibbon et al.[14] reported the relationship between body image discrepancy and BMI across

Appendix B. Attitudes Toward Obese Persons (ATOP) Scale

Harold E. Yuker, David B. Allison, Myles S. Faith "Methods for measuring attitudes and beliefs about obese people" in *Handbook of Assessment Methods for Eating Behaviors and Weight-Related Problems. Measures, Theory, and Research* (David B. Allison, editor) Sage Publications Thousand Oaks, CA, 1995. Adapted from *Research With the Attitudes Toward Disabled Persons Scale (ATDP)* 1960–1985 by H.E. Yuker and J.R. Block, 1986, Hofstra University, Center for the Study of Attitudes Toward Persons With Disabilities, Hempstead, NY.

Please mark each statement below in the left margin, according to how much you agree or disagree with it. Please do not leave any blank. Write a +1, +2, +3, or -1, -2 or -3, according to the scale below.

Agree	**Disagree**
+3 = I strongly agree	-1 = I slightly disagree
+2 = I moderately agree	-2 =I moderately disagree
+1 = I slightly agree	-3 = I strongly disagree

1. ____ Obese people are as happy as nonobese people.
2. ____ Most obese people feel that they are not as good as other people.
3. ____ Most obese people are more self-conscious than other people.
4. ____ Obese workers cannot be as successful as other workers.
5. ____ Most nonobese people would not want to marry anyone who is obese.
6. ____ Severely obese people are usually untidy.
7. ____ Obese people are usually sociable.
8. ____ Most obese people are not dissatisfied with themselves.
9. ____ Obese people are just as self-confident as other people.
10. ____ Most people feel uncomfortable when they associate with obese people.
11. ____ Obese people are often less aggressive than nonobese people.
12. ____ Most obese people have different personalities than nonobese people.
13. ____ Very obese people are ashamed of their weight.
14. ____ Most obese people resent normal weight people.
15. ____ Obese people are more emotional than other people.
16. ____ Obese people should not expect to lead normal lives.
17. ____ Obese people are just as healthy as nonobese people.
18. ____ Obese people are just as sexually attractive as nonobese people.
19. ____ Obese people tend to have family problems.
20. ____ One of the worst things that could happen to a person would be for her/him to become obese.

racial groups using silhouettes more similar to those of Bulik et al.[25] than to ours (Appendix A). That is, even though they studied a racially diverse population, they used silhouettes most representative of European Americans. Body image discrepancy was defined as the difference between present and desired silhouette. White women experienced body image discrepancy at a lower BMI level (24.6 kg/m^2) than black (29.2 kg/m^2) or Hispanic (28.5 kg/m^2) women. The authors concluded that these findings might have unhealthful implications, particularly for women of color.

Celio et al.[26] stated that blacks are more likely than whites to have a wider range of socially acceptable weights, shapes and standards of attractiveness. They suggested that whites are more likely to focus on a slender body shape, while blacks have a more broadly based concept of attractiveness that includes personal style, hairstyle, skin color and tone, ethnic pride and grooming. Our questionnaire (Appendix B) was not this broadly based. Further study is warranted.

Strengths and Weaknesses of the Study

Selecting students from an historically black university has both strengths and weakness. Our study sample is more homogeneous than that found in most universities. Also, to the extent that racial/ethnic differences exist among college students, racial homogeneity reduces nonrace-specific factors. Our manner of student selection was nonrandom and subject to all the biases of a convenience sample. Also, our subject numbers were quite small.

CONCLUSION

Black male and female college students from an historically black university were largely between the 50th and 75% BMI percentiles for sex and age according to 2000 CDC growth charts. Based on data available in the literature, the distribution of BMI measurements among our black students was largely as expected with the caveat that our black female students were more likely to be obese than our black male students. Our findings support the observations of other investigators that young black women are tolerant of a variety of body sizes. Based on findings from our ATOP scale, body size sense of self and sex do not influence attitudes toward obese persons. Our findings are highly preliminary because of our small sample size and nonrandom selection of study subjects. Further studies are needed given the severity of the obesity epidemic in the United States, particularly among black women. Also, our study needs to be repeated in a more racially heterogeneous setting.

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