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HEALTH-RELATED QUALITY OF LIFE IN OVERWEIGHT AND NONOVERWEIGHT BLACK AND WHITE ADOLESCENTS

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Abstract

Objectives—To assess the impact of obesity on quality of life (QOL) in black and white adolescents.

Study design—One hundred ten overweight (body mass index [BMI], $41.7 \pm 8.9 \text{ kg/m}^2$) and 34 nonoverweight adolescents (BMI, $20.6 \pm 2.9 \text{ kg/m}^2$) and their parents completed measures of QOL.

Results—Overweight was associated with poorer adolescent-reported QOL and parent reports of their children's QOL. Examining groups by weight status and race, overweight whites reported the greatest impairment on Social/Interpersonal, Self-Esteem, and Physical Appearance QOL (all $P < .01$), whereas parents of overweight blacks reported the poorest General Health Perceptions scores regarding their children. Interactions between BMI z-score and race were detected for Social/Interpersonal, Self-esteem, Daily Living, Self-Efficacy, Self-regard, and Physical Appearance QOL (all $P < .05$): Higher BMI in whites was associated with greater impairments in QOL than in blacks. Parents reported similar relations for their children.

Conclusions—According to adolescent and parent reports, overweight is associated with poorer QOL in adolescence, regardless of race; however, compared with overweight white adolescents, blacks report less impairment in QOL. Future research is required to determine whether differences in QOL are predictive of treatment success.

Pediatric overweight is associated with increased medical morbidity¹ and negative psychosocial functioning.^{2,3} Limited prior research also suggests obesity affects significantly the quality of life (QOL) of adolescents. Six studies^{4–9} have directly examined the relation of childhood obesity and health related QOL (HRQOL), defined as “the physical, psychologic, and social domains of health that are influenced by individual experiences, beliefs, expectations, and perceptions.”¹⁰ One study found that obese youth report lower HRQOL compared with nonoverweight control subjects, with distress at levels similar to children and adolescents with cancer.⁴ Several groups have also found parents of overweight children more likely to report poorer child HRQOL than parents of nonoverweight children.^{5–7,9}

The relation between race and QOL has remained relatively unexplored in overweight children,¹¹ while yielding mixed findings in the adult literature. Some studies have found obese whites

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report more impairment on QOL measures than blacks,^{12–14} whereas others have identified no racial differences.^{15,16}

The goal of the current study was to compare the QOL of overweight and nonoverweight black and white adolescents. We hypothesized that both black and white overweight adolescents and their parents would report lower teen HRQOL than their nonoverweight counterparts. Since some data suggested obesity was associated with less psychologic distress in black than white adults, we also hypothesized that overweight black adolescents would report less impairment in quality of life than overweight whites.

BMI
HRQOL

Body mass index
Health-related quality of life

QOL

Quality of life

METHODS

Subjects

Extremely overweight (body mass index [BMI], 41.7 ± 8.9 kg/m²; mean $\pm$ SD) adolescents (62 black and 48 white) were assessed before entry into an obesity treatment program. Nonoverweight (BMI, 20.1 ± 2.9 kg/m²) adolescents ($n = 34$) were assessed before they participated in an exercise physiology study for healthy volunteer adolescents. Subjects were recruited through posted flyers and, in the case of overweight volunteers, newspaper advertisements and letters to local physicians. Inclusion and exclusion criteria are described elsewhere.¹⁷ The protocol was approved by the Institutional Review Board of the National Institute of Child Health and Human Development.

Of overweight adolescents screened, 34% ($n = 70$) did not enter the trial; 23 individuals chose not to participate based on the time commitment required, and 47 teens were ineligible because they lacked evidence of obesity-related comorbid conditions. There were no differences in the race, sex, or age of these groups compared with the studied cohort.

Adolescents completed the following questionnaires.

Impact of Weight on Quality-of-Life, adapted for use with adolescents (IWQOL-A) is a 66-item self-report, condition-specific instrument designed to measure the perceived effect of weight on quality of life. The adolescent version differs from the adult IWQOL¹⁸ in that it generates seven subscales (Health, Social/Interpersonal, Work, Mobility, Self-esteem, Activities of Daily Living, and Comfort with Food) subscales, eliminating the eighth (Sexual Life) subscale. Questions not applicable to adolescents were omitted from the original 74-item questionnaire and terminology was simplified and/or modified for adolescent use. The original IWQOL has demonstrated good construct validity, test-retest reliability, and internal consistency.^{18,19} Higher scores indicate greater QOL impairment. While a short-form of the IWQOL now exists, it was not available at the time data collection was initiated. To assess the construct validity of the adapted version of the IWQOL-A, we examined correlations of the Self-esteem and Social/Interpersonal subscales to data collected by the Children's Depression Inventory (CDI).²⁰ The IWQOL-A Self-esteem scale was significantly correlated with the CDI Negative Self-esteem scale ($P < .001$) and the Social/Interpersonal scale was significantly correlated with the CDI Interpersonal Problems scale ($P < .001$). Test-retest reliability was assessed over a 6 month interval in a subset of the adolescents by examining the intra-class correlation coefficients in 23 study subjects whose weight remained stable (within ± 0.93 BMI units, equivalent to a 5-lb change in body weight). The IWQOL-A Health ($\alpha = 0.66$; $P < .01$), Social/Interpersonal ($\alpha = 0.54$; $P < .05$), Work/School ($\alpha = 0.56$; $P = .06$), Mobility ($\alpha = 0.50$; $P = .06$), and Daily Living ($\alpha = 0.56$; $P < .05$) subscales all showed acceptable agreement. We

eliminated the Food Comfort scale ($\alpha = 0.31$, $P = .21$) from our analyses. The possible subscale score ranges are as follows: Health: 12 to 60, Social/Interpersonal: 11 to 55, Work/School: 6 to 30, Mobility: 10 to 50, Self-esteem: 10 to 50, and Activities of Daily Living: 7 to 35. While no data have been published on the IWQOL adolescent version, of the 6 scales retained for our analyses, 3 scales (Social/Interpersonal, Self-esteem, and Daily Living) maintained all of the individual items and constructs used to generate the same scales for the adult IWQOL. Studies of treatment seeking obese adults have reported the following ranges of mean subscale scores: Social/Interpersonal: 16.3 to 23.2, Self-esteem: 20.0 to 28.2, and Daily Living: 11.9 to 18.3.^{18,19,21}

Health-Related Quality-of-Life (HRQOL)²² is a 55-item HRQOL self-report assessment designed to address the key domains known to be affected by obesity and the subsequent loss of body weight. The questionnaire was developed using scales recommended by quality-of-life researchers, clinicians, obese individuals, and findings in the literature regarding HRQOL in obesity. The HRQOL generates the following subscales: General Health, Comparative Health, Health Efficacy (consisting of three individually scored questions: A, “How much do you believe your weight is harmful to your health?” B, “How much do you think your health will benefit if you achieve or maintain your ideal weight?” C, “How sure are you that you will control your weight in the next year?”), Overweight Distress, Depression, Self-regard, Physical Appearance, Work Productivity/Work Loss, Physical and Social Activities, and Satisfaction with Treatment. A study of normal weight and obese adults demonstrated good internal consistency and test-retest reliability, and adequate construct validity.²² For use with our sample, we adapted the HRQOL by eliminating the age-inappropriate questions that generate the Work Productivity/Work Loss and Physical and Social Activities scales. The Satisfaction with Treatment scale was removed as it was not relevant to our baseline analyses. For the General Health (possible score range: 0 to 100), Comparative Health (possible range: 0 to 100), and Physical Appearance (possible range: 0 to 35) subscales, lower scores indicate greater QOL impairment. For the Depression (possible range: 0 to 60), Health Efficacy (possible range: 1 to 10), Overweight Distress (possible range: 0 to 100), and Self-regard (possible range: 0 to 49) subscales, higher scores are indicative of worse QOL impairment.

In terms of construct validity, the HRQOL Depression scale was significantly correlated with 4 of 5 CDI subscales and with the Total scale (all $P \leq .001$). For test-retest reliability assessed over a 6-month interval, 5 of the 7 HRQOL scales showed acceptable agreement: General Health ($\alpha = 0.65$; $P = .01$); Health Efficacy B ($\alpha = 0.59$; $P < .05$); Depression ($\alpha = 0.67$; $P < .01$); Self-Regard ($\alpha = 0.60$; $P < .01$); Physical Appearance ($\alpha = 0.79$; $P < .001$). The Comparative Health ($\alpha = 0.27$; $P = .24$), Health Efficacy A ($\alpha = 0.42$; $P = .12$) and C ($\alpha = 0.03$; $P = .53$), and Overweight Distress ($\alpha = 0.18$; $P = .33$) scales subscales were eliminated because they did not demonstrate adequate reliability.

One parent (almost invariably the mother) completed the Child Health Questionnaire – Parent Report (CHQ-PF50),²³ a validated²⁴ 50-item parent-reported measure of physical and psychosocial well-being of children and adolescents that has been shown to be a useful method of assessing children’s health in pediatric and minority populations.²⁵ Scales based on a single-item response were not analyzed (Global Health, Global Behavior, and Family Cohesion). Lower scores represent poorer health.

Physical Measures

Measurement of BMI was obtained as previously described,¹⁷ and a z-score (BMI-SD score) was determined based on age- and sex-specific NHANES standards.²⁶ All subjects underwent a medical history and a physical examination.

Analyses

One-way analyses of variance (ANOVA) were used to compare subjects by weight status. Covariates considered were age, sex, and socioeconomic status. For the CHQ comparison of weight status, age was controlled for in the Parental Impact – Emotional and Family Activities scale analyses and both age and socioeconomic status were accounted for in analysis of the Parental-Impact – Time scale. One- by four-way (1×4) ANOVAs were used to compare overweight blacks and whites and nonoverweight blacks and whites on all dependent variables with Bonferroni-Hochberg correction post hoc tests. To determine whether QOL differed by race independent of BMI-SD, or showed a BMI-SD by race interaction, mixed model analyses of covariance (ANCOVA) were used to examine racial differences using BMI-SD as a continuous factor. Sex was controlled for in analyses of the IWQOL-A Mobility, Self-esteem, and Daily Living scales, the HRQOL General Health and Physical Appearance scales, and the CHQ General Health Perceptions and Global Health scales. Age was controlled for in the HRQOL General Health and the CHQ Parental Impact-Emotional, and Parental Impact-Time, and Family Activities models. Mean $\pm$ SD values are reported, and nominal P values are shown. Differences and associations between groups were considered significant when P values were $\leq .05$.

RESULTS

Subject Characteristics

Overweight subjects were from families with significantly lower Hollingshead socioeconomic class scores (SES) compared with the nonoverweight subjects (Table I). Therefore SES was included as a potential covariate for all analyses.

Among overweight subjects were adolescents with hyperinsulinemia (black: $n = 44$, 71%; white: $n = 37$, 77%), hyperlipidemia (black: $n = 31$, 50%; white: $n = 18$, 38%), hypertension (black: $n = 5$, 8.1%; white: $n = 7$, 15%), type 2 diabetes (black: $n = 3$, 5%; white: $n = 2$, 4%), and hepatic steatosis (black: $n = 6$, 10%; white: $n = 5$, 10%). No significant differences were found in the number or type of obesity-related comorbidities for black and white subjects. There were also no significant differences between the mean number of self-reported obesity-related comorbidities for overweight black and white subjects' mothers (black: 1.1 ± 1.3 vs white: 0.79 ± 1.3 , $P = .35$), fathers (black: 0.85 ± 1.1 vs white: 0.79 ± 0.83 , $P = .92$), or extended families (black: 3.4 ± 1.2 vs white: 3.1 ± 1.4 , $P = .23$).

Relation Between Adolescent and Parent Reports

Among the many significant relations between adolescent and parent reports, a number of scales sharing constructs demonstrated significant relations. The adolescent-report IWQOL Health scale correlated significantly with the parent report CHQ General Health Perceptions ($r = -0.34$, $P < .05$) scale. IWQOL Social scale correlated significantly with the CHQ Role/social Limitations – Physical ($r = -0.25$, $P < .01$) and Family Activities ($r = -0.17$, $P < .05$) scales. The IWQOL Mobility scale correlated with the CHQ Physical Functioning ($r = -0.32$, $P < .01$), Role/social Limitations – Physical ($r = -0.18$, $P < .05$), and Bodily Pain ($r = -0.30$, $P < .01$) scales. IWQOL Self-esteem scale correlated with the CHQ Self-esteem scale ($r = -0.25$, $P < .05$). The IWQOL Daily Living scale correlated with the CHQ Physical Functioning ($r = -0.30$, $P < .01$) and Role/social Limitations – Physical ($r = -0.23$, $P < .01$) scales. Of the HRQOL scales, only the General Health subscale appeared to correspond to a CHQ subscale, and was significantly related to the parent-reported General Health Perceptions scale ($r = 0.35$, $P < .01$).

Adolescent Reports

Overweight subjects reported significantly poorer QOL compared with nonoverweight teens on all of the IWQOL and HRQOL subscales, with the exception of the HRQOL Self-regard scale (Means, standard deviations, *F*-values and significance levels in Table II). Comparing subjects by weight status separated by race (four groups), overweight white teens reported significantly poorer IWQOL Social/Interpersonal and Self-esteem QOL compared with all three groups and overweight blacks reported poorer Self-esteem compared with nonoverweight subjects. Overweight white adolescents endorsed poorer HRQOL Physical Appearance compared with the other three groups, whereas overweight blacks endorsed poorer scores than nonoverweight teens (for all main effects $P < .01$; Table III). No differences were detected on either the IWQOL-A or the HRQOL based upon sex (data not shown). After controlling for race, only the HRQOL General Health was negatively correlated with age ($r = -0.2$, $P < .05$; older children reported lower QOL), and the HRQOL Depression scale was marginally correlated with SES ($r = 0.2$, $P = .05$; less impairment was associated with lower SES).

Significant interactions between BMI-SD and race were detected on the IWQOL-A Social/Interpersonal, Self-esteem, and Daily Living subscales. For whites, as BMI-SD increased, subjects reported poorer Social/Interpersonal (BMI-SD $\times$ race interaction: $F = 7.2$, $P < .01$) and Self-esteem ($F = 5.4$, $P < .05$) QOL. This pattern was not evident for black subjects (Figure, A and B). Although increases in BMI-SD were associated with poorer reports of Daily Living QOL for both races, the increase in scores among whites was significantly more precipitous ($F = 9.8$, $P < .01$; Figure C). Similar interactions were also found between BMI-SD and race on the HRQOL Health Efficacy B scale ($F = 5.8$, $P < .01$), the Self-Regard ($F = 4.2$, $P < .05$) and Physical Appearance scales ($F = 8.6$, $P < .01$): as BMI-SD increased, whites' reports of impairment increased more precipitously than blacks' reports.

Parent Reports

Parents of overweight teens reported significantly poorer CHQ scores compared with parents of nonoverweight subjects on all subscales except the CHQ Role/Social Limitations – Physical and Parental Impact – Time scales (Means, standard deviations, *F*-values and significance levels in Table II). Comparing subjects by weight status separated by race, parents of overweight black teens reported poorer CHQ General Health Perceptions compared with parents of teens in the other three groups; and parents of overweight whites reported poorer scores compared with nonoverweight whites' parents but not blacks' parents (main effect, $P < .01$; Table III). No other racial differences between weight subgroups were detected. No differences were detected on the CHQ scale based upon sex or age (data not shown). After controlling for race, only the Role/Social Limitations – Physical scale demonstrated a marginally negative correlation with age ($r = -0.2$, $P = .05$; parents of older teens reported poorer functioning), and the Parental Impact - Time scale was correlated with SES ($r = 0.2$, $P < .05$; less impairment was associated with higher SES).

Significant BMI-SD by race interactions were found for the following CHQ scales: Mental Health, Parental Impact-Emotional, and Family Activities. Although BMI-SD did not appear to be associated with scores on the Mental Health (BMI-SD $\times$ race interaction: $F = 4.6$, $P < .05$), Parental-Impact Emotional ($F = 7.0$, $P < .01$), or Family Activities ($F = 5.0$, $P < .05$) subscales according to black parents, high BMI-SD was associated with poorer QOL in white teens as reported by their parents.

DISCUSSION

We found overweight was a potent indicator of poorer weight and health-related QOL for white and black adolescents. Based on their IWQOL responses, overweight teens appeared to struggle

with levels of distress regarding Social/Interpersonal, Self-esteem and Daily Living QOL similar to those reported by obese adults seeking weight loss treatment. However, overweight had a greater impact among heavier whites, compared with blacks, with regard to social and psychologic well-being, aspects of daily living, health efficacy, and physical appearance. As white adolescents became heavier, they described greater distress than blacks. These findings are consistent with some^{12,13} but not all^{12,13,15,16} adult studies reporting that obese blacks have greater QOL and less impairment than obese whites.^{12–14}

While no prior study has directly compared QOL between overweight black and white adolescents, racial comparisons of body weight and eating concerns have been examined. One study found that compared with black girls of similar body weight, white girls endorsed significantly greater disturbed eating and body weight-related cognitions.²⁷ Moreover, black college women report less dissatisfaction with weight and less thin body-size ideals.²⁸ Black girls are also more likely than white girls to misperceive themselves as being thinner than they actually are.²⁹ Such differences may be a reflection of a greater acceptance of obesity in some subcultures.³⁰ Other studies have found no differences between black and white adults on measures of body dissatisfaction,^{31–33} with one study³² suggesting that previous findings of less body concern in black women may be due to other demographic variables. However, the present analyses suggest that the differing impact of overweight on QOL in black teens is not due to such factors.

Black parents of overweight teens reported their children had poorer general health than healthy weight teens or than overweight whites. By contrast, parents of heavier white teens reported poorer QOL psychosocial functioning than normal weight or overweight black adolescents. It is possible that parents of overweight black teens are more generally concerned about their children's current or future health and susceptibility to illness, while parents of overweight whites focus on the specific psychologic and social impact of obesity. Interestingly, in a weight loss intervention for black adolescent girls, the strongest predictive variable for weight loss was parent report of family satisfaction.³⁴ This finding was interpreted to mean that the family context has an important influence on the effectiveness of weight loss treatment. Further studies should investigate reports of QOL and parent-reported family satisfaction to determine whether these factors serve as relevant mediators of weight loss for black and white teens. Alternatively, the characteristics of our weight reduction study, requiring an obesity-related medical complication, may have differentially affected black and white parents. This may lead the parents of black overweight teens to report greater physical problems.

Limitations of this study include the small sample size of nonoverweight subjects. However, the sample size was adequate to find significant differences in QOL between overweight and nonoverweight adolescents. There are also possible sampling biases introduced by the study of overweight adolescents who desired weight loss treatment and healthy weight teens willing to participate in an exercise physiology study. The detected differences between groups may represent the extremes on the spectrum of our measures. However, the comparisons between black and white teens would not be affected by such biases. Because we detected several racial differences that were independent of weight status, it is also possible the measures of QOL we used may in some instances induce differential responses in blacks and whites. In addition, further analysis of the stability of our adapted versions of the QOL measures is required with samples not undergoing treatment, as our pretest-posttest comparison was obtained from a group of adolescents whose weight remained stable after treatment. Validation is also needed to determine whether our overweight subjects reported clinically meaningful levels of distress compared with other samples of overweight teens. Given that the overweight subjects in our sample reported scores similar to overweight adults, the means from the present study may provide potential adolescent cut-off scores on our measure of QOL that are indicative of

clinically significant distress. Finally, since our sample only included adolescent subjects, our findings may not generalize to younger overweight children.

Black adults are less successful at weight loss treatment attempts,^{35–38} and the same may be true for black teens.¹⁷ We hypothesize that impairment in QOL may be a motivator for weight loss in adolescents, and that one obstacle to weight loss in black adolescents is their less marked dissatisfaction with weight and QOL. Whether the presence or absence of impairment in QOL is a predictor for the success of obesity treatment in adolescents remains to be determined. Future studies should investigate whether clinicians can more successfully motivate overweight black adolescents by focusing on QOL domains that cause them distress, such as the associated health risks and mobility limitations caused by excess weight.

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Figure.

A, IWQOL: Social/Interpersonal scale scores reported by black ($r = 0.05$, $P = .67$) and white ($r = 0.40$, $P = 0.001$) adolescents, race $\times$ BMI-SD interaction, $P < .01$; **B**, IWQOL: Self-esteem scale scores reported by black ($r = 0.10$, $P = .36$) and white ($r = 0.42$, $P < .001$) adolescents, race $\times$ BMI-SD interaction, $P < .05$; **C**, IWQOL: Daily Living scale scores reported by black ($r = 0.30$, $P = .01$) and white ($r = 0.67$, $P < .0001$) adolescents, race $\times$ BMI-SD interaction, $P < .01$.

Table 1

Subjects

	Overweight		Nonoverweight		F statistic
	Blacks (n = 62) (19 M/43 F)	Whites (n = 48) (22 M/26 F)	Blacks (n = 14) (7 M/7 F)	Whites (n = 20) (8 M/12 F)	
Age (y)	14.5 ± 1.5	14.3 ± 1.6	14.7 ± 2.1	14.3 ± 1.6	0.19
Socioeconomic status score [†]	3.3 ± 1.0 _a	3.3 ± 1.0 _a	2.5 ± 0.9 _b	1.8 ± 0.7 _c	15.3 [*]
Weight (kg)	120.3 ± 27.8	105.8 ± 25.9	56.6 ± 12.9	52.6 ± 11.6	54.7 [*]
Height (cm)	163.8 ± 7.7	166.3 ± 8.5	164.5 ± 8.9	162.9 ± 9.4	1.11
BMI (kg/m ²)	44.6 ± 8.6 _a	38.1 ± 7.9 _b	20.7 ± 3.6 _c	19.6 ± 2.5 _c	77.6 [*]
BMI-SD	6.1 ± 3.2 _a	5.0 ± 2.3 _b	0.12 ± 1.3 _c	-20.22 ± 0.7 _c	43.7 [*]
Fat (%) by ADP	48.3 ± 5.7 _a	48.3 ± 5.7 _a	18.3 ± 9.8 _b	21.6 ± 7.1 _b	166.8 [*]

BMI, Body mass index; BMI-Standard Deviation Score (BMI-SD) was calculated from data of Frisanch³⁶; ADP, air displacement plethysmography. Different subscript letters indicate significant differences between groups.

^{*} $P \leq .01$; mean ± SD and (range) are given unless otherwise indicated.

[†] Socioeconomic status calculated according to Hollingshead Index; higher scores represent lower status.

Table II
Means and standard deviations of quality of life scores based on weight status

	Overweight (n = 106)	Nonoverweight (n = 34)	F-statistic
Adolescent report			
Impact of Weight on Quality-of-Life			
Health	23.1 ± 5.6	16.1 ± 3.9	66.4**
Social/interpersonal	21.5 ± 9.0	14.7 ± 4.5	29.1**
Work/school	14.0 ± 5.1	12.1 ± 4.0	4.8*
Mobility	16.9 ± 6.3	11.21 ± 2.0	67.1**
Self-esteem	21.93 ± 8.0	14.3 ± 3.8	52.5**
Daily living	14.1 ± 4.6	7.9 ± 1.4	145.2**
Health-Related Quality-of-Life			
General health	54.0 ± 25.4	86.7 ± 13.4	90.25**
Health efficacy B ¹	8.2 ± 2.1	6.2 ± 4.1	5.4**
Depression	12.3 ± 12.4	4.1 ± 3.6	35.6**
Self-regard	35.8 ± 6.4	36.2 ± 7.7	0.07
Physical appearance	19.9 ± 7.7	28.3 ± 5.6	44.9**
Child Health Questionnaire–Parent Report			
General health perceptions	66.6 ± 22.4	92.7 ± 9.4	43.3**
Physical functioning	87.0 ± 21.5	99.8 ± 1.0	12.0**
Role/social limitations – emotional/behavioral	91.9 ± 20.2	100.0 ± 0.0	5.4*
Role/social limitations – physical	90.7 ± 25.4	99.03 ± 5.7	3.4
Bodily pain/discomfort	75.5 ± 23.8	95.9 ± 9.6	23.7**
Behavior	74.6 ± 17.9	87.8 ± 11.4	16.1**
Mental health	75.8 ± 18.1	86.3 ± 8.8	10.6**
Self-esteem	64.3 ± 19.4	107.3 ± 158.7	7.4**
Parental impact – emotional	62.8 ± 26.8	94.2 ± 7.7	46.1**
Parental impact – Time	88.1 ± 18.8	96.7 ± 10.1	0.9
Family activities	81.1 ± 20.7	93.1 ± 10.2	10.6**

* $P \leq .05$.

** $P \leq .01$.

¹ How much do you believe your weight is harmful to your health? For the IWQOL-A, higher scores are indicative of greater impairment. For HRQOL, lower scores indicate greater QOL impairment on the General Health and Physical Appearance subscales, whereas higher scores are indicative of worse QOL impairment for Health Efficacy B, Depression, and Self-regard subscales.

Table III
Means and standard deviations of overweight black and white and nonoverweight black and white subjects

	Overweight		Non-overweight		Statistic F
	Blacks (n = 62)	Whites (n = 48)	Blacks (n = 14)	Whites (n = 20)	
Adolescent report					
Impact of Weight on Quality-of-Life					
Health	22.4 ± 5.2 _a	24.1 ± 6.0 _a	16.1 ± 2.7 _b	16.1 ± 4.6 _b	16.3 ^{**}
Social/interpersonal	19.0 ± 7.8 _a	24.6 ± 9.5 _b	14.9 ± 5.3 _a	14.6 ± 4.0 _a	10.8 ^{**}
Work/school	13.5 ± 5.2	14.6 ± 5.0	11.9 ± 2.9	12.2 ± 4.7	1.7 [*]
Mobility	16.7 ± 6.8 _a	17.3 ± 5.6 _a	11.1 ± 1.6 _b	11.3 ± 2.3 _b	9.1 ^{**}
Self-esteem	20.1 ± 7.5 _a	24.2 ± 8.1 _b	13.6 ± 3.8 _c	14.8 ± 3.8 _c	13.1 ^{**}
Daily Living	13.8 ± 4.8 _a	14.4 ± 4.4 _a	8.1 ± 1.6 _b	7.9 ± 1.3 _b	19.7 ^{**}
Health-Related Quality-of-Life					
General health	54.8 ± 25.8 _a	53.0 ± 25.3 _a	86.8 ± 13.4 _b	86.6 ± 13.7 _b	16.4 ^{**}
Health efficacy B [/]	8.2 ± 2.2 _a	8.2 ± 2.1 _a	7.3 ± 3.7 _{a,b}	5.4 ± 4.3 _b	5.9 ^{**}
Depression	12.0 ± 12.3	12.8 ± 12.5	2.9 ± 2.8	5.0 ± 3.9	4.80
Self-regard	37.6 ± 5.3	33.5 ± 6.9	34.6 ± 10.6	37.4 ± 4.5	4.01
Physical appearance	22.3 ± 8.0 _a	16.8 ± 6.0 _b	28.8 ± 6.9 _c	27.9 ± 4.5 _c	17.6 ^{**}
Child Health Questionnaire-Parent Report					
General health perceptions	60.6 ± 21.2 _a	73.8 ± 21.9 _b	86.4 ± 9.9 _{b,c}	97.0 ± 6.2 _c	20.7 ^{**}
Physical functioning	84.2 ± 24.0 _a	90.5 ± 17.7 _{a,b}	100.0 ± 0.0 _{a,b}	99.7 ± 1.3 _b	5.0 ^{**}
Role/social limitations –emotional/behavioral	89.1 ± 23.6	95.3 ± 14.6	100.0 ± 0.0	100.0 ± 0.0	2.89
Role/social limitations –physical	90.5 ± 24.9	91.5 ± 26.2	100.0 ± 0.0	98.4 ± 7.4	1.14
Bodily pain/discomfort	74.3 ± 25.8 _a	77.0 ± 21.3 _{a,b}	94.3 ± 11.6 _{b,c}	97.0 ± 8.0 _c	8.0 ^{**}
Behavior	71.9 ± 21.1 _a	77.9 ± 12.6 _{a,b}	89.3 ± 9.3 _b	86.7 ± 12.8 _b	6.6 ^{**}
Mental health	74.8 ± 19.6 _a	77.0 ± 16.1 _{a,b}	85.7 ± 9.6 _{a,b}	86.8 ± 8.5 _b	3.7 [*]
Self-esteem	64.9 ± 20.5	63.6 ± 18.2	87.1 ± 12.3	121.5 ± 207.6	3.0
Parental impact – emotional	62.3 ± 27.4 _a	63.4 ± 26.3 _a	93.5 ± 9.4 _b	94.6 ± 6.9 _b	14.9 ^{**}
Parental impact – time	83.9 ± 26.5	89.5 ± 16.1	94.4 ± 15.0	98.4 ± 4.0	3.00
Family activities	81.4 ± 22.4	80.7 ± 18.5	94.0 ± 10.2	92.5 ± 10.5	3.49

Different subscript letters indicate significant differences between groups.

* $P \leq .05$.

** $P \leq .01$.

[/] How much do you believe your weight is harmful to your health? For the IWQOL-A, higher scores are indicative of greater impairment. For HRQOL, lower scores indicate greater QOL impairment on the General Health and Physical Appearance subscales, whereas higher scores are indicative of worse QOL impairment for Health Efficacy B, Depression, and Self-regard subscales.