Self-reported Weight Status and Dieting in a Cross-sectional Sample of Young Adolescents

National Health and Nutrition Examination Survey III

Richard S. Strauss, MD

Objective: To explore the relationship of self-reported weight status and dieting to actual weight and height in a cross-sectional nationally representative sample of young adolescents.

Methods: Weights and heights were obtained on 1932 adolescents aged 12 to 16 years enrolled in the National Health and Nutrition Examination Survey III. Information on adolescents' perception of weight status, desired weight, and weight loss attempts was obtained by questionnaire.

Results: Adolescents' reports of whether they considered themselves overweight or normal weight correlated poorly with medical definitions of overweight: 52% of girls who considered themselves overweight were, in fact, normal weight (body mass index ≤85th percentile), while only 25% of boys who considered themselves overweight were normal weight (P = .001). Adolescent white girls were significantly more likely to consider themselves overweight, even when their weight status was normal, than black girls (P < .001), black boys (P < .001), and white boys (P < .001). Adolescent white girls were also more likely to diet than black girls (P < .001), black boys (P < .001), and white boys (P < .001). Dieting behavior was associated with whether adolescents viewed themselves as overweight independent of whether they actually were overweight. Racial differences between dieting and self-perceived weight status were limited to girls. There were no significant differences in self-perceived weight status (P = .28), dieting behaviors (P = .99), and desire to weigh less (P = .95) among black and white boys.

Conclusions: Significant sex and racial differences existed in weight perception, desired weight, and dieting. A high proportion of normal-weight white girls consider themselves overweight and have attempted to lose weight.


Editor's Note: Is anyone surprised by the findings in this study? If so, you haven't watched television or read magazine and newspaper ads.

Catherine D. DeAngelis, MD

There is no doubt that many female adolescents who consider themselves overweight are, in fact, normal weight. Feldman and colleagues demonstrated that almost half of the girls they surveyed thought that they were too fat, while only 17% of girls who thought they were overweight had increased weight for height. In contrast, boys who thought that they were too fat tended to be overweight. However, the study by Feldman et al relied on a small sample of white Canadian children and was only reported in abstract form. Little detail on methods was given. Other studies reporting similar findings have also relied on either small samples or samples that do not represent the national population (ie, rural school children in Iowa, middle- and upper-income Cincinnati, Ohio, schoolchildren, and South Carolina schoolchildren). In addition, some studies do not account for racial differences in weight perception or dieting. Only the National Heart, Lung, and Blood Institute Growth and Health Study (NGHS) reported weight-related perceptions and behaviors across a spectrum of body mass indexes (BMIs). However, the NGHS report focused only on preadolescent girls (9-10 years old).

It is also clear that adolescents demonstrate significant sex and racial differences in weight perceptions and dietary behaviors. However, other family and social factors, such as parental weight, education, and socioeconomic status (SES), may also influence adolescent weight perceptions and dieting. For instance, Tien-
SUBJECTS AND METHODS

SAMPLE

The NHANES III is the seventh in a series of large national health examination surveys conducted in the United States since the 1960s. The NHANES III examined 1932 children between the ages of 12 and 16 years. Weights and heights were available for more than 99% of the children. Of the children enrolled, 1097 (56.8%) were white, 743 (38.5%) were black, and 92 (4.8%) were other. A family questionnaire was provided to each child's parent or guardian and was administered in the home. Family income was reported for 91% of the children, and highest level of education of the head of the household was reported in 100%. A poverty-income ratio was calculated on the basis of family income and size by means of tables published each year by the Bureau of the Census.

ANTHROPOMETRICS

Body weight was determined to the nearest 0.05 kg (Toledo 2181 Scale) and height was measured to the nearest 0.1 cm with standardized measuring equipment (Holtain Height Stadiometer). Equipment was recalibrated between each measurement. Triceps skin folds were determined to 0.1 mm by trained technicians using skin-fold calipers (Holtain). Normal weight was defined as a BMI (weight in kilograms divided by the square of the height in meters) less than the 85th percentile for age and sex, overweight was defined as a BMI greater than the 85th percentile for age and sex, and obesity was defined as a BMI greater than the 95th percentile for age and sex. Reference BMI percentiles were derived from combined data of the first and second NHANES. This definition is in accordance with recommendations of the Expert Committee on Clinical Guidelines for Overweight in Adolescence. Maternal and paternal weight status was categorized as lean (BMI < 20.0), normal (20.0 ≤ BMI < 25.0), overweight (25.0 ≤ BMI < 30.0), or obese (BMI ≥ 30) according to the World Health Organization guidelines.

DEPENDENT VARIABLES

All children underwent a standardized home interview with trained staff. Interviews were conducted in English and Spanish. Interview forms were also available in both languages. To ensure accuracy of information, approximately 10% of respondents were recontacted either by telephone or in person to ensure the validity of their responses. Children were asked the following questions concerning self-perceived weight and weight control practices: (1) Do you consider yourself now to be overweight, underweight, or about the right weight? (2) Would you like to weigh more, weigh less, or stay about the same? (3) During the past 12 months, have you tried to lose weight?

STATISTICS

Because the NHANES III study oversampled blacks, younger children, and the elderly, the data were weighted so that all statistics reflected a nationally representative sample of children aged 12 to 16 years. Sample weights provided by NHANES III took into account unequal selection probabilities resulting from planned oversampling of certain groups and cluster design. Whites and Hispanics were grouped together because of sample size limitations and herein are identified as “White.” Differences in proportions of children who considered themselves overweight, desired to weigh less or more, and attempted to lose weight were assessed by χ² at each level of BMI. Odds ratios were calculated by logistic regression. Multivariate logistic regression was used to assess the influence of sex, family income, family education, and parental weight on the risk of dieting, desire to weigh less or more, and self-perception of overweight while controlling for the child's BMI, sex, and race. To adjust for complex sample design and clustering effects in the NHANES III sample, statistical significance was assessed by the balanced repeated replication method with the use of the software package WesVarPC. (Westat Inc, Rockville, Md.) The balance repeated replication method provides for a general means of estimating variance in clustered, multistate surveys such as NHANES III, while adjusting for the effects of nonresponse and poststratification.

RESULTS

In the NHANES III survey, approximately 24% of young adolescents were overweight (BMI > 85th percentile), and 10% were obese (BMI > 95th percentile). Similar results have been previously reported for the 1988 through 1991 subgroup of NHANES III. There were no significant differences in age or racial distribution between normal-weight (BMI < 85th percentile), overweight, and obese children (Table).

Children's reports of whether they considered themselves overweight or normal weight correlated poorly with medical definitions of overweight. Of children who considered themselves overweight, 42% had a BMI less than the 85th percentile and 70% had a BMI less than the 95th percentile. Only 28% of children who considered them-
selves overweight had a BMI between the 85th and 95th percentiles.

Significant sex and racial differences existed in self-perception of weight status (Figure 1). Overall, girls tended to misclassify their weight status significantly more often than boys: 52% of girls who considered themselves overweight were, in fact, normal weight (BMI ≤ 85th percentile). In contrast, only 25% of boys who considered themselves overweight were normal weight (P < .001). In particular, white girls who considered themselves overweight were more than 3 times as likely to have a BMI less than the 85th percentile compared with white boys (odds ratio [OR], 3.54; 95% confidence interval [CI], 2.36-5.31), black boys (OR, 3.63; 95% CI, 2.35-5.60), and black girls (OR, 3.10; 95% CI, 1.91-5.01). There were no differences in self-perceived weight status among black and white boys (P = .28).

Significant sex-related differences also existed in attempts to diet, particularly in nonobese children (P < .001). However, racial differences in dieting were only observed in girls (Figure 2). In addition, normal-weight white girls were significantly more likely to try to lose weight than were normal-weight white boys (OR, 6.19; 95% CI, 3.59-10.67), black boys (OR, 9.23; 95% CI, 5.21-16.43), or black girls (OR, 2.37; 95% CI, 1.52-3.67). There were no differences in dieting between black and white boys (P = .99). There were also no significant differences in dieting behavior among obese blacks, whites, boys, or girls (P = .37).

Self-perceived weight status was also associated with attempts at weight loss, independent of race (P < .001). Sixty-eight percent of whites and 70% of blacks who classified themselves as overweight reported having tried to lose weight within the last year (P = .94). In addition, there was no difference in dieting behavior among adolescents who considered themselves overweight, whether or not they actually had an elevated BMI (68% vs 66%; P = .77). In contrast, only 15% of adolescents who viewed themselves as normal weight reported dieting in the last year.

Significant racial and sex differences existed in the desire to weigh more or less (Figure 3 and Figure 4). A significantly greater proportion of girls than boys desired to weigh less (P < .001). Nonoverweight white girls preferred to weight less than nonoverweight black girls (Figure 3). Overall, 21% of black girls desired to weigh less compared with only 7% of white girls (P < .001). Similarly, 46% of black boys wanted to weigh more compared with 27% of white boys (P < .001). In addition, 34% of normal-weight black girls desired to weigh less compared with 51% of normal-weight white girls (P < .01). Of interest, overweight and obese black and white girls were equally likely to desire to weigh less: 90% of overweight black girls wanted to weigh less compared with 97% of white girls (P = .10). Similarly, black and white boys were equally likely to want to weigh less whether they were normal weight (P = .92), overweight (P = .97), or obese (P = .52).

Finally, the use of triceps skin folds, instead of BMI, to determine relative weight did not significantly affect the results. Ninety-five percent of children who were normal weight (<85th percentile) by BMI were also normal weight by triceps skin folds. Similarly, there was a 93% concordance in determining obesity (>95th percentile) by either triceps skin folds or BMI. As a result, the use of triceps skin folds as a determinant of weight status resulted in minimal differences in the percentage of children at each weight level who considered themselves overweight, desired to weigh more or less, or had attempted dieting (data not shown).

Multivariate logistic regression was also performed to assess whether parental weight, education, or income influenced an adolescent's perception of body weight and

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**Table 1: Characteristics at Enrollment**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Normal Weight (BMI &lt; 85th Percentile)</th>
<th>Overweight (85th &lt; BMI &lt; 95th Percentile)</th>
<th>Obese (BMI &gt; 95th Percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
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<td>14.0 ± 1.4</td>
<td>14.0 ± 1.3</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>53.4 ± 9.6†</td>
<td>68.9 ± 9.5†</td>
<td>89.6 ± 23.0†</td>
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<tr>
<td>Height, m</td>
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<td>1.65 ± 0.10</td>
<td>1.66 ± 0.10†</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>19.8 ± 2.3†</td>
<td>25.2 ± 1.9†</td>
<td>32.2 ± 5.9†</td>
</tr>
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<td>Racial distribution, %</td>
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<td>10</td>
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<td></td>
<td></td>
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<tr>
<td>Black</td>
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</tbody>
</table>

*Values are given as mean ± SD unless otherwise specified. BMI indicates body mass index.
†All 3 groups are significantly different from each other (P < .01).
‡Normal weight and obese are significantly different (P < .01).

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**Figure 1.** Percentage of adolescents at each body mass index (BMI) percentile who consider themselves overweight. Differences in percentages of adolescents at each BMI level were assessed by χ². Overall, girls tended to misclassify their weight status significantly more often than boys (P < .001).

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attempts to lose weight. Because weight perceptions and attempts to lose weight were highly influenced by BMI, sex, and race, these factors were controlled for in all analyses. There was no independent influence of father’s weight status ($P = .35$), family education ($P = .15$), or family income ($P = .69$) on the child’s perception of being overweight. However, children of lean mothers (BMI <20) were significantly more likely to view themselves as overweight than were children of normal-weight or overweight mothers (OR, 2.84; 95% CI, 1.42-5.67; $P < .005$). Similarly, there was no independent influence of paternal weight status ($P = .17$), family education ($P = .57$), or family income ($P = .33$) on an adolescent’s desire to weigh less; however, children of lean or normal-weight moth-

Figure 2. Percentage of adolescents at each body mass index (BMI) percentile who have tried to lose weight in the past year. Differences in percentages of adolescents at each BMI level were assessed by $\chi^2$. Across the entire spectrum of body mass, there was no difference in dieting between black and white boys ($P = .99$).

Figure 3. Percentage of adolescents at each body mass index (BMI) percentile who want to weigh less. Differences in percentages of adolescents at each BMI level were assessed by $\chi^2$.

Figure 4. Percentage of adolescents at each body mass index (BMI) percentile who want to weigh more. Differences in percentages of adolescents at each BMI level were assessed by $\chi^2$. A significantly greater proportion of girls desired to weigh less compared with boys ($P < .001$). There was no statistical difference in the desire to weigh more between black and white boys at any individual BMI level; however, across the entire spectrum of BMI, black boys were significantly more likely to desire more weight than the entire cohort of white boys ($P < .001$).
ers were more likely to want to weigh less than children of overweight or obese mothers (OR, 1.23; 95% CI, 1.04-1.64; P < .05). There was no independent influence of maternal weight status (P = .81), paternal weight status (P = .99), family education (P = .64), or family income (P = .96) on an adolescent’s dieting behavior.

**COMMENT**

Data from NHANES III provide a detailed description of weight perceptions and attempts at weight loss in a large, nationally representative sample of young adolescents. Self-reported weight status was correlated poorly with actual weight status, particularly in white girls. More than 40% of white girls considered themselves overweight. However, only one half of white girls who considered themselves overweight were actually overweight. In contrast, approximately three quarters of black and white boys who considered themselves overweight were actually overweight. Sex differences in self-perceived weight status and desire to weigh less were evident throughout the weight spectrum and were not confined to overweight or obese children.

Sex differences in self-reported weight and weight status may indicate a general desire to weigh less. In this study, girls were more than twice as likely as boys to want to weigh less. In contrast, boys often desired to weigh more. Similarly, Gustafson-Larson and Terry and Maloney et al also reported that preteen and adolescent girls were almost twice as likely as similarly aged boys to report a desire to be thinner. There is no doubt that increasing emphasis on thinness by television, advertising, and marketing campaigns has a profound effect on the desire to be thinner, especially among females. Most alarmingly, girls as young as 5 or 6 years old already express fear of gaining weight.

Significant racial differences in self-perceived weight status and desired weight also existed. However, racial differences were limited to girls; black and white boys demonstrated similar self-perceived weight status, dieting behaviors, and desire to weigh less. In contrast, normal-weight black girls were significantly less likely than normal-weight white girls to consider themselves overweight. Normal-weight black girls were more likely to want to lose weight and less likely to want to lose weight than normal-weight white girls. Similarly, Neff and colleagues reported that white adolescent girls were almost twice as likely as black adolescent girls to perceive themselves as overweight. Racial differences in weight perception have also been related to self-perceived weight status and adolescents’ self-perceived weight status also existed. Children of lean mothers were significantly more likely to consider themselves overweight than children of normal-weight or overweight mothers. In addition, children of lean and normal-weight mothers were also more likely to desire to weigh less than children of overweight or obese mothers. These data are in contrast to a previous study by Tienboon et al that demonstrated increased weight concerns and dieting among girls with overweight mothers. However, in the study by Tienboon et al, adolescent girls with overweight mothers were also significantly heavier than adolescent girls with normal-weight mothers; therefore, higher weights of the adolescent girls, and not the weight status of their mothers, most likely accounted for the increased weight concern and dieting among the girls in the study. Unfortunately, dieting practices of the children’s mothers were not elicited in NHANES III. It has been shown previously that children with eating disorders have mothers with increased weight concerns, concerns about body shape, and increased dietary restraint. In addition, adolescents with bulimia often perceive their mothers, but not their fathers, as pressuring them to lose weight. Finally, data from the NGHS study indicates that children whose mothers said that they were too fat demonstrated more than a 2-fold increased risk of dieting. No relationship was demonstrated between family income or education and self-perceived weight status, weight concerns, or dieting. Although studies in adults...
report increased weight concerns and dieting among women of higher SES, data in children have been contradictory. Drewnowski and colleagues demonstrated that dieting, binging, and vigorous exercise were decreased in low-SES females, but not males. However, the study by Drewnowski et al did not account for the children’s actual weight and height in determining dieting behaviors. In a comprehensive health survey of more than 36,000 students in grades 7 through 12 in Minnesota, Story and colleagues demonstrated higher levels of weight satisfaction and less vomiting, binging, and laxative use among boys and girls with higher SES, although dieting was more frequent among higher-SES girls. However, the study by Story et al did not focus on a nationally representative sample of adolescents and was further limited by the inclusion of relatively few minorities and low-SES children (86% of children were white, 86% were of middle or upper SES, and 34% were rural). Therefore, differences in children’s ages, relative weight, and ethnicity may account for the differences in the effects of SES observed between studies.

It is a common myth that overweight children are not interested in losing weight. The current study suggests that more than 90% of obese children say that they want to weigh less, and more than two thirds say they have tried to lose weight within the last year. Most importantly, similar weight concerns were voiced by overweight black, white, male, and female adolescents. This finding was unexpected, since studies of college students and adults have demonstrated a significantly lower prevalence of dieting among blacks than whites. However, data from the NHGS also indicate that approximately three fourths of 9- to 10-year-old girls with elevated BMI were trying to lose weight, independent of race. It is possible that younger, overweight black children are now beginning to adopt the body size “norms” of their white peers. It is also possible that dieting behaviors among overweight blacks diminish after adolescence. Unfortunately, overweight children have little guidance in weight loss attempts. Skipping meals, diet pills, smoking, and self-induced vomiting are common unhealthy practices used by adolescents to lose weight.

Finally, a major limitation of this study is that NHANES III relied on a relatively simple self-report of weight perception and dieting behaviors. It would have been preferable to use a more detailed assessment of body image distortion and dieting behavior such as the Eating Symptoms Inventory, or graphic representations of self-perceived and desired body sizes. However, detailed scales of body image distortion are not easy to use in large epidemiological studies. As a result, the vast majority of epidemiological and observation studies have relied on similar self-reports of weight perception and dieting behavior.

In conclusion, physicians need to recognize that adolescents’ perception of their body weight is dependent on social, cultural, and family pressures. Sex, race, and maternal body size all play a critical role in an adolescent’s perception of his or her body weight. White adolescent girls are particularly likely to consider themselves overweight and try to lose weight even when their weight is well within the healthy weight range. In addition, adolescents’ reports of whether they considered themselves overweight or normal weight correlated poorly with medical definitions of overweight. Dieting behavior is most closely related to whether adolescents view themselves as overweight, independent of whether they are actually overweight. In addition, the pediatrician needs to remain aware that adolescents who partake in frequent dieting, particularly when their weight is within the normal range, may be at increased risk for developing eating disorders.

Finally, overweight children are often dismissed as lazy and indulgent. This study, along with the NHGS study, demonstrates that overweight black and white children are interested in losing weight. Unfortunately, few comprehensive programs exist to treat childhood weight problems. Too often, childhood weight control is based on weekly weigh-ins, with little family counseling or activity planning. Comprehensive programs involving family-based behavioral and dietary therapy are time consuming, difficult, and often frustrating; however, long-term success is achievable.

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REFERENCES


Once diagnosed, these patients should be followed up both clinically and radiographically (with plain films) by the pediatric orthopedic surgeon. If there is not clinical deterioration (limping, limited joint movement), hip radiographs should be performed once a year until resolution is noted.

In conclusion, Meyer dysplasia is a rare condition with a benign clinical course that may mimic other, more severe hip diseases. A greater awareness of this condition would prevent unnecessary hospitalization and treatment and allay parental fears regarding the prognosis.

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REFERENCES


Correction

Error and Omission in Text. In the article by Strauss titled “Self-reported Weight Status and Dieting in a Cross-sectional Sample of Young Adolescents: National Health and Nutrition Examination Survey III,” published in the July issue of the ARCHIVES (1999;153:741-747), an error and an omission appeared in the text. On page 742, in the “Sample” subsection of the “Subjects and Methods” section, the fourth sentence should have read as follows: “Of the children enrolled, 1097 (56.8%) were white, 743 (38.5%) were black, and 92 (4.8%) were other.” Also, on that same page in the “Statistics” subsection of the “Subjects and Methods” section, a new sentence should have been inserted after the second sentence and read as follows: “Whites and Hispanics were grouped together because of sample size limitations and herein are identified as ‘white.’ ”