Weight Control Behaviors Among Obese, Overweight, and Nonoverweight Adolescents

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Objective: To evaluate weight control behaviors, eating, and physical activity behaviors among obese, overweight, and nonoverweight female and male adolescents.

Methods: A representative sample of 8,330 7th, 9th, and 11th grade public school students in Connecticut participated in the study. Adolescents responded to questions about weight control behaviors (dieting, exercise, vomiting, diet pills, and laxatives), healthy eating behaviors, breakfast consumption, and vigorous physical activity.

Results: In comparison to nonoverweight youths, overweight adolescents were less likely to eat breakfast and less likely to engage in vigorous physical activity than nonoverweight youths. Higher prevalences of unhealthy weight control behaviors were evident among overweight youths.

Conclusions: Overweight adolescents use more unhealthy weight management strategies and are not engaging in healthier strategies, such as increased physical activity or healthier eating. These findings suggest the need to provide consistent messages about healthy weight loss methods to adolescents.

Key words: adolescents; weight control.

Overweight adolescents are at risk for a number of weight-related physical and psychosocial consequences. Although many of the physical risks are not realized until adulthood, the psychosocial consequences can begin early in life, can be difficult to manage, and can have long-term psychological implications. Empirical research shows that overweight children are rejected by their peers more than any other handicapped persons and experience discrimination and rejections as adults (LeBow, 1984). Overweight adolescents have a greater risk for developing dissatisfaction with their bodies (Grilo, Wilfley, Brownell, & Rodin, 1994; Vander Wal & Thelen, 2000) and lower self-esteem (Grilo et al., 1994; Pesa, Syre, & Jones, 2000) and are teased more than their normal weight peers (Jackson, Grilo, & Masheb, 2000). Teasing can be emotionally difficult for adolescents to endure. In a study of 50 overweight adolescent girls, the girls reported significant and hurtful stigmatizing experiences, including name calling and teasing. In addition, participants reported hurtful comments and behaviors by family members and peers (Neumark-Sztainer, Story, & Faibisch, 1998).

Few studies have evaluated which weight control behaviors overweight adolescents use most frequently. Weight control strategies range from healthier behaviors, such as moderate dieting and exercise, to potentially harmful behaviors, such as purging, laxative use, diet pill use, and skipping meals. It is...
important to explore the weight control strategies used by overweight youth given the high percentages of overweight adolescents, the trend toward increasing prevalence of obesity (Troiano, Flegal, Kuczmarski, Campbell, & Johnson, 1995), and the lack of long-term effective treatments. More than a third of all female students and about a quarter of all male students considered themselves to be overweight (Kann et al., 1995; Middleman, Vazquez, & Durant, 1998). Adolescents who feel overweight are more likely to be actively trying to lose weight (Middleman et al., 1998) and may be at risk for using harmful weight control behaviors. Population-based studies show that 30% of all adolescents are dieting and 40% of adolescents are trying to lose weight (Kann et al., 1995), and 7% of adolescent females and approximately 3% of adolescent males report using vomiting, diet pills, or laxatives to control their weight (French, Perry, Leon, & Fulkerson, 1995; Kann et al., 1995; Krowchuk, Kreiter, Woods, Sinal, & DuRant, 1998; Middleman et al., 1998; Neumark-Sztainer et al., 1997; Richter, Ritenbaugh, Nichter, Vuckovic, & Aickin, 1995; Story, Neumark-Sztainer, Sherwood, Stang, & Murray, 1998). Adolescents who use these drastic weight control methods are at a higher risk for engaging in other health-compromising behaviors, including substance use, risky sexual behaviors, depression, suicide attempts, unhealthy eating, and eating disorders (French, Perry, Leon, & Fulkerson, 1994; Killen et al., 1987; Neumark-Sztainer, Story, Resnick, & Blum, 1996; Patton, Johnson-Sabine, Wood, Mann, & Wakeling, 1990; Story et al., 1998).

Overweight adolescents may be at higher risk for using unhealthy weight control strategies than normal-weight adolescents. Overweight adolescents may be farther from their ideal weight and could be looking for a quick solution. Overweight adolescents may also have failed to lose weight using diet and exercise and may believe that these unhealthy weight control strategies are their last hope. Recent studies have shown that overweight female and male adolescents are at a higher risk for dieting and binge eating (Neumark-Sztainer et al., 1997, Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999). As compared to nonoverweight female adolescents, overweight female adolescents are more likely to engage in both healthy weight control behaviors (healthy eating and exercise) and unhealthy weight control behaviors (fasting, skipping meals, laxative/diuretic use, diet pill use, vomiting, and increase in smoking; French et al., 1995; Neumark-Sztainer et al., 1997). Even in younger children, dieting and weight control behaviors are more frequent in girls who are overweight (Childress, Brewerton, Hodges, & Jarrell, 1993; Shislahk et al., 1998).

Because there are only a few population-based studies evaluating the use of weight control behaviors in overweight adolescents, a number of questions remain unanswered. Few studies have focused specifically on overweight adolescents, nor have they examined weight control strategies in depth. Most of the studies have evaluated body mass index (BMI; kg/m$^2$) as one of a number of risk factors for weight control behaviors, but no study has addressed the question of how these weight control behaviors vary by weight status. Due to the few studies on overweight adolescents, it is unclear whether overweight adolescents use one weight control behavior more frequently than others. In addition, none of the published studies has explored other behaviors that may be used for weight control, such as skipping meals, healthier eating, and physical activity. To promote healthy weight management among overweight youths, it is important to assess whether adolescents correctly interpret healthy weight control messages, such as those recommending regular meals, lowfat foods, increasing fruit and vegetables, and regular physical activity.

In a previous article, our group examined BMI as one of a number of correlates of dieting, exercise for weight loss, and disordered eating behavior (Neumark-Sztainer et al., 1999). We found that overweight adolescents were more likely to be dieting and using exercise to lose weight. We also found that overweight female adolescents were more likely than their male counterparts to acknowledge disordered eating behavior. In this study, we focused our efforts on understanding a broader range of behaviors that have potential implications for weight control and adolescent health. This population-based cross-sectional study examined weight control behaviors (including exercise, dieting, vomiting, use of diet pills or laxatives) and a variety of eating and physical activity behaviors in obese, overweight, and non-overweight female and male adolescents. This study examined not only reported exercise for weight loss purposes but also vigorous physical activity. We hypothesized that increased levels of overweight would be positively associated with unhealthy weight control behaviors and inversely related to healthy eating patterns and physical activity.
Method

Participants

The sample was drawn from a statewide representative sample of 9,943 seventh, ninth, and eleventh grade public school students from Connecticut who participated in a survey of adolescent health in 1995–1996, The Voice of Connecticut Youth Survey (CYS). Approximately 83% of the enrolled students in the sampled grades completed administered surveys. Approximately 5% of the sample was not included in the analyses due to questionable body mass index values (BMI > 50 or BMI < 10), missing data for height or weight, incomplete surveys, or failure on a series of internal consistency and reliability checks. Usable data were obtained on 9,097 students.

Self-reported height and weight on the survey were converted to body mass index. Respondents were divided into underweight (< 15% BMI; n = 680), normal weight (15%–85% BMI; n = 6,600), overweight (85%–95% BMI; n = 1215) and obese (> 95% BMI; n = 602), using the cut-off points based on reference data from NHANESI for adolescent age and gender subgroups (Must, Dallal, & Dietz, 1991a, 1991b).

In preliminary analysis, the underweight adolescents were found to be significantly different from the normal weight adolescents on a large number of the variables. We subsequently dropped the underweight adolescents from further analyses because we did not want the differences between underweight and nonoverweight and overweight adolescents to skew the results. We wanted to focus specifically on overweight teens. The final sample included 4,249 girls and 4,081 boys. Sociodemographic characteristics of the remaining study population are listed in Table I.

Sample Design

The sampling strategy was based on a set of geographic and socioeconomic criteria established by the Departments of Health and Education in Connecticut for the delivery and monitoring of government programs and services. A stratified random sampling design was employed in which the state’s five geographical Service Delivery Areas (SDAs) were crossed with five socioeconomic strata defined by combining the state’s nine Educational Reference Groups (ERGs). The ERGs are socioeconomic gradations defined by a statistical model based on multiple indicators of economic need taken from 1990 census tract data for Connecticut (e.g., family income, parental level of education, occupation, percentage of single family homes, and percentage of homes in which English is the second language). The ERG system is issued by the state to control for socioeconomic level when comparing student achievement across school districts. Thus, the use of both the SDA and ERG classification systems ensured a sample that...
was geographically and socioeconomically representative of youths in public school throughout the state, as compared to 1990 census data for Connecticut. The crossing of five SDAs with five ERGs resulted in 25 cells, of which two had no school districts. Sampling from each cell was done in proportion to the number of school districts and students within the cell, with the final goal of ensuring proportional representation of school districts and seventh, ninth, and eleventh grade students for each SDA and for each ERG. Sixty-one schools were included in this analysis.

**Survey Development**

The Voice of Connecticut Youth Survey was designed to provide a comprehensive assessment of adolescent health needs in the state of Connecticut. A statewide advisory board determined survey topics. Items were primarily derived from four existing surveys: National Longitudinal Study of Adolescent Health Survey (Resnick et al., 1997), Family Health Assessment Survey (Blum, Beuhring, & Lammers, 1995), Minnesota Adolescent Health Survey (Neumark-Sztainer et al., 1998), and the Youth Risk Behavior Surveillance (Kann et al., 1995). Language and response scales were simplified and items were organized into topic areas to ease administration. After revision and pilot testing, the final survey included 225 items covering all key domains of health risk behaviors as well as risk and protective factors. The survey was administered in classroom settings. Surveys were anonymous and students were assured that only group results would be reported. Parents were notified of the survey using a negative consent procedure. Those who did not want their daughter or son to participate were asked to notify the school. Students themselves gave written assent at the time of survey administration, in accordance with the requirements of the Connecticut Department of Health Institution Review Board, which regarded administration of this survey as routine procedure within the school.

**Measures**

A number of questions were chosen from the CYS to measure dieting behaviors, eating behaviors, and exercise behavior. These items are listed below.

**Weight Control Behaviors.** Participants responded to five questions designed to measure behaviors to lose weight or keep from gaining weight. Participants responded to the question “During the past week (7 days), did you do any of the following things to lose weight or keep from gaining weight?” Respondents marked yes or no to the following behaviors: (1) dieted (ate less or differently), (2) exercised (to burn calories or fat), (3) made yourself vomit (throw up), (4) took diet pills (Dexatrim), (5) took laxatives (like Ex-lax) or diuretics (water pills). Since there was a low percentage of respondents who endorsed the questions on vomiting, diet pills, and laxatives, these variables were combined for clustered logistic regression analyses in the variable “disordered eating symptoms.”

**Healthful Eating Behavior.** Eating behavior was assessed by a number of questions regarding the frequency with which specific foods were eaten during the last week. Four questions were used in these analyses to assess consumption of foods typically low in fat by the question “Did you eat or drink the following things yesterday?:” (1) lowfat milk, yogurt, (2) bread, rice, pasta, cereal, bagels, (3) fruits, and (4) vegetables. Forced choice responses included (1) no, (2) yes, only once, and (3) yes, twice or more. For the purposes of analysis, responses on each of these four questions were combined into the following categories; frequently (yes, twice or more) or less frequently (no or yes, only once).

**Breakfast Consumption.** Participants were asked about eating breakfast in the morning before school with the question “Do you usually eat breakfast on school days?” Respondents chose one of three responses: (1) no, (2) yes, but it doesn’t include fruit, milk, or juice, and (3) yes, it usually includes fruit, milk, or juice. For analysis, responses were dichotomized into (1) yes, usually eat breakfast on school days (with or without fruit, milk or juice) or (2) no.

**Vigorous Physical Activity.** Vigorous physical activity was assessed with the question “In a normal week, how many times do you work, play, or exercise hard enough to make you sweat and breathe heavily?” Respondents chose one of five responses to this question: (1) never, (2) 1 or 2 times, (3) 3 to 5 times, (4) 6 or 7 times, (5) more than 7 times. For analysis, responses were dichotomized into two categories: three or more times per week or less than three times per week, based on recommendations by the International Consensus Conference on Physical Activity Guidelines for Adolescents (Sallis & Patrick, 1994).

**Sociodemographic Variables.** Sociodemographic and personal variables included gender, grade level, ethnicity, height, weight, family socioeconomic status (SES), and community socioeconomic status. All of these variables were self-reported. Family SES was
Weight Control Among Overweight Adolescents

Based on adolescent's self-report of parental education and employment status and was divided into four levels: high (mother or father had professional training beyond a four-year college and currently works full time); middle-high (mother or father graduated from college and currently works full or part-time or is retired, or mother or father had professional training beyond college and currently works part-time or is retired); middle-low (mother or father graduated from high school but not from college, and currently works full or part-time or is retired); and low (parents did not graduate from high school, or graduated from high school but are not currently working, for reasons other than retirement). Questions were asked separately for each parent and the maximum value of either mother's or father's categorical measure was employed.

Statistical Analysis

The associations between overweight status and weight control, eating, and physical activity were evaluated in female and male adolescents. All analyses were conducted using Version 6.12 of SAS (SAS Institute, 1997). School was included as a random effect in all analyses to reflect the two-stage sampling design described earlier. For dichotomous outcomes, for which normally distributed residual errors could not be assumed, analyses were conducted using the GLIMMIX macro (Littell, Milliken, Stroup, & Wolfinger, 1996). The GLIMMIX macro implements the Generalized Linear Mixed Model and is appropriate for data with a nonnormal error distribution and multiple random effects. For dichotomous outcomes, a binomial distribution was specified for the residual error in combination with a logit link to obtain a mixed-model logistic regression analysis.

The following analyses were conducted. Prevalence rates of demographic variables by weight status were examined separately for female and male adolescents. Prevalence rates of weight control, eating, and physical activity behaviors by weight status were examined separately for female and male adolescents. Logistic regression models used weight control behavior or health behavior (yes/no) as the dichotomous outcome, weight status as the independent variable, and school as a random effect. Odds ratios and 95% confidence intervals for weight control, eating, and physical activity behaviors by weight status were examined separately for female and male adolescents. Logistic models used weight control behavior or health behavior (yes/no) as the dichotomous outcome and weight status as the independent variable. These models were adjusted for sociodemographic factors (parent SES, race, and grade) and used school as a random effect.

Results

Prevalence of Health and Dieting Behaviors by Gender

Prevalence of weight control and physical activity variables are described for nonoverweight, overweight, and obese adolescents by gender (Tables II and III). The overweight and obese adolescents were compared to the nonoverweight adolescents. The superscript indicates a significant difference from the nonoverweight group.

Weight Control Behaviors. The prevalence of unhealthy weight control behaviors (laxatives, diet pills, vomiting) was directly related to overweight status in both female and male adolescents. A higher percentage of obese girls engaged in unhealthy weight control behaviors, followed by the overweight girls and with the lowest level of these behaviors seen in the nonoverweight girls. Similar patterns were seen in the male adolescents.

As overweight status increased, the prevalence of dieting also increased. A higher percentage of obese females were dieting, followed by the overweight girls and finally the nonoverweight girls. Similar patterns were seen in the male adolescents.

Eating and Physical Activity. The prevalence of usual breakfast consumption was inversely related to overweight status. An inverse relationship was also seen in the relationship between vigorous exercise for more than three times per week and weight status in both female and male adolescents. The obese adolescents were less likely to report vigorous physical activity than the overweight boys and girls. The nonoverweight girls were more likely to exercise than the overweight girls. Some differences across weight status were found for lowfat eating (i.e., overweight girls were less likely to eat lowfat dairy products or grains on the previous day), but these differences tended to be small.

Odds Ratios Between Weight Control, Eating Behaviors, and Physical Activity

Odds ratios between weight control, eating behaviors, and physical activity are described for nonover-
weight, overweight, and obese adolescents by gender (Table IV). Obese boys and girls and the overweight boys were less likely to eat breakfast than nonoverweight youths. After controlling for race, SES, and grade, no relationships were found for fruit or vegetable intake or lowfat dairy foods among overweight and nonoverweight youths. Obese girls and overweight boys reported consuming fewer grain products than nonoverweight youths. Both obese and overweight youths dieted more frequently than nonoverweight youths. Overweight boys were three to four times as likely to diet compared to nonoverweight boys, and overweight girls were twice as likely to diet as nonoverweight girls. The prevalence of the unhealthy weight control behaviors was too low to use multivariate models, and we grouped these behaviors into a disordered eating symptoms category. The obese girls were found to have more disordered eating symptoms than nonoverweight girls. Overweight girls and obese boys were less likely to report engaging in vigorous physical activity than nonoverweight youths. However, both moderately overweight and obese boys and girls were more likely than nonoverweight youths to report using exercise to lose weight.

### Discussion

The purpose of this study was to take an in-depth look at the use of weight control behaviors in overweight and obese adolescents. A number of main points emerged from this study. Consistent with our hypothesis, we found that overweight adolescents were less likely to engage in vigorous physical activity or to report healthy eating patterns, behaviors that have potentially positive implications for weight management. Overweight youths were at a greater risk for unhealthy weight control behaviors (diet pills, laxatives, vomiting). Of concern, high percentages of both overweight and nonoverweight adolescents seem to be consuming low levels of fruits and vegetables and are not getting adequate exercise.

These data suggest that nonoverweight as well as overweight adolescents are at risk for unhealthy eating patterns and inadequate levels of physical activ-
### Table III. Males: Prevalence and 95% Confidence Intervals of Health and Weight Control Behaviors Grouped by Weight Status

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Nonoverweight 85th–95th %ile</th>
<th>85th–95th %ile (n = 751)</th>
<th>&gt;95th %ile (n = 376)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually eat breakfast</td>
<td>67.0</td>
<td>59.5a</td>
<td>57.1a</td>
</tr>
<tr>
<td></td>
<td>(63.9–69.8)</td>
<td>(55.0–63.8)</td>
<td>(51.5–62.8)</td>
</tr>
<tr>
<td>Eat &gt;1 lowfat dairy yesterday</td>
<td>33.1</td>
<td>35.1</td>
<td>32.2</td>
</tr>
<tr>
<td></td>
<td>(30.7–35.6)</td>
<td>(31.3–39.1)</td>
<td>(27.4–37.4)</td>
</tr>
<tr>
<td>Eat &gt;1 grain yesterday</td>
<td>53.7</td>
<td>49.9</td>
<td>47.4a</td>
</tr>
<tr>
<td></td>
<td>(51.6–55.8)</td>
<td>(46.2–53.6)</td>
<td>(42.4–52.6)</td>
</tr>
<tr>
<td>Eat &gt;1 fruit yesterday</td>
<td>40.4</td>
<td>38.3</td>
<td>36.2</td>
</tr>
<tr>
<td></td>
<td>(37.9–43.0)</td>
<td>(34.4–42.3)</td>
<td>(31.2–41.5)</td>
</tr>
<tr>
<td>Eat &gt;1 vegetable yesterday</td>
<td>34.1</td>
<td>32.7</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>(31.8–36.4)</td>
<td>(29.1–36.5)</td>
<td>(27.5–37.4)</td>
</tr>
<tr>
<td>Dietedb</td>
<td>8.6</td>
<td>21.5a</td>
<td>31.3a</td>
</tr>
<tr>
<td></td>
<td>(7.6–9.6)</td>
<td>(18.8–24.6)</td>
<td>(26.8–36.2)</td>
</tr>
<tr>
<td>Self-induced vomiting</td>
<td>1.5</td>
<td>1.6</td>
<td>2.9a</td>
</tr>
<tr>
<td></td>
<td>(1.1–2.1)</td>
<td>(0.9–2.7)</td>
<td>(1.6–5.0)</td>
</tr>
<tr>
<td>Diet pills</td>
<td>0.7</td>
<td>1.2</td>
<td>1.8a</td>
</tr>
<tr>
<td></td>
<td>(0.5–1.1)</td>
<td>(0.7–2.0)</td>
<td>(1.0–3.3)</td>
</tr>
<tr>
<td>Laxatives</td>
<td>1.3</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>(0.9–1.8)</td>
<td>(1.1–2.9)</td>
<td>(1.1–3.7)</td>
</tr>
<tr>
<td>Exercised to lose weight</td>
<td>37.9</td>
<td>61.5a</td>
<td>65.4c</td>
</tr>
<tr>
<td></td>
<td>(35.4–40.4)</td>
<td>(57.5–65.3)</td>
<td>(60.2–70.4)</td>
</tr>
<tr>
<td>Vigorous exercise</td>
<td>81.1</td>
<td>81.7</td>
<td>74.5a</td>
</tr>
<tr>
<td></td>
<td>(79.0–82.9)</td>
<td>(78.4–84.5)</td>
<td>(69.6–78.9)</td>
</tr>
</tbody>
</table>

School is included as a random effect.

*p < .05, as compared to the nonoverweight group.

bDuring the past 7 days.

### Table IV. Odds Ratios and 95% Confidence Intervals for Health and Dieting Behaviors Among Obese and Overweight Female and Male Adolescents as Compared to Nonoverweight Adolescents

<table>
<thead>
<tr>
<th></th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nonoverweight</td>
<td>85th–95th %ile</td>
<td>&gt;95th %ile</td>
<td>Nonoverweight</td>
<td>85th–95th %ile</td>
<td>&gt;95th %ile</td>
</tr>
<tr>
<td>Usually eat breakfast</td>
<td>1.0</td>
<td>.87 (.70–1.07)</td>
<td>.72 (.53–.97)</td>
<td>1.0</td>
<td>.72 (.60–.86)</td>
<td>.68 (.54–.86)</td>
</tr>
<tr>
<td>Eat &gt;1 lowfat dairy yesterday</td>
<td>1.0</td>
<td>1.08 (1.08)</td>
<td>1.16 (1.16)</td>
<td>1.0</td>
<td>1.12 (0.94–1.34)</td>
<td>1.04 (0.81–1.33)</td>
</tr>
<tr>
<td>Eat &gt;1 grain yesterday</td>
<td>1.0</td>
<td>.95 (.85–1.38)</td>
<td>.73 (.82–1.64)</td>
<td>1.0</td>
<td>.82 (.77–1.17)</td>
<td>.67 (.29–1.32)</td>
</tr>
<tr>
<td>Eat &gt;1 fruit yesterday</td>
<td>1.0</td>
<td>1.06 (.77–1.17)</td>
<td>1.04 (.54–.99)</td>
<td>1.0</td>
<td>.90 (.86–1.06)</td>
<td>.90 (.86–1.12)</td>
</tr>
<tr>
<td>Eat &gt;1 vegetable yesterday</td>
<td>1.0</td>
<td>.88 (.86–1.32)</td>
<td>.82 (.76–1.42)</td>
<td>1.0</td>
<td>.91 (.86–1.09)</td>
<td>.91 (.68–1.09)</td>
</tr>
<tr>
<td>Dieted</td>
<td>1.0</td>
<td>2.04 (1.06)</td>
<td>2.36 (1.06)</td>
<td>1.0</td>
<td>2.98 (1.65–2.52)</td>
<td>4.72 (1.75–3.19)</td>
</tr>
<tr>
<td>Disordered eating symptoms</td>
<td>1.0</td>
<td>1.18 (.81–1.71)</td>
<td>2.48 (.61–3.72)</td>
<td>1.0</td>
<td>1.36 (.87–2.71)</td>
<td>1.54 (.86–2.16)</td>
</tr>
<tr>
<td>Exercised to lose weight</td>
<td>1.0</td>
<td>1.40 (1.12–1.74)</td>
<td>1.55 (1.12–2.12)</td>
<td>1.0</td>
<td>2.70 (2.26–3.21)</td>
<td>3.07 (2.42–3.90)</td>
</tr>
<tr>
<td>Vigorous exercise &gt;3X/week</td>
<td>1.0</td>
<td>.65 (.52–.80)</td>
<td>.67 (.49–.90)</td>
<td>1.0</td>
<td>1.11 (.89–1.38)</td>
<td>.69 (.53–.90)</td>
</tr>
</tbody>
</table>

Controlling for parent SES, race, and grade.

*aDuring the past 7 days.
iti. Less than two-thirds of boys and less than half of the girls reported that they usually ate breakfast on a school day. Approximately a third of the adolescents reported eating more than one fruit or vegetable on the previous day. Approximately two-thirds of the adolescents reported that they were involved in vigorous physical activity more than three times in the last week. These results imply that healthy eating and physical activity messages are not being interpreted or implemented by youths, regardless of weight status. These results raise particular concerns when the increasing rates of obesity in children and adolescents are considered.

Although more overweight adolescents reported using exercise to lose weight within the past week, they were also less likely to exercise at a vigorous level three times per week. Overweight adolescents may use exercise as a way of managing their weight, but it may not be at a high enough frequency or intensity to assist them in their task.

The results of this study suggest that many overweight adolescents are not reporting healthy eating patterns, which may assist with weight management. In this study, overweight adolescents reported fairly similar eating habits to their peers. Other national studies have shown that a lower percentage of overweight adolescents consume one or more fruits and vegetables on a daily basis (Neumark-Sztainer et al., 1996) or adequate dairy products (Neumark-Sztainer et al., 1997) as compared with nonoverweight adolescents. In this study, trends suggest that lower percentages of overweight adolescents consume fruits or vegetables on a daily basis, but these results were not significant in this analysis.

In this study, overweight adolescents were less likely to eat breakfast in the morning than nonoverweight adolescents. Overweight adolescents may skip meals, such as breakfast, as a way of managing their weight. The reduced likelihood of breakfast consumption in the morning is of particular concern when considered in light of growing evidence of the link between breakfast consumption and academic performance, school attendance, and other psychosocial factors (Murphy, Pagano, Nachmani, Sperling, & Kleinman, 1998).

Consistent with the literature, we found that overweight adolescents were more likely to engage in unhealthy weight control behaviors but were less likely to engage in healthier behaviors that could assist with lifelong weight management. In this study, over 9% of the obese girls and almost 3% of the obese boys reported using one of the unhealthy weight control methods (vomiting, diet pills, laxatives) within the last 7 days. Both the male and female overweight adolescents were at greater risk for using any of these methods in an attempt to manage their weight. The risk was particularly high for overweight girls, who were more than two times as likely to report these unhealthy weight control methods than nonoverweight adolescent girls. Although the percentages of adolescents who used these unhealthy weight control behaviors may appear low, these behaviors were reported as occurring within the last 7 days and longer time periods may show even higher prevalence. The brevity of the measures assessing dieting, eating patterns, and physical activity should also be considered.

The high prevalence of dieting among adolescents in the 1990s is reinforced by the data in this study. More than half of the obese female adolescents and almost a third of the obese male adolescents were on a diet. These data add to a growing body of literature suggesting that overweight adolescents are aware of the potential negative health implications of obesity and may be trying to manage their weight though dieting or other strategies.

The strengths of this study include the size of the population, the diversity in terms of gender, ethnicity and socioeconomic status, and the confidential nature in which the data were collected. Another strength was the comprehensive nature of the survey and the inclusion of items assessing weight, height, weight control behaviors, food intake, and physical activity. However, the limitations of this study should also be considered when interpreting these results. The self-report nature of these data is a limitation, as adolescents may distort their weight or frequency of behaviors due to the sensitive nature of the questions. Adolescents may have underreported their weight and overreported their physical activity. However, the similarity of prevalence rates for unhealthy weight control behaviors from other studies suggests that inferences to the general population of adolescents may be acceptable. These results do not address the causal nature of the relationships between level of overweight in adolescents and unhealthy dieting practices, eating behaviors, and physical activity. For example, from these data we cannot determine to what degree being overweight leads to decreased physical activity and the extent to which lower levels of physical activity leads to higher levels of obesity. In addition, the brevity of these measures should also be considered.

The results of this study also have clinical impli-
cations. Clinicians need to be aware that overweight youths are at risk for using potentially harmful weight management behaviors. Adolescents may be using these weight management strategies because of the increasing psychosocial pressures and consequences. Typically, health providers may screen underweight adolescents only for dieting, laxative or diet pill use, or purging. This article demonstrates that overweight adolescents would also benefit from screening and early intervention.

In summary, this study demonstrated that overweight adolescents are less likely to use healthy weight management strategies and are more likely to be dieting and using unhealthy weight control practices than nonoverweight adolescents. Both overweight and nonoverweight male and female adolescents would benefit from messages about healthy lifestyle changes. These findings have implications for future research in areas of screening adolescents for dysfunctional eating behaviors and developing interventions and support systems aimed at promoting lifestyle changes in overweight adolescents.

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