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Disordered Weight Control Behaviors in Early Adolescent Boys and Girls of Color: An Under-Recognized Factor in the Epidemic of Childhood Overweight

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Abstract

Objectives—Ethnic disparities in childhood overweight are well-documented. In addition, disordered weight control behaviors (DWCB) have been linked to overweight and weight gain in multiple ways, but little is known about DWCB in youth of color, especially boys. We examined the distribution and determinants of ethnic and gender disparities in DWCB in early adolescents.

Methods—In fall 2005, 47 Massachusetts middle schools participating in the Healthy Choices overweight prevention study administered a self-report baseline survey assessing student sociodemographics, height, weight, and DWCB (vomiting or use of laxatives or diet pills in the past month to control weight). Data from 16,978 girls and boys were used in multivariate logistic regression models to estimate the odds of DWCB in youth of color compared to their white peers, controlling for individual- and school-level factors.

Results—Among white youth, 2.7% of girls and 2.3% of boys reported DWCB. The odds of DWCB were elevated 2–10 times in most ethnic group relative to whites. Disparities were attenuated but persisted after controlling for multiple individual- and school-level factors.

Conclusions—Ethnic disparities in DWCB must be considered in efforts to address the epidemic of childhood overweight.

Keywords

Adolescence; eating disorders; overweight; disparities

Childhood overweight in the U.S. is well-documented, as are greater rates of overweight in Latinos, African-Americans, and American Indians relative to white youth [1]. There are multiple linkages between overweight and eating disorders, including higher rates of disordered weight control behaviors (DWCB), such as self-induced vomiting or use of laxatives or diet pills for weight control, in overweight compared to healthy weight boys and girls and prospective associations of dieting, body dissatisfaction, and binge eating with excess weight gain in adolescence [2, 3]. Ethnic differences in DWCB in youth are less well-described. In older adolescents, findings vary for girls as to relative rates of eating disorder symptoms across groups [4–6]; in contrast, older adolescent boys of color report higher rates than white boys [4–6]. Early adolescence is the developmental period when eating disorder symptoms may first emerge [7], but little is known about DWCB in this life stage, especially in youth of color and boys.

Methods

In 2004, the Massachusetts Department of Public Health in partnership with Blue Cross Blue Shield of Massachusetts launched the Healthy Choices (HC) Initiative, a three-year school-based intervention to promote healthy eating and physical activity and reduce TV viewing and overweight in middle school youth. [8] Administrators at all public middle schools in the state were notified about HC; all of the 51 schools entering the study in 2005 were invited to participate in an evaluation of the intervention that involved collecting survey data from students at several time points. The sociodemographic composition of these schools was similar to that of middle schools statewide. In fall 2005, before intervention activities began, 47 (92.2%) schools administered a baseline, self-report survey assessing sociodemographics, height, weight, and weight-related behaviors was administered to all 6th, 7th, and 8th graders. Self-reported height and weight, which have moderate validity in adolescents [9], were used to classify overweight (body mass index [BMI] $\geq$ 85th percentile for age and sex) following U.S. Centers for Disease Control and Prevention (CDC) guidelines (<http://www.cdc.gov/growthcharts/>). To assess DWCB, students were asked, “In the last 30 days, have you done any of the following to lose or maintain your weight?” and they chose as many as applied from the options: “Vomit or throw up on purpose after eating”; “Take laxatives”; “Take diet pills without a doctor’s permission.” This item was modified from validated DWCB items used by the CDC’s Youth Risk Behavioral Surveillance System [10]. Information on school characteristics (percent of students eligible for free or reduced-price lunch, percent of residents in school census tract living at or below poverty) were gathered through publicly available data sources (<http://profiles.doe.mass.edu/>; www.census.gov). Passive parental consent and adolescent assent procedures were used. Harvard School of Public Health institutional review board approved this study.

Generalized estimating equation (GEE) methods were used to estimate adjusted odds ratios (ORs) of reporting DWCB (defined as any vomiting or laxative or diet pill use for weight control in the past month) in youth of color compared to their same-gender, white peers. Multivariate models were used to cross-sectionally examine potential individual- and school-level confounders and explanatory factors and to account for school clustering. Subgroup analyses used GEE models controlling for gender and grade, stratified by race/ethnicity group, to examine gender differences in prevalence of DWCB. A total of 20,367 surveys were collected; 3,389 were excluded due to missing or implausible values, resulting in an analytic sample of 16,978 (83.4%).

Results

The sample was diverse in race/ethnicity and school and neighborhood socioeconomic status (Table 1). The percent of students reporting DWCB in the past month was lowest in white youth and highest in Hawaiian/Pacific Islander youth. Overall and within each ethnicity group, girls and boys did not significantly differ ($P>0.05$) in percent reporting DWCB except within the American Indian/Alaskan Native group ($P=0.008$).

As shown in Table 2, among both girls and boys and controlling for grade (Model 1), nearly all ethnicity groups were more likely than same-gender white peers to report DWCB in the past month. Being overweight, having reached menarche (for girls), dieting in the past month, perceiving oneself as very underweight *or* very overweight, and, in boys only, higher percent of residents living at or below poverty in the child's school neighborhood were all positively associated with the odds of reporting DCWB (Models 2–5). ORs were attenuated but remained significant even in the fully adjusted model (Model 5).

Discussion

With its *Strategic Plan for NIH Obesity Research* [1], the National Institutes of Health issued a call six years ago for increased research on eating disorders. Yet today, much remains unknown about DWCB in U.S. youth of color, particularly boys. In our sample of almost 17,000 middle school students, we found strong evidence that pronounced ethnic disparities in extreme weight control efforts emerge by early adolescence in both boys and girls.

Our findings of higher DWCB rates in boys of color compared to white boys are consistent with other U.S. national [4, 5] and state-specific studies with high school students [6]. It has been suggested that higher rates of DWCB in youth of color may be attributed in part to high rates of overweight in some ethnic groups relative to white youth [5]. We found controlling for overweight generally attenuated ethnic differences in ORs, but only slightly. After accounting for multiple individual- and school-level factors, we found that the magnitude of group differences in DWCB persisted, indicating that other unmeasured factors, such as disconnection from family and school and violence victimization [6], may be at play and will require further investigation.

Limitations include the use of cross-sectional, self-report data, lack of data on other DWCB, such as fasting and use of diuretics and anabolic steroids, and small sample sizes for some ethnic subgroups. In addition, the Healthy Choices study did not use representative sampling.

Conclusion

Accumulating evidence prospectively links eating disorder symptoms to less healthful nutrition and physical activity behaviors and excess weight gain [2, 3]. This evidence, combined with our findings, highlight the importance of considering ethnic disparities in DWCB in efforts to address the epidemic of adolescent overweight.

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Table 1
Sample Characteristics of Middle School Students Participating in Healthy Choices (N=16,978)

	White	Asian	Black	Hawaiian/Pacific Islander	American Indian/Alaskan Native	Latina/o	Multiethnic Asian and White	Multiethnic Black and White	Other ^a
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
FEMALES (N=8,196)									
Total	76.7 (6,288)	4.0 (326)	3.8 (315)	0.4 (33)	0.9 (73)	7.6 (620)	0.7 (55)	0.8 (66)	5.1 (420)
<u>Weight Status</u>									
BMI ≥ 85 th Percentile	11.2	6.8	20.0	15.1	15.1	16.5	7.3	12.1	14.0
Has Reached Menarche	49.3	56.4	65.4	63.6	63.0	72.4	49.1	77.3	57.1
Dieted in Past Month	26.4	18.1	30.8	24.2	42.5	32.3	25.5	31.8	32.6
<u>Self-Perceived Weight Status</u>									
Very Underweight	2.7	2.5	3.8	3.0	4.1	3.9	1.8	0	3.3
Slightly Underweight	15.9	18.4	8.6	18.2	9.6	11.0	20.0	12.1	15.0
About Right	56.7	57.1	57.8	42.4	49.3	55.0	41.8	57.6	50.7
Slightly Overweight	21.3	17.5	23.8	15.1	24.7	25.3	27.3	27.3	24.1
Very Overweight	3.3	4.6	6.0	21.2	12.3	4.8	9.1	3.0	6.9
% with Disordered Weight Control Behaviors ^b	2.7	3.1	6.7	24.2	23.3	6.6	5.5	6.1	5.7
Mean (sd)^c		Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c
% of Students in Child's School Eligible for Free/Reduced-Price Lunch	20.5 (15.9)	19.4 (20.6)	39.8 (24.3)	19.9 (18.8)	26.1 (17.7)	46.6 (26.5)	17.1 (18.2)	31.5 (21.7)	28.1 (20.4)
% of Residents in Child's School Census Tract Living at or Below Poverty Threshold	6.5 (5.6)	5.4 (3.9)	11.5 (9.9)	6.3 (5.8)	8.7 (7.1)	10.7 (8.8)	5.7 (4.4)	9.0 (8.0)	8.7 (7.7)
MALES (N=8,782)									
Total	76.1 (6,683)	3.9 (339)	4.2 (370)	0.4 (36)	1.3 (110)	7.4 (653)	0.7 (60)	0.7 (65)	5.3 (466)
<u>Weight Status</u>									

	White	Asian	Black	Hawaiian/Pacific Islander	American Indian/Alaskan Native	Latina/o	Multiethnic Asian and White	Multiethnic Black and White	Other ^a
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
MALES (N=8,782)									
BMI ≥ 85 th Percentile	18.7	15.9	20.0	19.4	13.6	22.5	15.0	24.6	20.4
Dieted in Past Month	16.7	17.1	22.7	22.2	21.8	24.2	15.0	27.7	23.0
<u>Self-Perceived Weight Status</u>									
Very Underweight	3.7	5.6	5.7	2.8	8.2	4.3	6.7	3.1	4.7
Slightly Underweight	18.2	18.3	17.0	19.4	13.6	15.6	25.0	15.4	18.0
About Right	54.6	53.1	57.6	47.2	58.2	57.7	45.0	49.2	53.0
Slightly Overweight	20.2	20.9	16.2	13.9	16.4	18.4	20.0	21.5	21.0
Very Overweight	3.3	2.1	3.5	16.7	3.6	4.0	3.3	10.8	3.2
% with Disordered Weight Control Behaviors ^b	2.3	4.1	8.7	16.7	9.1	6.0	1.7	9.2	4.1
	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c	Mean (sd)^c
% of Students in Child's School Eligible for Free/Reduced-Price Lunch	20.8 (16.3)	23.4 (23.4)	39.0 (23.8)	28.0 (20.6)	26.9 (20.3)	47.8 (26.7)	17.6 (16.4)	38.0 (25.3)	31.5 (23.0)
% of Residents in Child's School Census Tract Living at or Below Poverty Threshold	6.6 (5.6)	6.0 (4.5)	10.9 (9.22)	9.4 (8.2)	7.8 (7.3)	10.2 (8.3)	5.3 (4.3)	9.7 (8.9)	9.6 (9.0)

^a Other group includes those missing ethnicity and other multiethnic groups besides Asian/White and Black/White.

^b Disordered weight-control behaviors defined as report of any vomiting or use of laxatives or diet pills for weight control in past month.

^c sd=standard deviation

Boldface indicates P-value<0.005 for ethnicity group difference from same-gender white referent group in multivariable models, controlling for grade; critical p-value chosen to produce an expected value of less than one Type I error for preplanned comparisons in Table 1.

Table 2

Results From Multivariable GEE Models Estimating Odds of Disordered Weight-Control Behaviors^a Associated With Ethnicity Group, Controlling for Covariates in Table^b, in Middle School Students Participating in Healthy Choices

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)
FEMALES					
<u>Ethnicity</u>					
White (referent)	1.00	1.00	1.00	1.00	1.00
Asian	1.14 (0.62, 2.11)	1.12 (0.61, 2.05)	1.27 (0.68, 2.37)	1.19 (0.63, 2.24)	1.21 (0.63, 2.32)
Black	2.49 (1.24, 5.01)	2.19 (1.10, 4.36)	2.28 (1.17, 4.44)	2.23 (1.08, 4.62)	1.95 (1.02, 3.75)
Hawaiian/Pacific Islander	10.7 (5.03, 22.7)	10.5 (5.05, 22.0)	12.4 (5.50, 28.0)	9.32 (4.83, 18.0)	9.41 (4.86, 18.2)
American Indian/Alaskan Native	10.7 (5.80, 19.6)	9.93 (5.45, 18.1)	9.17 (4.84, 17.4)	8.37 (4.43, 15.8)	8.06 (4.25, 15.3)
Latina	2.45 (1.71, 3.51)	2.12 (1.49, 2.98)	2.13 (1.51, 3.01)	2.10 (1.47, 3.01)	1.84 (1.25, 2.73)
Multiethnic Asian and White	2.05 (0.73, 5.77)	2.21 (0.79, 6.20)	2.19 (0.79, 6.03)	1.90 (0.65, 5.57)	1.93 (0.66, 5.65)
Multiethnic Black and White	2.14 (0.80, 5.73)	1.90 (0.72, 4.98)	1.88 (0.73, 4.84)	1.98 (0.79, 4.98)	1.84 (0.72, 4.69)
Other ^c	2.25 (1.30, 3.91)	2.11 (1.22, 3.66)	2.02 (1.14, 3.58)	1.84 (1.02, 3.33)	1.74 (0.96, 3.17)
<u>Weight Status</u>					
BMI ≥ 85 th Percentile		1.55 (1.12, 2.15)	1.19 (0.85, 1.67)	0.84 (0.56, 1.26)	0.81 (0.55, 1.21)
Has Reached Menarche		1.82 (1.32, 2.51)	1.50 (1.09, 2.07)	1.61 (1.18, 2.20)	1.57 (1.14, 2.16)
Dieted in Past Month			3.50 (2.61, 4.69)	3.46 (2.52, 4.74)	1.22 (0.90, 1.55)
<u>Self-Perceived Weight Status</u>					
Very Underweight				5.69 (3.26, 9.92)	5.61 (3.22, 9.80)
Slightly Underweight				1.05 (0.68, 1.63)	1.06 (0.69, 1.64)
About Right (referent)				1.00	1.00
Slightly Overweight				1.03 (0.75, 1.41)	1.05 (0.76, 1.45)
Very Overweight				4.98 (3.32, 7.46)	5.02 (3.34, 7.55)
% of Students in Child's School Eligible for Free/Reduced-Price Lunch					1.00 (0.99, 1.01)
Percent of Residents in Child's School Census Tract Living at or Below Poverty Threshold					1.01 (0.99, 1.03)
MALES					
<u>Race/Ethnicity</u>					

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)
White (referent)	1.00	1.00	1.00	1.00	1.00
Asian	1.83 (0.89, 3.78)	1.81 (0.89, 3.66)	1.79 (0.90, 3.62)	1.79 (0.91, 3.51)	1.85 (0.94, 3.61)
Black	4.01 (2.72, 5.91)	3.88 (2.67, 5.66)	3.70 (2.56, 5.34)	3.58 (2.45, 5.23)	3.26 (2.09, 5.08)
Hawaiian/Pacific Islander	8.31 (3.39, 20.35)	7.38 (3.05, 17.9)	7.29 (2.80, 19.0)	6.79 (2.69, 17.1)	6.38 (2.54, 16.0)
American Indian/Alaskan Native	4.21 (2.20, 8.07)	3.93 (2.09, 7.40)	3.75 (1.94, 7.24)	3.58 (1.82, 7.05)	3.56 (1.82, 6.96)
Latino	2.74 (1.60, 4.69)	2.54 (1.47, 4.38)	2.37 (1.38, 4.09)	2.32 (1.34, 4.01)	2.17 (1.31, 3.62)
Multietnic Asian and White	0.70 (0.11, 4.53)	0.75 (0.11, 5.03)	0.75 (0.11, 5.03)	0.69 (0.10, 4.61)	0.72 (0.11, 4.71)
Multietnic Black and White	4.53 (1.74, 11.8)	4.47 (1.71, 11.7)	3.96 (1.54, 10.2)	3.48 (1.33, 9.12)	3.43 (1.33, 8.83)
Other ^c	1.79 (1.20, 2.66)	1.72 (1.15, 2.57)	1.63 (1.09, 2.45)	1.59 (1.06, 2.39)	1.48 (0.93, 2.34)
<u>Weight Status</u>					
BMI ≥ 85 th Percentile		1.79 (1.38, 2.32)	1.36 (1.05, 1.77)	1.48 (1.04, 2.12)	1.45 (1.01, 2.09)
Dieted in Past Month			2.50 (1.79, 3.49)	2.71 (1.88, 3.92)	2.68 (1.83, 3.93)
<u>Self-Perceived Weight Status</u>					
Very Underweight					
Slightly Underweight				4.37 (3.12, 6.15)	4.28 (3.06, 6.00)
About Right (referent)				1.42 (1.02, 1.97)	1.42 (1.02, 1.98)
Slightly Overweight				1.00	1.00
Very Overweight				0.89 (0.60, 1.33)	0.91 (0.61, 1.36)
% of Students in Child's School Eligible for Free/Reduced-Price Lunch				2.21 (1.25, 3.90)	2.23 (1.27, 3.94)
					1.00 (0.98, 1.01)
% of Residents in Child's School Census Tract Living at or Below Poverty Threshold					1.03 (1.00, 1.05)

^aDisordered weight-control behaviors defined as report of any vomiting or use of laxatives or diet pills for weight control in past month.

^bII models control for grade.

^cOther group includes those missing ethnicity and other multiethnic groups besides Asian/White and Black/White.

Boldface indicates P-value<0.05 for ethnicity group difference from same-gender white referent group in multivariable models.