Children's Report of Lifestyle Counseling Differs by BMI Status

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Abstract

Background: This study examined whether children's report of receiving weight, nutrition, and physical activity counseling from their clinicians differs by their BMI status and identified factors associated with higher rates of counseling.

Methods: Physical assessments and health surveys were collected from a school-based sample of 959 5th and 6th grade students. Multivariate logistic regression analysis was used to examine how lifestyle counseling differs by BMI status, adjusting for race, gender, socioeconomic status, co-morbidities, site of care provider, and age.

Results: Healthy weight children reported receiving the least amount of lifestyle counseling, with nearly one-quarter reporting none at all. Overweight children were no more likely than their healthy weight peers to report receiving weight and nutrition counseling. As expected, obese children were approximately two times more likely to report being counseled on their weight, nutrition, or physical activity as compared to healthy weight children (all *p* values at least <0.01). However, 23.9% of obese children reported receiving no counseling about their weight. After adjusting for BMI and all other confounding factors, for each lifestyle topic, Hispanics were at least 1.84 times more likely than whites to report being counseled (all *p* values at least <0.05). Blacks were at least 1.38 times more likely than whites to report being counseled (all *p* values at least <0.05). Girls were at least 1.38 times more likely than boys to report being counseled (all *p* values at least <0.05).

Conclusion: Although lifestyle counseling is universally recommended, many children report not receiving counseling. Despite clinical indications for more intensive counseling, overweight children report similar counseling rates as their healthy weight peers. Furthermore, a substantial proportion of obese children report not receiving lifestyle counseling. Future research should examine how lifestyle counseling can more effectively reach all children.

Introduction

Nearly one-third of US children ages 2–19 are overweight (BMI ≥ 85th and < 95th percentile) or obese (BMI ≥ 95th percentile).¹ According to recommendations from an Expert Committee convened by the American Medical Association, the CDC, and US Department of Health and Human Services Health Resources and Services Administration,² clinicians should screen children annually for overweight and obesity and then provide targeted counseling based on BMI status. These recommendations emphasize universal assessment and health counseling with the goals of prevention in healthy weight children and treatment in overweight and obese children.³

Previous studies have shown clinician documentation of weight status and obesity diagnosis to be suboptimal. A recent

study using data from the National Ambulatory Medical Care Survey and the National Hospital Medical Care Survey found that only 18% of children (ages 2–18) with a BMI ≥ 95th percentile had a documented diagnosis of obesity. Not only was obesity underdiagnosed, but it was also undertreated, with only half of obese children receiving any sort of counseling on weight reduction, diet, or exercise.⁴ This study is limited in that it only examined children with the diagnosis of obesity and overlooked the clinically important diagnosis of overweight. Similarly, a chart review of a Medicaid population found that only 12% of youth (ages 13–16) with a BMI ≥ 85th percentile had their weight status documented and only 7% had documented physical activity or nutrition counseling.⁵ However, this study did not differentiate between overweight and obese youth.

Both obese and overweight children were included and distinguished in studies from the National Health and

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Nutrition Examination Survey (NHANES). Among adolescents (ages 16–19) classified as obese, only 37–51% reported ever being informed by a clinician that they were obese; teens classified as overweight reported being informed of their weight status at rates as low as 17%.^{6,7} However, NHANES did not assess whether the adolescents then received appropriate counseling about nutrition and physical activity and did not assess whether healthy weight adolescents received preventive counseling. A recent study examining lifestyle counseling among all BMI categories found that obese adolescents (ages 12–17) received diet and exercise screening more frequently than their overweight peers, with rates declining between 2003 and 2007.⁸ Similarly, another study found that youth (ages 10–18) with BMIs $\geq 85^{\text{th}}$ percentile were more likely to report receiving lifestyle counseling; however, this study did not distinguish between overweight and obese youth.⁹ Both of these studies were limited by the use of self-reported height and weight to calculate BMI.

The primary aim of this study was to document the self-reported receipt of counseling about weight, nutrition, and physical activity by BMI status in a high-risk cohort of predominantly minority and low-income children. This study adds to the literature by examining counseling rates among younger children (ages 9–13), an age group in which lifestyle counseling has not yet been examined. This is a crucial age for physical activity counseling because childhood levels of physical activity are a strong predictor of physical activity in adolescence,¹⁰ and during the transition from childhood to adolescence, physical activity levels tend to decline.^{11–13} Additionally, this is an age at which children are beginning to have independence and influence on their food choices and food preparation,^{14–16} and with this increasing autonomy, it is important that the children themselves receive and recall nutrition counseling for it to be effective.

Additionally, this study is strengthened by including children in all weight categories, using objective measures of height and weight to calculate BMI, and examining factors beyond BMI (*i.e.*, race, gender, socioeconomic status, co-morbidities, site of care provider, and age) that may be associated with lifestyle counseling.

Methods

Community Interventions for Health is a comprehensive community-based study designed to prevent chronic disease by addressing individual and environmental chronic disease risk factors.¹⁷ New Haven, CT, is an affiliated study site. All procedures were approved in advance by the Yale University Human Subjects Committee (protocol #0904004988) and the local Board of Education. Written parental consent and child assent were obtained for all participants in English or Spanish.

Study Participants

Participants included 1226 5th and 6th grade students from 12 K–8 (kindergarten through 8th grade) schools randomly selected from a total of 27 K–8 schools in New

Haven. To be eligible, students had to be in a homeroom classroom where the sole language of instruction was English. Our study sample represents 88% of all eligible children. Two percent were excluded because of parental opt-out, and 10% were absent during data collection. The analytic sample for this article included 959 students (78%). Students were excluded if they did not have survey data ($n = 132$) or physical measures ($n = 65$), if they were missing data for any explanatory variables ($n = 21$) or all of the outcome variables ($n = 20$), or if underweight (BMI $< 5^{\text{th}}$ percentile, $n = 29$) since expected lifestyle counseling would be substantively different from counseling aimed at overweight and obese children who are the focus of this article.

Data Collection and Measurement

Protocol. Physical measurements were obtained by trained research assistants. Measures were taken privately and recorded with only school-assigned identification numbers to enable data linkage. Measurements were based on the World Health Organization Expanded STEPS protocol.¹⁸ A standardized stadiometer (Charder Electronic Co., LTD, Taichung City, Taiwan) and digital scale (Seca Corp., Hamburg, Germany) were used to measure height and weight, respectively. Student surveys were administered via desktop computer during regularly scheduled computer classes. To take into account subjects' differing levels of literacy, trained research staff read all questions and responses aloud while students read the survey and entered responses online (SurveyMonkey.com, LLC, Palo Alto, CA). Group administration facilitated participation for students with limited literacy. Surveys took approximately 30 minutes, and a small gift (*i.e.*, backpack) was given to each child who participated.

Measures

Lifestyle counseling. Counseling was assessed by yes or no questions that asked, “Has a doctor or nurse ever talked to you about any of the following: —your weight? —healthier eating? —doing more exercise or physical activity?”

Physical assessments. BMI was calculated based on height and weight, and age- and gender-adjusted percentiles were determined for each student.¹⁹ Following standard protocols, healthy weight was defined as BMI $\geq 5^{\text{th}}$ percentile and $< 85^{\text{th}}$, overweight was defined as BMI $\geq 85^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile, obese was defined as BMI $\geq 95^{\text{th}}$ percentile.²

Socioeconomic status. Data from school district records on students' qualification for the free and reduced-price school lunch program was used as the indicator of socioeconomic status (SES). Low SES was defined as eligibility for free or reduced-price lunch, whereas higher SES was defined as being ineligible for these programs.

Site of care provider. Students were asked “where do you go most often when you get sick” and chose from responses of “emergency room, my doctor, school health clinic, and don't know/not sure.”

Co-morbidities. Students were asked “has a doctor or nurse ever told you that you have —diabetes —asthma?”

Statistical Analysis

Descriptive statistics were calculated for BMI status, and the confounding variables of race, gender, SES, co-morbidities, site of care provider, and age. Multivariate logistic regression analyses were performed to test associations of the outcome variables (whether the student reported being counseled on weight, diet, or exercise) with BMI category after adjusting for potential confounders, including race, gender, SES, age, site of care provider, and the co-morbidities of diabetes and asthma. Separate logistic regression models were run for each outcome variable using PROC SURVEYLOGISTIC in SAS to account for clustering by school due to the school-stratified sampling design. The Wald chi-squared statistic was used to test if regression coefficients significantly differed from zero. Model assumptions and fit were diagnosed with fit, residual and influence statistics. Statistical significance was set at 0.05. Statistical analyses were performed using SAS 9.2 (SAS Institute Inc., Cary, NC).

Results

Description of Study Participants

The final sample included 959 children ages 9–13 years (Table 1). There was a high prevalence of overweight (19.3%) and an even higher prevalence of obesity (29.9%), together accounting for nearly one-half of the entire sample. Reflecting school district demographics, black and Hispanic minorities were well represented, making up over 80% of the sample. All other represented races, white ($n=128$), Asian ($n=14$), and American Indian ($n=1$) were combined into a single category in these analyses. Seventy percent of the children qualified for free lunch, with another 12.6% qualifying for a reduced-price lunch, serving as a proxy for low SES. Most children (68.8%) reported receiving medical care at a personal physician's office. Asthma was self-reported by 22.8% of study participants, and diabetes was self-reported by 2.6% of study participants.

Logistic Regression Analysis

Nearly one-quarter of healthy weight children reported receiving no lifestyle counseling at all and only 34.1% reported being counseled on all three topics. Within each topic, the percent of healthy weight children reporting counseling ranged from approximately 55% to 60%. Despite clinical indications, overweight children were no more likely than their healthy weight peers to report receiving weight and nutrition counseling (Table 2), although they were more likely to report counseling on physical activity (OR=1.62, 95% CI 1.05–2.48). As expected, obese children were significantly more likely to report receiving counseling on weight (OR=2.21, 95% CI 1.65–2.97, nutrition (OR=2.52, 95% CI 1.73–3.67), and physical activity (OR=1.96, 95% CI 1.27–3.04) compared

Table 1. Characteristics of Study Sample ($n=959$)

Characteristic	n (%) ^a
Age	
9 years	1 (0.1)
10 years	319 (33.3)
11 years	460 (48.0)
12 years	162 (16.9)
13 years	17 (1.8)
Gender	
Female	515 (53.7)
Male	444 (46.3)
Race	
Hispanic	424 (44.2)
Black	392 (40.9)
White/other ^b	143 (14.9)
School lunch eligibility	
Free lunch	679 (70.8)
Reduced price lunch	121 (12.6)
Full price	159 (16.6)
BMI status	
Healthy weight ($5\% \geq \text{BMI} < 85\%$)	487 (50.8)
Overweight ($85\% \geq \text{BMI} < 95\%$)	185 (19.3)
Obese ($\text{BMI} \geq 95\%$)	287 (29.9)
Site of care	
Personal physician's office	660 (68.8)
Emergency room	124 (12.9)
School health clinic	47 (4.9)
Unknown	128 (13.4)
Asthma	
Yes	219 (22.8)
No	740 (77.2)
Diabetes	
Yes	25 (2.6)
No	934 (97.4)

^aPercentages may not add to 100% due to rounding.

^bOther includes Asians ($n=14$) and American Indian ($n=1$).

to healthy weight children, even after controlling for race, gender, SES, age, site of care provider, and the co-morbidities of diabetes and asthma. However, 23.9% of obese children did not report receiving any counseling about their weight, and 8.7% reported not receiving lifestyle counseling on any topic.

	Weight counseling (n=946)		Nutrition counseling (n=956)		Physical activity counseling (n=946)	
	% Counseled	Adjusted OR ^a (95% CI)	% Counseled	Adjusted OR ^a (95%CI)	% Counseled	Adjusted OR ^a (95% CI)
BMI status						
Healthy weight (5%≥BMI<85%)	57.8	—	60.8	—	55.4	—
Overweight (85%≥BMI<95%)	61.8	1.16 (0.85, 1.59)	66.2	1.20 (0.90, 1.60)	65.9	1.62 (1.05 2.48)*
Obese (BMI≥95%)	76.1	2.21 (1.65, 2.97)***	79.4	2.52 (1.73, 3.67)***	71.3	1.96 (1.27, 3.04)**
Race						
White/other	49.7	—	49.6	—	39.6	—
Black	63.3	1.38 (1.06, 1.79)*	65.4	1.80 (1.12, 2.90)*	63.8	2.12 (1.44, 3.12)***
Hispanic	70.0	1.84 (1.24, 2.71)**	75.2	2.94 (1.48, 5.82)**	68.3	2.57 (1.68, 3.93)***
Gender						
Male	61.6	—	64.0	—	60.0	—
Female	66.2	1.40 (1.07, 1.84)*	70.4	1.59 (1.20, 2.10)**	64.0	1.38 (1.02, 1.86)*
Socioeconomic status (SES)						
Higher SES	52.3	—	61.1	—	43.1	—
Low SES	66.5	1.58 (1.108, 2.30)*	68.7	1.03 (0.67, 1.57)	65.9	2.15 (1.23, 3.76)**
Asthma						
No	62.0	—	66.4	—	60.9	—
Yes	71.4	1.36 (1.17, 1.66)**	71.0	0.98 (0.72, 1.34)	66.5	1.11 (0.66, 1.85)
Diabetes						
No	63.7	—	66.9	—	61.7	—
Yes	81.8	2.39 (0.93, 6.09)	87.5	3.65 (1.03, 12.96)*	78.3	2.12 (1.18, 3.79)*
Likelihood ratio test of global Null hypothesis	χ^2 60.23 df 12 p value <.0001			χ^2 80.52 df 12 p value <.0001		χ^2 77.30 df 12 p value <.0001
^a Also adjusted for age and site of care provider. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$ based upon Wald chi-squared statistic. OR, odds ratio; CI, confidence interval; df, degrees of freedom.						

Girls were 30–50% more likely to report receiving counseling than boys for all three lifestyle topics. Having a lower SES, as defined by eligibility for free or reduced-price lunch, significantly increased the odds of reporting being counseled on weight and physical activity, with no significant association for nutrition counseling. Hispanic children were roughly two to three times as likely to report each type of counseling compared to the reference category of whites and others. Black children were roughly twice as likely as whites/others to report nutrition and physical activity counseling, and 1.38 times as likely to report weight counseling. As expected, lifestyle counseling was higher among children with co-morbidities with asthmatics more likely to report receiving weight counseling (OR=1.36, 95% CI 1.17–1.66) and diabetics more likely to report receiving nutrition (OR=3.65, 95% CI 1.03–12.96) and physical activity counseling (OR=2.12, 95% CI 1.18–3.79). No association was found between site-of-care provider with any of the three lifestyle counseling outcomes, and thus results are not shown.

Discussion

This is among the first studies to examine the report of lifestyle counseling across BMI categories in children. Our results show that despite recommendations for universal preventive health messages,² children across all BMI categories reported that they did not receive lifestyle counseling. Nearly one-half of the children in our study were overweight or obese, which is substantially higher than the national prevalence of childhood overweight and obesity.¹ Despite clinical indications for more intensive lifestyle counseling, overweight students were no more likely than their healthy weight peers to report receiving weight and nutrition counseling. This finding is consistent with prior work that demonstrated this pattern of counseling in adolescents.⁹ We did find that overweight children were more likely than healthy weight children to report being counseled about physical activity; however, this difference may be driven by the low rate (55.4%) of physical activity counseling among healthy weight children as compared to their counseling on the other lifestyle factors. Taken together, this evidence suggests that many overweight children are not receiving appropriate, targeted lifestyle counseling.

In our study, obese children were more likely than healthy weight children to report being counseled. Although rates of counseling on weight in this sample show an improvement from prior studies in which one-third to one-half of obese children were not counseled,^{5–7} our rates were still inadequate, with nearly one-quarter of obese children reporting never having discussed their weight with a clinician. The potential benefits of effectively treating childhood obesity are substantial. Recent evidence indicates that if an overweight or obese child achieves healthy weight as an adult, they have no increased cardiovascular risk compared to adults who had been healthy weight throughout childhood.²⁰ Moreover, if we do not address childhood

obesity, this generation of children is expected to have a shorter life expectancy than their parents.²¹

There are two overall possible explanations for why the children in our study are not reporting receiving the recommended lifestyle counseling: Either the counseling is occurring but children are not remembering and reporting it or clinicians are not counseling all children. First, many overweight and obese children considerably underestimate their own weight status, and this misperception is greater when exposed to more obese family members and classmates.²² Since our study population had such a high prevalence of overweight and obesity (nearly 50% compared to the national prevalence of 32%¹), they may misperceive their own weight status and therefore may not attend to discussions about their weight because they do not view it as a health problem. Additionally, even if clinicians are counseling all children, they may spend more time counseling obese children for whom it is a greater health threat. Future studies should examine what aspects of counseling are most memorable to children.

Alternatively, clinicians may not be providing children with the necessary lifestyle counseling. Despite recommendations to assess children's weight status annually by calculating BMI percentiles,^{2,23} in several recent surveys of physician practices, at least one-half of physicians did not calculate BMI percentiles.^{24–28} Instead, physicians were more likely to plot children's height and weight on a growth chart and visually assess patients for weight concerns. Given the high prevalence of childhood overweight and obesity in the United States, it may be that the appearance of an overweight or obese child has become normalized, and by relying on visual assessment, clinicians are not diagnosing all overweight and obese children. Without first recognizing which children are overweight or obese, clinicians may not then be providing appropriate lifestyle counseling. This theory is supported by a study that found that children with extreme obesity, who provide clinicians with the greatest visual cues, were more likely to receive weight reduction counseling than children of other weight categories.²⁹ Calculating BMI percentiles is therefore an essential first step in screening for overweight and obesity to ensure that children are diagnosed and then receive appropriate counseling. One method of facilitating calculating BMI percentiles is the adoption of electronic medical records that automatically calculate BMI percentiles. The use of such medical records has been found to increase the diagnosis and counseling of overweight children.³⁰

Childhood overweight and obesity are more prevalent among racial minorities¹; however, evidence on lifestyle counseling differences by race remains limited and inconclusive. In a study of preventive obesity counseling in healthy weight children, non-Hispanic patients received more counseling than Hispanics.³¹ In contrast, in a study of the diagnosis of childhood obesity in outpatient visits, obesity was more likely to be diagnosed in nonwhite patients.⁴ In the current study, Hispanics and blacks were more likely than whites to report receiving counseling,

even after controlling for BMI status. The geographic area in this study has a high prevalence of racial and ethnic minorities, so it is possible that the clinicians are more skilled in counseling about lifestyle factors in a way that is particularly salient and memorable to minority children.

Last, we document sex differences, with girls more likely to report being counseled than boys, regardless of BMI. Again, this may either be due to girls being counseled similarly but remembering and reporting it more frequently than boys, or clinicians are in fact counseling girls either more frequently or effectively. Specifically, because overweight and obese girls are more likely to report body dissatisfaction than boys of the same weight category,^{32,33} it is possible that there is a recall bias and they are more likely to remember being counseled about weight. Alternatively, sex differences may be the result of a clinician bias in counseling, reflecting social norms about the acceptability of overweight among girls versus boys. Although it is of utmost importance that clinicians counsel overweight and obese girls, clinicians should be sensitive in such discussions because weight stigma is already more prevalent in girls than boys.³⁴

This study has several limitations. First, our survey asked whether the child had ever talked to a clinician about weight, nutrition, or physical activity. We have no information on quantity or quality of counseling or when or how often the counseling occurred. We also do not have records of whether the children in our study had well-child clinician visits in the past year, where preventive counseling would be expected to occur. Our study was also cross-sectional, and so we do not have information on how counseling affected children's behavior over time. It can also be argued that use of child self-report of counseling as opposed to clinician documentation is a limitation because we cannot differentiate whether counseling did not occur or if children are not recalling the counseling they received. However, research has shown good reliability in children's self-report on health questionnaires starting as young as age 8.³⁵ Additionally, we believe that child self-report is an important method for assessing counseling effectiveness, because it reflects whether the counseling was salient and memorable to the child. However, it is also possible that at this age group, clinicians may speak in private to the parents of the child, which would not be captured by our measures. Nevertheless, in an age group with significant influence regarding their health behaviors, whether a child is made aware of clinician's concerns and suggestions for lifestyle changes is key to behavior change. Due to necessary data restrictions from the school district, the only measure of the child's family income is eligibility for the national school lunch program. Last, due to logistical challenges in ensuring a private space for examination by trained personnel, we were unable to perform Tanner Staging to assess pubertal status.

In contrast, this study has several strengths. Importantly, we used objective measures of children's weights and heights to calculate BMI, and included all BMI risk categories. We were also able to link important health survey

information to physical measures to understand whether, and how, BMI is associated with receipt of counseling. Unlike prior studies that mostly focused on adolescents, our participants were young (ages 9–13) and predominantly composed of racial minorities, who are particularly at risk for overweight and obesity.

Conclusions

The rapid growth in childhood obesity may result in today's youth being the first generation in modern times not to outlive their parents. Although lifestyle counseling is recommended for children of all BMI statuses, many children report not receiving counseling. Despite clinical indications for more intensive counseling, overweight children report similar lifestyle counseling rates as their healthy weight peers. Furthermore, a substantial proportion of obese children report not receiving lifestyle counseling. Future research should examine why students are reporting not being counseled to see if they are indeed not being counseled, or if the counseling they are receiving is not effective. Also, future research could explore what makes counseling more salient to different subpopulations.

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Stacey Kallem, BA, developed hypotheses, interpreted results, and was primary author of the manuscript. Amy Carroll-Scott, PhD, MPH, contributed to study conceptualization, data collection design, statistical analyses, and interpretation of results. Kathryn Gilstad-Hayden, MS, conducted statistical analyses, developed tables and figures, and contributed to manuscript writing. Susan M. Peters, APRN, MPH, contributed to study design and coordinated data collection of surveys and physical measurements. Catherine McCaslin, PhD, contributed to study design and data collection and interpretation of results. Jeannette R. Ickovics, PhD, is Principal Investigator, and contributed extensively to study conceptualization, interpretation of results, and manuscript writing.

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