



HHS Public Access

Author manuscript

Am J Health Promot. Author manuscript; available in PMC 2015 November 25.

Published in final edited form as:

Am J Health Promot. 2014 ; 29(2): e73–e81. doi:10.4278/ajhp.130410-QUAN-165.

Children’s, Their Guardians’, and Health Care Professionals’ Perceptions of Child Overweight in Relation to Children’s Weight Loss Attempts

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Abstract

Purpose—To examine accuracy of children’s, their guardians’, and health care professionals’ (HCPs’) perceptions of child overweight and obesity, the degree of agreement between their perceptions, and relationships with weight loss attempts among overweight or obese children.

Design—Cross-sectional study using 2005–2010 National Health and Nutrition Examination Survey.

Setting—United States.

Subjects—Out of 4691 children and adolescents, ages 8 to 15 years, 16.4% were overweight (body mass index [BMI] percentiles 85–94.99) and 19.3% were obese (BMI percentiles 95).

Measures—Age and sex-specific BMI percentiles; responses of adult proxies (guardians) on whether they considered their child overweight and whether an HCP had ever told them that their child was overweight; responses of children and adolescents on their self-perceived weight status and whether they were trying to lose weight; children’s and guardians’ socio-demographic characteristics.

Analysis—Weighted percentages; sensitivities and Cohen’s kappas; adjusted prevalence ratios.

Results—Children, their guardians, and HCPs underestimated child’s actual overweight or obesity status. Little agreement existed between overweight or obese children, their parents, and HCPs on whether these children were overweight or obese. Overweight and obese children

perceived as such by themselves, their guardians, and HCPs were 88% and 32%, respectively, more likely to attempt weight loss based on multivariable analyses.

Conclusion—Accurate and shared perceptions of adiposity in children and adolescents between children themselves, their guardians, and HCPs are positively associated with weight loss attempts among overweight or obese children in the United States.

Keywords

Overweight; Obesity; Perceptions; Weight Loss; Children and Adolescents; NHANES; Prevention Research; Manuscript format: research; Research purpose: descriptive, modeling/relationship testing; Study design: nonexperimental; Outcome measure: cognitive behavioral; Setting: national; Health focus: weight control; Strategy: culture change; Target population age: youth, adults; Target population circumstances: full spectrum of socio-demographic characteristics

INTRODUCTION

Childhood overweight and obesity remain significant public health problems with a well-recognized spectrum of adverse short- and long-term health, social, and psychological outcomes.^{1–4} Implementation of successful interventions to prevent and treat overweight and obesity in children and adolescents requires comprehensive efforts, many of which involve collaboration of parents, health care professionals (HCPs), and children themselves.⁵ Such efforts may be greatly facilitated if all of them accurately perceive the child's overweight and obesity. The perceptions represent subjective assessment of the child's actual adiposity levels. Consistent with cognitive-behavioral theories, perceptions are among the key influences on an individual's behavior.⁶ This study examines prevalence of measured and perceived children's overweight and obesity status reported by children themselves, their guardians, and HCPs and agreement between them in the context of children's weight loss attempts in the United States.

Prior studies have examined perceptions of children's adiposity levels either among parents, HCPs, or children alone. Among parents, recognition of their child's overweight varies; in a vast majority of studies, it is less than 50%.^{3,7–10} Parents who underestimate their overweight child's adiposity levels are much less likely to report concerns about the child's weight or to believe their child is at risk for health or social problems than parents who correctly recognize their child as overweight.^{8,9,11,12} Furthermore, parents who do not recognize that their child is overweight or that their child's weight is a health problem are less likely to be ready to make changes to help their child lose weight.¹³

Although current guidelines recommend routine screening of children for overweight and obesity and communication of the screening results to parents,^{14–17} rates of youth overweight identification by an HCP have been low.^{14,18–24} Between 1999 and 2008, 22% of parents of overweight children aged 2 to 15 years reported having been told by an HCP that their child was overweight.²² In a more recent analyses based on the 2001–2010 National Health and Nutrition Examination Survey (NHANES) data, over 75% of proxy respondents of overweight or obese children do not recall ever being notified of their child's adiposity levels by an HCP. Recall of HCP identification is higher for obese (36.2%)

compared to overweight (10.2%) children.²⁴ Physician counseling on child and adolescent overweight has been positively associated with increased likelihood of overweight children perceiving themselves as such, attempting weight loss, and improving dietary behaviors.¹⁸

Similarly to parents and HCPs, children and adolescents have also been found to misperceive their own weight status.^{25–27} In a study based on the East London Adolescents Community Health Survey, approximately 17% and 33% of overweight boys and girls, respectively, as well as 50% and 67% of obese boys and girls, respectively, perceived themselves as “too heavy.”²⁶ In a study based on the Quebec Child and Adolescent Health and Social Survey, 71.4% of overweight and 59.4% of obese youth underestimated their weight status.²⁷ In a sample of U.S. adolescents aged 10 to 18 years enrolled in the NHANES 2005–2006, 60.5% and 40.1% of overweight boys and girls, respectively, did not consider themselves “fat or overweight.”²⁵ Similar to parents’ and HCPs’ misperceptions, a child’s misperception of his or her weight status is greater among overweight than obese children.^{26,27} Based on descriptive analysis of the NHANES sample, 68.1% of overweight or obese adolescents aged 10 to 18 years have attempted weight loss.²⁵

Although alignment of accurate overweight and obesity perceptions between children, their parents, and HCPs may contribute to children’s engagement in appropriate weight control efforts, this potential contribution has not been explored, particularly in a nationally representative sample of children and adolescents in the United States. Using the 2005–2010 NHANES data, this study assessed (1) the accuracy of children’s, their guardians’, and HCPs’ perceptions of children’s overweight and obesity status; (2) the degree of agreement regarding perceived children’s adiposity between overweight or obese children, their guardians, and HCPs; and (3) the association of perceptions and their alignment with weight loss attempts among overweight or obese children.

METHODS

Design and Setting

This is a cross-sectional study based on the NHANES public-use data from the 2005–2006, 2007–2008, and 2009–2010 survey cycles. NHANES, conducted by the Centers for Disease Control and Prevention (CDC) National Center for Health Statistics, assesses the health and nutritional status of adults and children in the United States. The NHANES complex, multistage probability sample represents the total non-institutionalized civilian population residing in the 50 states and District of Columbia. Each 2-year survey cycle consists of questionnaires administered in a household followed by a standardized physical examination, during which anthropometric measurements are taken, in specially equipped mobile examination centers (MECs).²⁸ The unweighted response rates for examined 2005–2010 samples were 75% to 77% (for all ages).²⁹ The three cycles of NHANES included 4781 children and adolescents aged 8 to 15 years who were seen in the MEC; 98.1% of those children had data on weight and height. These survey cycles and age group were selected given availability of consistent self-report and anthropometric measures from 2005 to 2010.

Measures

Measured Weight Status—Anthropometric data included measures of stature and weight collected in the MEC. Standing height was measured using a stadiometer with a fixed vertical backboard and an adjustable head piece. Weight was taken using a digital floor scale. More detailed description of the NHANES Anthropometry Examination can be found on the NHANES Web site.³⁰ Using standardized height and weight from the Body Measures module, age and sex-specific body mass index (BMI) percentiles were calculated according to the 2000 CDC growth charts excluding extreme values (i.e., z-scores >4) using the *zanthro* function in Stata.^{31–33} The 2000 CDC growth charts provide the recommended and well-recognized reference values for analyses of surveillance data and assessment of overweight and obesity among U.S. children and adolescents.^{31,32} Other classification standards exist, such as those recommended by the International Obesity Taskforce, which uses an international reference population.³⁴ However, because HCPs in the United States are most likely to be familiar with and utilize the standard U.S. growth curves to assess weight status among children and adolescents,³⁵ the U.S. growth curves were used to define overweight and obesity in our sample. Children and adolescents with a BMI at or above the 85th percentile and lower than the 95th percentile were classified as overweight, whereas children with BMI at or above the 95th percentile were classified as obese.^{31–33} The analytic sample included 767 overweight and 1078 obese children and adolescents.

Perceptions of Child Overweight and Children’s Attempts to Lose Weight—As part of the Early Childhood Questionnaire, adult proxy respondents (typically parents or guardians) were asked if they considered their child “overweight, underweight, or about the right weight.”

Guardians’ responses were used to operationalize their perceptions of a child being overweight (n = 990) vs. underweight or about the right weight (n = 3694). Guardians also reported if “a doctor or health care professional ever told” them that their child was overweight. The HCPs’ perceptions were based on the guardian’s report of being told by an HCP that the child was overweight (n = 654) vs. not being told so (n = 4209). As part of the Weight History (8–15 years) Questionnaire, children and adolescents were asked if they considered themselves “fat or overweight,” “too thin,” or “about the right weight.” Responses of children and adolescents were used to operationalize their self-perceptions of being overweight (n = 851) vs. “too thin,” “underweight,” or “about the right weight” (n = 3554). Children and adolescents were also asked if they were “trying to lose weight,” “gain weight,” “stay the same weight,” or “not trying to do anything about their weight.” The responses were dichotomized to capture children’s and adolescents’ attempts to lose weight (n = 1603) vs. lack thereof (n = 2800).

Control Variables—Consistent with prior research,^{3,8,18,25,31} variables adjusted for in the multivariable analysis included children’s age, sex, race/ethnicity, and household poverty to income ratio (PIR), as well as guardians’ age, sex, marital status, and level of educational attainment. Number of health care visits in the past year was included in the model because those visits may increase the opportunities for an HCP to address a child’s weight status. Similarly, the child’s reported general health status was included because it may influence

either the HCP's recognition of overweight or the guardian's recollection of the contents of a health care visit.

Statistical Analysis

First, descriptive statistics were employed to describe the prevalence of measured and perceived child overweight and children's weight control behaviors, as well as socio-demographic characteristics of children and their guardians. Next, using contingency tables, sensitivities—the probabilities that overweight or obese children will be perceived as such by themselves, their guardians, or HCPs—were estimated with measured BMI as the gold standard on which accuracy of each of the individual perceptions was based. These analyses were performed on the full sample of 4691 children and adolescents aged 8 to 15 years and their guardians.

The analyses were then restricted to the 1845 children and adolescents with BMI 85th percentile. This allowed to determine degree of agreement between overweight or obese children's perceptions of whether they were overweight or obese vs. their guardians' and HCPs' perceptions, respectively, as well as between perceptions of child overweight among guardians vs. HCPs. Contingency tables were used to estimate Cohen's kappas (k)—the probabilities of agreement between the perceptions, adjusted for the probabilities of agreement at random—based on the survey-weighted cell percentages in the contingency tables.³⁶ Because a child's self-perception is an important correlate of health behaviors,²⁵ sensitivities were also estimated using overweight or obese children's self-perception as the standard to which perceptions of guardians and HCPs were compared. Similarly, because the perception of a parent or guardian may influence the extent to which he or she addresses the child's weight issues,^{8,9,11–13} the guardians' perceptions were used as the standard to which HCPs' perceptions were compared.

Next, associations of weight loss attempts (yes/no) with perceptions divided into eight mutually exclusive subcategories representing each of the individual perceptions only or their combinations were examined. Given small cell sizes of the subcategories, prevalence of weight loss attempts was further examined using only four mutually exclusive subcategories of perceptions. More specifically, contingency tables and χ^2 tests of independence were employed to compare differences in percentages of overweight or obese children's attempts to lose weight (yes/no) when they were perceived as such by (1) nobody (i.e., neither themselves, their parents, nor HCPs); (2) one person—themselves, their guardians, or HCPs only; (3) two people—themselves and their guardians, themselves and their HCPs; or their guardians and HCPs, or (4) all three people—themselves, their guardians, and HCPs. Only results for this four-category exposure grouping are shown, because of small sample sizes and wide confidence intervals (CIs) resulting from the eight-category grouping. The bivariate analyses were followed by estimating prevalence ratios (PRs) of overweight or obese children's weight loss attempts given perceptions (vs. lack thereof as a reference group), adjusting for children's age, sex, general health status, and number of prior-year HCP visits; household's PIR; guardian's age, sex, marital status, and level of educational attainment; and survey year. Observations with missing values were excluded from the adjusted analyses.

Lastly, as a sensitivity check, 296 overweight children and adolescents who reported not receiving health care in the past year were excluded, and the aforementioned bivariate and multivariable analyses were repeated. This was followed by refitting multivariable models including observations with missing values (i.e., adding an indicator of missing for guardian's education, marital status, and PIR). No appreciable differences from reported results were found in either of the sensitivity checks.

All analyses used appropriate NHANES MEC weights for the 6 years of data to account for the complex survey design and nonresponse. Sampling errors were estimated by the Taylor series (linearization) method. Stata/SE 12.1 for Windows was used for all descriptive and bivariate analyses. PREDMARG option in SAS-Callable SUDAAN 9.3 logistic regression procedure was employed for the model-adjusted PRs.³⁷ Statistical significance level was set at 5%. All tests were two-tailed.

RESULTS

Study Population Description

The full sample analyses (Table 1) included 4691 children and adolescents aged 8 to 15 years. The mean age was 11.6 years. Approximately 58.6% of the study population identified themselves as non-Hispanic white, 14.2% as non-Hispanic black, and 19.0% as Hispanic. Slightly more than half of the study population was male (51.0%). Approximately 13.4% did not receive health care in the year prior to interview, and 4.7% reported being in fair/poor health.

Perceived vs. Measured Child Overweight and Obesity

Of the full sample, 16.4% (95% CI: 15.1–17.7) of children and adolescents were overweight. Among them, 24.9% of children perceived themselves as such; 22.4% and 14.9% were perceived as such by their guardians and HCPs, respectively. Approximately 19.3% (95% CI: 17.4–21.5) of children were obese, of whom 57.6% recognized themselves as such; 70.5% were perceived as such by their guardians and 41.2% by the HCPs (Table 2).

Perceptions of Overweight or Obese Children, Their Guardians, and HCPs

Among overweight children ($n = 717$) who perceived themselves as such (Table 3), the sensitivity of their guardian's perceptions was .46. The sensitivity of their HCPs' perceptions was .23. The probability that an overweight child perceived as such by the guardian would also be perceived as overweight by the HCP was .33. Fair to slight agreement existed between overweight children's self-perceptions of being overweight and their guardians ($k = .32$) or HCPs ($k = .12$) perceiving them as such. Slight agreement existed between guardians and HCPs on whether an overweight child was indeed overweight ($k = .20$).³⁸

Among obese children ($n = 1008$) perceiving themselves as such (Table 3), the probabilities of being perceived as obese by their guardians and HCPs were .82 and .49, respectively. The sensitivity of HCPs' identification of a child as obese given the corresponding parental perception was .56. Fair agreement existed between obese children's perceptions of being

obese and their guardians' ($\hat{k} = .26$), as well as between guardians' perceptions and their recall of HCPs' recognition of child obesity ($\hat{k} = .28$). Slight agreement existed between obese children's perceptions of being obese and those of their HCPs ($\hat{k} = .16$).³⁸

Perceptions and Children's Weight Loss Attempts

Fewer overweight (49.0%) than obese (77.7%) children reported trying to lose weight ($p < .001$) (Table 4). Overweight children who were perceived as such by only one person (i.e., themselves, their guardians, or HCPs) were 63% more likely (95% CI: 1.30–2.04) to attempt weight loss compared to those overweight children who were not perceived as such by themselves, their guardians, or HCPs ($p < .001$). Overweight children perceived as being overweight by two people (i.e., themselves and their guardians or HCPs, or both their guardians and HCPs) were twice as likely to attempt weight loss compared to their counterparts perceived as such by nobody (i.e., by neither themselves, their guardians, nor HCPs) (PR = 2.09, 95% CI: 1.65–2.64). Similarly, the likelihood of weight loss attempts among overweight children perceived as such by all three people was twice as high (PR = 2.08, 95% CI: 1.60–2.69) than among overweight children perceived as such by nobody ($p < .001$) (Table 4).

In contrast, individual perceptions were not statistically significantly associated with weight loss attempts among obese children (Table 4). However, when perceived as such by two people, obese children were 22% more likely (95% CI: 1.05–1.41) to attempt weight loss, compared to their counterparts not perceived as such by themselves, their guardians, or HCPs ($p = .009$). When perceived as such by themselves, their guardians, and HCPs, obese children were 34% more likely (95% CI: 1.18–1.52) to attempt weight loss ($p < .001$).

Adjusting for potential confounders did not substantially (i.e., not more than by .20 percentage points) change the magnitude and significance of these associations for either overweight or obese children. Non-Hispanic black overweight and obese children were 33% (95% CI: 1.05–1.68) and 13% (95% CI: 1.02–1.24), respectively, more likely to attempt weight loss compared to non-Hispanic white children. Male obese children were 10% (95% CI: .83–.99) less likely to attempt weight loss than obese females. Other control variables were not statistically significantly associated with overweight or obese children's weight loss attempts in the multivariable analyses (results not shown).

DISCUSSION

Successful weight reduction interventions among overweight or obese children and adolescents require recognition of child overweight. Using a nationally representative sample of U.S. children and adolescents, ages 8 to 15, this study revealed that less than one-third of overweight children and adolescents perceived themselves or were perceived by their guardians and HCPs to be overweight. Although the extent of underestimation of adiposity levels was lower for obese children, 42.4% of them did not recognize themselves as such. Perceptions of child obesity had the highest sensitivity among guardians of obese children (.70) and the lowest among HCPs (.41).

The underestimation of child overweight may be explained by obesity being a stigmatizing condition^{39,40} or desensitization to excess weight, which has become the norm.⁴¹ The low sensitivity of HCPs' perceptions could be attributed to several physician-identified barriers that may dissuade physicians from identifying child overweight or communicating results of their screenings to parents. These barriers include, but are not limited to, physicians' beliefs about lack of parent involvement and patient motivation, lack of time for counseling, and lack of reimbursement, as well as lack of support services and treatment futility.⁴² Brief and relatively simple interventions have been shown to improve weight screening and communication practices among physicians.⁴³⁻⁴⁵ The improvements are associated with more accurate parental perception of child weight status and positive health behaviors related to weight management.²³

Our findings of underestimation of child adiposity by the children themselves, their guardians, and HCPs, as well as of higher extent of such underestimation in overweight compared to obese children, are consistent with those of previous studies.^{3,7-10,14,18-27} A more accurate identification of child overweight in obese than overweight children may be a result of the former children appearing more obviously "bigger" than the latter children. Obese children may also be more likely to suffer from weight-related health comorbidities that may also increase the likelihood of overweight identification.⁴⁶⁻⁴⁸

Our study also revealed little agreement existed between overweight or obese children, their guardians, and HCPs on whether these children were overweight or obese. Although the sensitivities of guardians' and HCPs' perceptions given their child's own perceptions were higher among obese children, the estimated probabilities of agreement between individual perceptions adjusted for chance were at similar low levels as those estimated for overweight children.

Accurate and shared perceptions of child adiposity were associated with an increased likelihood of weight loss attempts among children. More specifically, a higher percentage of overweight or obese children attempted weight loss when they were perceived as such by themselves and when their perceptions were supported by those of their guardians or HCPs, or when both their guardians and HCPs perceived them as such. Of note, overweight children perceived as such by everybody (i.e., themselves, their guardians, and HCPs) were more than twice as likely to attempt weight loss compared to overweight children not perceived as such by anybody. Approximately 30% more of obese children perceived as such by everybody attempted weight loss when compared to their counterparts, based on both crude and adjusted analyses. These findings extend existing literature on the contribution of individual perceptions to weight control behaviors of children and adolescents^{13,18,25} to include contribution of shared accurate perceptions.

We also found that a significantly higher percentage of non-Hispanic black overweight and obese children attempted weight loss compared to non-Hispanic white children. This finding may be explained by higher rates of child overweight identification among black (vs. white) children.^{9,22,24,49} Several studies have shown that black overweight and obese children are more likely than their white counterparts to be identified as such by HCPs.^{9,22,24,49} For example, in a study based on electronic medical record data, black overweight and obese

patients aged 2 to 18 years were more likely to have been diagnosed as such compared to non-Hispanic white patients.¹⁹ In another study based on the 2001–2007 Medical Expenditure Panel Survey data, black adolescents aged 11 to 17 years were significantly more likely to receive a dietary advice from an HCP compared to white adolescents.⁴⁹

Our overall findings are strengthened by the use of (1) a nationally representative sample encompassing a population with various socio-demographic and economic backgrounds, and (2) standardized measures of height and weight of children and adolescents.

Among the limitations of this study is reliance on cross-sectional data and observational study design that preclude us from making causal inferences. Furthermore, sensitivity of HCPs' perceptions of child overweight or obesity could be underestimated, and sensitivity of parental perceptions could be overestimated (e.g., because of reliance on proxy report). HCPs were never asked directly about their perceptions. Even those HCPs who perceived an overweight or obese child as such might not have communicated their perceptions to the family. Also, because the proxy respondents (i.e., guardians) may not be the ones who typically accompany children to health care visits, they may be unaware of conversations with HCPs related to children's weight status. However, rates of HCP identification of overweight are similarly low in samples of older children or adults who do not rely on proxy reports.^{18,50} For example, in a study based on physicians' own reports, 38% and 36% of physicians misidentified the body type of children aged 12 to 18 years using word descriptions and figures, respectively.⁴¹ Additionally, guardians' report of HCPs' identification of child overweight may be subject to recall and response (e.g., optimistic⁵¹) biases.

Furthermore, our operationalization of weight perceptions is limited to cross-tabulations of perceived weight status (e.g., overweight, underweight, or about the right weight) and BMI classification categories. It is possible that children and adults may not have a good understanding of weight categories presented to them or that alternative measures, such as misperception scores based on the Stunkard Body Rating Scale, would allow for greater measurement precision.²⁷ Our overall findings, however, are consistent with those of prior studies that have used alternative approaches to measuring perceptions.

Lastly, although in multivariable analyses we controlled for several variables shown to be associated with perceptions and weight loss attempts, we did not have information on BMI of parents or HCPs, reimbursement for weight counseling, and other characteristics related to perceptions and weight screening practices.

In conclusion, this study suggests that excess weight in childhood and adolescence remains underestimated in the United States by children themselves, their guardians, and HCPs. Moreover, the extent of such underestimation is greater for overweight compared to obese children. The findings also demonstrate that accurate and shared perceptions of adiposity levels of children and adolescents between children themselves, their guardians, and HCPs are positively associated with weight loss attempts among overweight and obese children. This highlights the need for future research on how perceptions of youth overweight among

children, their parents, and HCPs can be brought into greater alignment and how such alignment may amplify obesity prevention and treatment efforts.

Acknowledgment

The findings and conclusions in this paper are those of the author(s) and do not necessarily represent the official position of the National Center for Health Statistics, Centers for Disease Control and Prevention.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers**What is already known on this topic?**

Prior studies have examined perceptions of children's adiposity levels either among parents, health care professionals (HCPs), or children alone. Child adiposity is underestimated by children themselves, their parents, and HCPs. The extent of such underestimation is higher in overweight compared to obese children.

What does this article add?

Using a nationally representative sample and measured height and weight, we find little agreement exists between overweight or obese children, their parents, and HCPs on whether these children are overweight or obese. We also extend existing literature on contribution of individual perceptions to weight control behaviors of children and adolescents to include significance of accurate and shared perceptions.

What are the implications for health promotion practice or research?

Recognizing that inaccurate perceptions of child overweight exist and working with children, their parents, and HCPs to improve accurate perceptions and to bring these accurate perceptions into greater alignment may be an effective strategy for promoting obesity prevention and treatment efforts.

Table 1

Socio-Demographic Characteristics of Children and Adolescents, 8–15 Years, and Their Guardians, NHANES 2005–2010

Characteristics	All Children (n = 4691) % (95% CI)*
Average child's age at interview, y	11.6 (11.5–11.7)
Child's sex (female)	49.0 (47.1–50.9)
Child's race/ethnicity	
Non-Hispanic white	58.6 (54.2–63.0)
Non-Hispanic black	14.2 (12.1–16.7)
Hispanic	19.0 (15.8–22.7)
Other (including multiracial)	8.1 (6.5–10.1)
Poverty to income ratio of child's household, % of federal poverty level	
0–100	21.2 (18.8–23.8)
101–200	21.8 (19.6–24.1)
201–400	30.1 (28.0–32.2)
>400	27.0 (23.8–30.4)
Child's general health condition	
Excellent/very good	75.5 (73.5–77.3)
Good	19.9 (18.3–21.5)
Fair/poor	4.7 (4.0–5.5)
No. of times received health care over the past year	
None	13.4 (12.0–15.0)
1	27.4 (25.6–29.2)
2–3	32.8 (31.2–34.3)
4–9	20.6 (19.2–22.1)
10 and more	5.8 (5.0–6.8)
Guardian's age	41.9 (41.4–42.3)
Guardian's sex (female)	48.0 (44.9–51.0)
Married guardian	74.7 (72.5–76.8)
Guardian's education	
<High school	19.7 (17.7–21.9)
=High school/General Educational Development or equivalent	22.8 (20.4–25.4)
>High school	57.5 (54.3–60.7)

* All estimates were calculated accounting for the complex, multistage, probability sampling design of NHANES and nonresponse. For continuous variable (age), mean is provided. CI indicates confidence interval; and NHANES, National Health and Nutrition Examination Survey.

Perceived Versus Measured Body Mass Index 85th Percentile in All Children and Adolescents*

Table 2

Perceptions	Measured Body Mass Index of Child or Adolescent (n = 4691) [‡]			Sensitivity	
	Overweight (16.4%) % (95% CI)	Obese (19.3%) % (95% CI)	Neither Overweight nor Obese (64.3%) % (95% CI)	Probability That an Overweight Child is Perceived as Such p (95% CI)	Probability That an Obese Child is Perceived as Such p (95% CI)
Child considers himself or herself "fat or overweight" [‡] (n = 4405)					
Yes	4.1 (3.4–5.0)	11.1 (9.9–12.5)	2.5 (1.8–3.4)	0.25 (0.20–0.30)	0.58 (0.54–0.62)
No	12.3 (11.0–13.7)	8.2 (7.0–9.5)	61.9 (59.7–64.1)		
Guardian perceives child as overweight [§] (n = 4684)					
Yes	3.7 (3.0–4.5)	13.6 (12.0–15.5)	1.1 (0.8–1.6)	0.22 (0.19–0.27)	0.70 (0.67–0.74)
No	12.7 (11.6–13.8)	5.7 (4.9–6.6)	63.2 (61.2–65.2)		
Guardian recalls an HCP said child was overweight [§] (n = 4683)					
Yes	2.4 (1.9–3.2)	7.9 (7.1–8.9)	1.1 (0.8–1.5)	0.15 (0.12–0.19)	0.41 (0.38–0.45)
No	13.9 (12.8–15.2)	11.3 (9.8–13.0)	63.3 (61.0–65.5)		

* All estimates were calculated accounting for the complex, multistage, probability sampling design of National Health and Nutrition Examination Survey and nonresponse. Cell percentages are reported. CI indicates confidence interval; and HCP, health care professional.

[‡] Based on the U.S. growth curves standards excluding extreme values, i.e. z-score > 4.

[§] Self-reported by child or adolescent aged 8–15.

[§] Self-reported by reference person or emancipated minor (referred to as a guardian).

Table 3

Perceptions of Child Overweight Among Overweight or Obese Children, Their Guardians, and HCPs *

Perceptions	Yes % (95% CI)	No % (95% CI)	Sensitivity p (95% CI)	Cohen's Kappa (Degree of Agreement Adjusted by Chance) k̂ (95% CI)
Overweight[†] Child Considers Himself or Herself "Fat or Overweight"[‡] (n = 717)				
Guardian perceives child as overweight [§] (n = 765)				
Yes	11.4 (8.7–14.9)	11.0 (8.4–14.1)	0.46 (0.35–0.57)	0.32 (0.24–0.41)
No	13.5 (9.6–18.5)	64.2 (58.8–69.3)		
Guardian recalls an HCP said child was overweight [§] (n = 765)				
Yes	5.7 (3.8–8.4)	9.1 (6.5–12.7)	0.23 (0.16–0.32)	0.12 (0.02–0.23)
No	19.2 (15.4–23.8)	66.0 (60.9–70.7)		
Guardian Perceives Child as Overweight[§]				
Guardian recalls an HCP said child was overweight [§]				
Yes	6.3 (4.7–8.5)	8.6 (5.8–12.5)	0.33 (0.23–0.44)	0.20 (0.10–0.30)
No	16.1 (12.6–20.3)	69.0 (64.8–73.0)		
Obese[†] Child Considers Himself or Herself "Fat or Overweight"[‡] (n = 1008)				
Guardian perceives child as overweight [§] (n = 1077)				
Yes	47.0 (42.7–51.3)	24.1 (21.2–27.2)	0.82 (0.77–0.85)	0.26 (0.20–0.32)
No	10.6 (8.4–13.4)	18.3 (15.3–21.8)		
Guardian recalls an HCP said child was overweight [§] (n = 1075)				
Yes	28.3 (25.0–31.9)	13.6 (10.8–16.9)	0.49 (0.44–0.54)	0.16 (0.10–0.22)
No	29.3 (25.6–33.3)	28.8 (25.1–32.9)		
Guardian Perceives Child as Obese[§]				
Guardian recalls an HCP said child was overweight [§]				
Yes	36.6 (33.0–40.3)	4.7 (3.3–6.5)	0.56 (0.51–0.62)	0.28 (0.23–0.34)
No	33.8 (29.7–38.1)	25.0 (21.6–28.9)		

* All estimates were calculated accounting for the complex, multistage, probability sampling design of National Health and Nutrition Examination Survey and nonresponse. Cell percentages are reported. CI indicates confidence interval; and HCP, health care professional.

[†] Based on the U.S. growth curves standards excluding extreme values, i.e. z-score > 4.

[‡] Self-reported by child or adolescent aged 8–15.

[§] Self-reported by reference person or emancipated minor (referred to as a guardian).

Table 4
 Perceptions of Child Overweight and Weight Loss Attempts of Overweight or Obese Children and Adolescents*

	Overweight Child Is Currently Trying to Lose Weight			Obese Child Is Currently Trying to Lose Weight		
	Yes (49.0%, 95% CI: 43.0–54.9)	Crude PR (95% CI)	Adjusted PR (95% CI)	Yes (77.7%, 95% CI: 74.1–81.3)	Crude PR (95% CI)	Adjusted PR (95% CI)
Overweight child is perceived as such by						
Nobody (n = 409)	36.5 (29.7–43.9)	Ref.	Ref.			
Child, guardian, or HCP only (n = 190)	59.4 (50.2–68.0)	1.63 (1.30–2.04)	1.58 (1.27–1.96)			
Child and guardian, child and HCP, or guardian and HCP (n = 85)	76.3 (62.3–86.3)	2.09 (1.65–2.64)	2.01 (1.60–2.54)			
Child, guardian, and HCP (n=30)	75.8 (52.3–89.9)	2.08 (1.60–2.69)	1.88 (1.37–2.57)			
Obese child is perceived as such by						
Nobody (n = 160)				67.5 (59.4–74.8)	Ref.	Ref.
Child, guardian, or parent only (n = 235)				63.8 (54.5–72.1)	0.94 (0.80–1.12)	0.95 (0.79–1.14)
Child and guardian, child and HCP, or guardian and HCP (n = 316)				82.4 (75.5–87.6)	1.22 (1.05–1.41)	1.20 (1.02–1.42)
Child, guardian, and HCP (n = 293)				90.6 (84.6–94.4)	1.34 (1.18–1.52)	1.32 (1.14–1.52)

* Percentages are row percentages. PR indicates prevalence ratio; CI, confidence interval; HCP, health care professional; and Ref., reference groups, which consist of overweight or obese children who are not perceived as such by children themselves, their guardians, and HCPs. Prevalence/risk ratios were adjusted for child's age, sex, race/ethnicity, general health status, and number of prior-year HCP visits; household's poverty to income ratio; caregiver's/reference person's age, sex, marital status, and level of educational attainment; and survey year, using PREDMARG option in the SAS-Callable SUDAAN logistic regression procedure.