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Factors Contributing to Weight Misperception in Obese Children Presenting for Intervention

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Abstract

Objective—To assess weight stigma, self-perception of weight status, and factors contributing to accurate self-perception of weight status in obese youth presenting for treatment at a hospital-based multidisciplinary weight management program.

Methods—Participants (N = 97; mean age = 8.56 ± 1.66 years) used a figural rating scale to assess weight stigma and their current and ideal body type, and Sizing Me Up, a measure of obesity-specific health-related quality of life (HRQOL).

Results—The majority endorsed negative/stereotypical attributes toward an obese body type, chose an average or underweight figure as their ideal, and 39% misperceived their weight status. Older child age and greater HRQOL impairment were significant predictors ($P < .01$) of correct self-perception.

Conclusion—Pediatricians may find that talking with the elementary school-aged patient and family about whether weight/size affects their day-to-day life will prove to be a salient and neutral opening to discussing the child's obesity and need for intervention.

Keywords

pediatric; weight; stigma; attributions; quality of life

Recent estimations suggest that 17% of elementary school children (ages 6–11) in the United States are obese (BMI 95th percentile),¹ placing them on a trajectory of significant health and psychosocial risk. Although the need for effective intervention is clear, a critical first step in the process of initiating lifestyle behavior change is the recognition of a child's obesity status. Parents frequently misperceive their child's weight status, with many believing their obese child is of average weight.^{2–4} Similarly, physicians may fail to correctly identify their pediatric patients as obese.^{5–8} Accordingly, recent expert guidelines on the prevention, assessment, and treatment of pediatric overweight/obesity⁹ outline how health care providers should routinely assess and manage excess weight status in their pediatric patients.

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Declaration of Conflicting Interests

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There is preliminary evidence that many overweight and obese youth^{10–14} also underestimate their own weight status. However, it is unknown whether obese children presenting for obesity treatment recognize that they are obese or desire to be a different (eg, thinner) body type. The few studies examining youth self-recognition of weight status used large community samples. Although this allowed the characterization of the broad weight spectrum, no study to date has included a high percentage of youth with BMI > 95th percentile nor specifically targeted those initiating weight intervention. Given that parental recognition of their child's obese status has been associated with readiness for action with regard to their child's weight,¹⁵ it is possible that child self-recognition may be similarly critical to successful engagement in weight management treatment.

Certainly, the developmental literature suggests that children are capable of self-perception¹⁶ and providing information regarding their health at a young age.^{17,18} For example, there is a growing literature documenting that obese youth recognize significant health-related quality-of-life (HRQOL) impairments in themselves^{19–22} and in daily functioning specifically related to their weight.^{23,24} The considerable stigma associated with being obese is also well documented.²⁵ Weight stigma begins early in childhood,²⁶ and even youth who are overweight or obese hold negative and stereotypical views about obesity.^{26–28} As Goodman et al¹⁴ suggested, obese youth may readily acknowledge psychosocial impairment (ie, HRQOL); however, because of denial and/or perceived stigma, they may be less likely to recognize their own obesity status.

Building on existing research in this area, we present data on a clinical sample of obese children at the time of treatment initiation and hypothesize that obese children will (1) apply more stereotypical and negative attributes to a hypothetical peer who is obese relative to an average or underweight peer, (2) be less likely to perceive themselves as obese, and (3) prefer to be nonobese. Furthermore, obese children with a greater degree of obesity or more impaired obesity-specific HRQOL will be more likely to correctly perceive themselves as obese.

Methods

Participants and Procedures

Participants included 97 obese children, 5 to 11 years old, and their caregivers at the time of treatment initiation in a hospital-based comprehensive multidisciplinary weight management program. This program requires that a child have a BMI ≥ 95th percentile and physician referral. Participants represent a subset of younger children from 2 large, consecutive studies examining HRQOL in obese youth. Inclusion criteria were consistent across both studies: (1) children 5 to 18 years of age, (2) willingness to comply with study procedures, (3) provision of written informed consent/assent, and (4) exclusion of youth with developmental disabilities or significant reading difficulties.

Procedures were consistent across both studies. Consecutive clinic patients from August 2004 through January 2007 received study brochures in the mail prior to their first clinic appointment. Patients and their care-givers were subsequently approached for recruitment and participation during their first clinic appointment, either a medical screening visit at the General Clinical Research Center (65%) or an intake evaluation with the treatment team (35%). Across studies, 106 of 117 (90.6%) potential age-eligible patients agreed to participate. We did not include 9 participants in the analyses for the following reasons: (1) 3 participants were 1 of 2 siblings, (2) 4 participants recruited had difficulty understanding the questionnaires because of inattention or reading difficulties, (3) 1 participant became ill during the visit and was unable to finish data collection, and (4) data were missing for 1

participant. Participants were compensated with a \$10 gift certificate from a local department store. The protocol was approved by the hospital's institutional review board.

Outcome Measures

Demographic background questionnaire—Caregivers completed a background questionnaire to document child race and caregiver marital status, years of education, and occupation. Adequate data were available to calculate the Revised Duncan (TSEI2),²⁹ an occupation-based measure of socioeconomic status (SES).^{30,31} Scores range from 15 to 97, with higher scores representing greater occupational attainment. For 2-caregiver households, the higher Duncan score was used in the analyses.

Perception of Weight Scale (POW)—The POW (Figure 1) is a sex-specific figural rating scale designed for the present study to assess young school-aged children's perceptions of weight stigma, their own weight status, as well as their ideal weight status. Similar to the line drawings of Stunkard et al³² and Collins,³³ a commissioned artist created 3 male and 3 female child figure drawings representing girls/boys of the same height but varied weight category (eg, underweight, average weight, and obese; Figure 1). However, figures were not given facial features, and hair was designed to represent multi-ethnic backgrounds to adequately assess perceptions for an ethnically diverse clinic population. Furthermore, the POW uses a 3-figure scale for ease of use with children as young as 5 years of age. The POW is administered orally by an interviewer who reads the following instructions: "Here is a picture of 3 boys/girls. I am going to ask you some questions about the pictures. There are no right or wrong answers; just pick the one that you think is best." Participants, who are presented with their sex-specific drawings, are asked to select which of the 3 pictures best characterizes items that describe activities and attributes typical of all children regardless of weight status (eg, "Which one of these kids sings the best?") and attributes that are stereotypically applied to overweight/obese children (eg, "teased the most," "runs the slowest"). Participants are also asked to choose the figure drawing that was "most like you" and "the one you would most like to be." The initial 5-item POW was completed by all participants (N = 97) across the 2 samples. For the purposes of the second study, 6 items were added to the POW, and it was completed by a smaller subsample (n = 46).

Sizing Me Up—Sizing Me Up²⁴ is a child self-report measure of obesity-specific HRQOL developed and validated for youth 5 to 13 years of age. The measure comprises 22 items with stems that orient children to respond to questions in context of their size (eg, "... because of my size"). For children 10 and younger, items are administered in an individual interview format, whereas older children complete the measure independently. Sizing Me Up consists of 5 subscales, including Emotional Functioning, Physical Functioning, Teasing/Marginalization, Positive Social Attributes, and Social Distress/Avoidance and Total Quality of Life. Scales are standardized, and scores range from 0 to 100, with higher scores representing better HRQOL. Sizing Me Up has been shown to be reliable and valid, with internal consistency coefficients ranging from 0.68 to 0.85.

Weight and height—Trained clinic nurses collected height and weight from child participants, which were abstracted from patient charts. Weight and height were measured (0.1 kg) on a digital Scale-Tronix scale (Wheaton, IL) and Holtain stadiometer (Holtain, Cry-myth, UK), respectively. Participants were weighed and measured in street clothing without shoes. These data were used to calculate BMI in units of kg/m² and standardized zBMI (BMI z score) using age- and sex-specific median, standard deviation, and power of the Box-Cox transformation (LMS method)³⁴ based on CDC 2000 growth curves³⁵

Statistical Analyses

Descriptive statistical analyses were conducted among variables of interest. Based on responses to the POW, children were categorized as either perceiving their weight status correctly (choosing “most like” child C) or incorrectly (choosing “most like” child A or B). A logistic regression analysis was completed to determine the odds of the child being correct or incorrect in their self-perceptions of weight status based on child gender, minority status, zBMI, and family SES (step 1) and self-reported HRQOL scores (step 2).

Results

Sample Characteristics

Children ($N = 97$; mean age = 8.56 ± 1.66 years; mean zBMI = 2.56 ± 0.34) were predominantly female (66%) and evenly represented African American (49%) and Caucasian (45%) ethnicities. Caregivers were primarily mothers (89% mothers, 5% grandmothers, 5% fathers, 1% other), with 13.12 ± 2.08 years of education and a mean revised Duncan score (eg, SES) of 36.79 ± 18.89 (eg, plumber, teacher's aide, payroll clerk). Sizing Me Up subscale scores were as follows: Emotional = 58.08 ± 31.38 ; Physical = 67.77 ± 23.80 ; Teasing = 65.64 ± 32.44 ; Positive Attributes = 55.56 ± 23.94 ; Avoidance = 80.27 ± 22.30 ; and Total = 65.32 ± 16.10 . These scores suggest global impairments across all domains of obesity-specific HRQOL.

Aim 1: Weight Stigma Within a Clinical Sample of Obese Youth

As presented in Table 1, a greater percentage of children endorsed negative attributes (eg, runs the slowest, is teased the most) for the obese body type (child C) and positive attributes (eg, has the most friends, looks the best) for the average weight (child B) and underweight (child A) body types.

Aim 2: Self-Perception of Weight and Ideal Weight

In all, 61% of participants correctly identified themselves as “most like” the obese body type (child C; Table 1). All children reported an ideal body type (child that they would “most like to be”) as either underweight (child A) or average weight (child B).

Aim 3: Predictors of Self-Perception of Weight

We used logistic regression analysis to examine potential predictors of accurate child perceptions of weight status. Child gender, age, race, zBMI, and SES were entered into block 1 of the model, and self-reported HRQOL total score was entered into block 2. Child gender, race, and family SES were not significant predictors. Although zBMI was initially a significant predictor in the model ($P = .03$), it was no longer significant ($P = .13$) when HRQOL was added to the model. As shown in Table 2, older children and children with lower total HRQOL were more likely to correctly perceive themselves as being obese ($\chi^2(6, N = 97) = 18.77$; $P < .01$).

Discussion

Children learn from an early age that “fat is bad and thin is good.”²⁶ It is therefore not surprising that obese children presenting for weight management hold negative and stereotypical views about obesity, and their ideal is an average or underweight body type. In fact, 100% would prefer to be more like a nonobese child, with 49% choosing an underweight child as their ideal. That our participants ranged from 5 to 11 years of age speaks to the powerful influence of current societal expectations to be thin that begin at a very young age in the United States.

Underestimation of weight status was hypothesized based on previous literature in community samples, but our findings that 39% of the present sample did not perceive themselves as obese is striking when considering the population studied. We specifically targeted youth with BMI 95th percentile presenting for obesity treatment in a comprehensive multidisciplinary weight management program, which necessitated the referring physician and parent recognizing the child's obese status. However, whether or how this type of information (eg, being obese, the need for intervention) was shared or discussed with the child and whether this affected the child's accuracy in self-perception of weight remains unknown. Whether weight misperception may affect a child's engagement and success in the treatment process remains a critically important direction for future research.

Interestingly, children's correct self-perception of being obese was associated with a number of factors, including being older. The broader developmental literature demonstrates that self-concept becomes more differentiated, predictable, and closely aligned with external indicators (eg, accomplishments, reports of significant others) as children grow older.^{36,37} Accordingly, a child's perception of their weight status or body type may become more accurate during the early elementary school years; Collins³³ provides some additional support for this hypothesis. Future longitudinal research with a larger and more diverse sample, in terms of weight and age, is imperative to fully capture this developmental phenomenon. However, independent of this potential developmental process, it cannot be ignored that younger age appears to be quite influential in the misperception of child weight status for other critical informants, including parents^{38–40} and physicians.^{5,6} This confirms a “general public misperception of what constitutes normal weight in younger children.”⁴¹ Given recent indications that the “die may be largely cast” for the obese 5-year old,⁴² health professionals and public health initiatives should focus on increasing awareness of accurate weight-related perceptions.

A unique strength of our clinical sample includes the range of obesity severity (zBMI range 1.73–4.03), demonstrating our nation's growing subpopulation of young children with extreme levels of obesity seeking care.⁴³ Interestingly, although our analyses initially suggested that greater obesity increased the odds of children's correct self-perception of obesity status, degree of obesity became irrelevant when a child's self-perceptions of obesity-specific HRQOL (eg, day-to-day functioning) was considered. These data are the first to our knowledge that demonstrate concordance between the psychosocial impact of a child's obesity and a child's subjective understanding of his or her obesity. Furthermore, these data also demonstrate the utility of validated condition-specific measures such as Sizing Me Up in clinical settings that target younger children.

The present study has important clinical implications for primary care physicians and health care providers in tertiary care settings. Given the present findings, it cannot be assumed that an elementary school-aged obese patient, and even one with a more extreme level of obesity, will accurately perceive his or her weight status. This is particularly true for younger elementary school children. However, our data indicate that clinicians will benefit from understanding children's perspective on how their size is affecting their day-to-day life to gauge their self-recognition of being obese. Recent expert guidelines underscore the need to approach the obese patient and family in a “supportive, empathetic, and nonjudgemental manner”⁹ when discussing the child's weight status and treatment options. In the absence of using an obesity-specific HRQOL questionnaire such as Sizing Me up in the clinical setting, talking with the patient or family about whether weight/ size affects their day-to-day life may provide clinicians with a more neutral opening to the discussion about the child's obesity and need for intervention.

This study also highlights factors not associated with misperception of weight status in obese youth presenting for treatment. Unlike earlier studies in which parent weight misperception of their youth is associated with child male gender,^{4,44,45} non-Caucasian ethnicity,⁴⁴ and lower level of parental education,^{38,40} demographic variables were not related to child misperception of weight status in the current study. This is in further contrast to studies that suggest that African American adolescents are less likely to perceive themselves as overweight,^{46,47} raising the possibility that demographic differences in misperception of weight status do not emerge for obese youth until later in adolescence. Certainly, recent evidence from the adult literature supports this developmental trend because weight misperception is highly prevalent in adults and more frequent in racial/ethnic minorities, males, and those with lower education.⁴⁸ Future pediatric studies with larger sample sizes and a broader age range should examine potential interactions of these demographic factors.

Several limitations of the present study provide directions for future research. First, whether these findings are generalizable to obese children who do not or cannot access an obesity treatment program remains unknown. Initial reports indicate that the majority of obese children in the community underassess their weight status^{10,11} and also report better HRQOL than treatment-seeking obese youth.⁴⁹ Study designs that include a non-treatment-seeking, demographically similar obese comparison group will be useful in clarifying this issue. Second, although the present sample accurately represented the racial/ethnic background of those families presenting to treatment at the specific clinic, future research with larger and more ethnically diverse samples of obese youth (eg, Hispanic, Native American) are needed. Finally, the present study design is cross-sectional. Future studies that use prospective longitudinal designs are critical. For example, studies that are able to test temporal ordering of associations (eg, obesity development, self-perceptions of weight status, HRQOL, stigma) are important next steps in the field.

In summary, given the growing public health burden of pediatric obesity, pediatricians are faced with a patient population of elementary school-aged children at known health and psychosocial risk. Whereas BMI is an effective screening tool in clinical settings, visual recognition of a child as obese and in need of intervention proves more difficult. The present study highlights that even as parents seek treatment for their child's weight, their child, while understanding weight stigma, may not understand that he or she is obese. As public health efforts, clinical programs, and individual primary care providers work to craft their message about the importance of being and maintaining a healthy weight, a delicate balance must be achieved between preventing potential psychosocial harm²⁵ and providing this important health information. For obese youth, discussing with families how the child's weight/size affects the child's day-to-day life may provide a salient and neutral opening to suggest the need for intervention.

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Figure 1.
Perception of Weight Scale (POW) depicting drawings of incremental weight status by gender

Table 1

Percentage of Participants in a Clinical Sample of Obese Children (5–11 Years Old) Choosing Body Type That Best Characterizes POW Items

	Percentage Endorsing		
	Figure A (Underweight)	Figure B (Average)	Figure C (Obese)
Positive attributes			
Looks the best ^a	49.0	47.1	3.9
Sings the best ^b	35.1	58.8	6.2
Has the most friends ^b	39.2	53.6	7.2
General attributes			
Is the smartest ^a	33.3	39.2	27.5
Is the silliest ^a	41.2	23.5	35.3
Is the strongest ^a	21.6	23.5	54.9
Negative attributes			
Is teased the most ^a	11.8	15.7	72.5
Runs the slowest ^b	6.2	1.0	92.8
Eats the most ^a	3.9	2.0	94.1
Self-perception and ideal			
Most like ^c	10.3	27.8	60.8
Would like to be ^a	47.1	52.9	0

POW = Perception of Weight Scale.

^a n = 46

^b n = 97.

^c n = 96.

Table 2

Logistic Regression Analysis Predicting POW Self-Perception as Obese

	B	P	SE	OR (95% CI)
Child age	0.57	.004	0.20	1.77 (1.20–2.59)
Child gender	−0.31	.54	0.50	0.73 (0.27–1.99)
Child minority status	0.03	.96	0.52	1.03 (0.37–2.84)
Family SES	0.02	.11	0.01	1.02 (1.00–1.05)
Child zBMI	1.27	.13	0.79	3.57 (0.69–18.40)
Child total QOL	−0.04	.02	0.02	0.96 (0.93–0.99)

POW = Perception of Weight Scale; SE = standard error; OR = odds ratio; CI = confidence interval; SES = socioeconomic status; zBMI = BMI z score; QOL = quality of life.