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Obesity Screening in the Pediatric Emergency Department

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Abstract

Objectives—The purposes of this study were (1) to examine parental perception of childhood obesity and race with measured body mass index (BMI), (2) to determine if parents are receptive to obesity screening in the pediatric emergency department and if receptivity varies by race or weight status, and (3) to determine eating habits that are predictors of obesity.

Methods—This study is a cross-sectional study, with a convenience sample of 213 patients (aged 4–16 years accompanied by a parent/legal guardian to a pediatric emergency department). Weight and height were obtained, and parents were asked to complete a survey about perception of their child's weight, nutrition, and exercise habits.

Results—The current study found that parent perception of weight status was fairly accurate, and perception was predictive of BMI. Race, however, was not predictive of BMI. Parents were generally receptive of weight screening in the pediatric emergency department, and this did not vary as a function of weight status; however, receptivity did vary based on ethnicity, with African American parents being more receptive than white parents. Large portion sizes and the number of times a child eats fast food per week were found to be predictive of obesity.

Conclusions—Greater than half of the children presenting to our pediatric emergency department were overweight or obese. Parents were generally accurate in their perception of their child's weight but were still receptive to obesity prevention and screening in the pediatric emergency department.

Keywords

pediatric obesity; parental perception; obesity screening

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Pediatric obesity has reached epidemic proportions over the past 2 decades and is becoming the most common chronic childhood illness.^{1,2} Results from the National Health and Nutrition Examination Survey indicate that approximately 17% of children aged 2 to 19 years are obese.³ Recent data reveal that the prevalence of obesity in adults is increasing the fastest in African American and Latino populations, with African Americans having 51% higher prevalence compared with whites.² Research on pediatric obesity has indicated that African American children, especially girls, face the greatest risk for obesity.¹

Factors influencing childhood obesity are multifaceted and include an imbalance in caloric intake versus expenditure, overall environment, and genetics.^{1,4} Risk factors for childhood obesity include ethnicity, low parental education, and social deprivation.⁵⁻⁹ Obesity prevention during childhood and adolescence is particularly important because obesity frequently continues into adulthood,¹⁰ leading to elevated risks for hypertension, type 2 diabetes, osteoarthritis, coronary heart disease, congestive heart failure, stroke, breast and colon cancer, and premature death.^{11,12}

Past studies have demonstrated the prevalence of parental misperception in relation to pediatric weight, and specifically obesity.^{11,13} This finding has been demonstrated across age ranges and in different countries.¹¹ There is variability in regard to how misperception differs by race and ethnicity, and the findings of past studies widely vary in relation to degree of misperception and underlying causes.¹¹ Some hypothesize that the variability may be due to increased tolerance for larger body sizes in certain cultures.¹¹ Alternative explanations for parental misperception of child's weight include shifts in what is considered normal weight due to increasing body size in the general population.¹⁴ In addition, general nonacceptance and minimization of the problem exist, such that parents believe that their child does not have the same level of obesity risk as other children.¹⁵

Examination of parental misperception of child weight is an essential element of obesity screening and counseling, given the primary role that parents play in children's health, socialization, and lifestyle habits. Numerous studies indicate the influence of parents on early childhood weight problems, especially if parents are overweight themselves.¹⁶ Without parents' recognition of their child's weight problem, obesity prevention and interventions are unlikely to be successful or even initiated.¹¹ Furthermore, youth who live with parents who accept behaviors associated with increased weight (eg, poor diet, lack of exercise and physical activity, heavy television diet) are more likely to be at risk for overweight and obesity in young adulthood.^{17,18}

According to the statement by the American Academy of Pediatrics Expert Committee regarding the subject of obesity, not only is the obesity problem epidemic, prevention is necessary through early screening.¹⁹ Screening of obesity includes early recognition of excessive weight gain compared with linear growth by calculating body mass index (BMI) periodically.¹⁹ The ideal setting for monitoring BMI is during well-child visits at the pediatrician's office; however, not all physicians are comfortable screening, diagnosing, and managing childhood obesity.^{20,21} In addition, an estimated 7.3 million children are uninsured and have limited access to health care outside the emergency department.²² Furthermore, certain populations (eg, low education, low income, African American) have

been associated with a high reliance on emergency departments for their children's health care.²³ Therefore, the pediatric emergency department (PED) is a potentially important setting to identify those patients at risk for obesity, to assess lifestyle risk factors for obesity, to examine parental perceptions of their child's weight, and to direct those patients at risk for further weight control-related interventions. There is limited to no existing literature about the potential for obesity prevention to occur in the PED.

The purposes of this study were to determine if parental perception of childhood obesity coincides with measured BMI and if parents are receptive to childhood obesity screening in the PED. In our first regression model, we regressed child obesity as measured by BMI on 2 predictors—race and parent view of their child's weight status. First, it was hypothesized that race would have a significant influence on obesity status, such that children who were African American would be more likely to be overweight than children in other racial/ethnic groups. Second, it was hypothesized that there would be a significant negative relationship between parent view of child weight status and child obesity status as measured by BMI. The second model analyzed race and child obesity status (measured by BMI) as predictors of parent report about wanting counseling regarding their child's weight in the PED. We hypothesized that race would have a significant influence on desire for counseling, specifically with African Americans wanting more counseling than those in other racial/ethnic groups. Next, we hypothesized that parents whose children were obese would want counseling more than parents of children who were not obese. A final objective of this study was to determine predictors of child weight status. Exploratory analyses were conducted to assess the influence of types of food the child was eating, whether the child was eating out, and the child's racial status. It was hypothesized that eating larger portions, drinking soda, and eating fast food would be related to the child being obese/overweight.

METHODS

Participants

This study was cross-sectional with children 4 to 16 years of age accompanied by a parent/legal guardian presenting to an urban PED in the Midwestern United States. Exclusion criteria were children outside the specified age category, parent/child participants who did not consent/assent, parents of critically ill children, and non-English-speaking parents. This study was approved by medical-center institutional review board.

Setting

The study was conducted in a large, urban, tertiary pediatric emergency department in a freestanding children's hospital. Our PED is a level I trauma center with roughly 88,000 patient visits each year and offers 24-hour coverage staffed primarily by board-certified faculty physicians trained in pediatric emergency medicine. Of the 88,000 patient visits, 14.4% are admitted to the hospital, and 21.2% come to the PED for an injury. Of the 88,000 patients, 48.5% are female, 45.6% are African American, 46.1% are white, and 3.8% are Hispanic. Regarding health insurance coverage, 30.8% have commercial insurance, 64.8% have government insurance (eg, Medicaid), and 4.2% are self-pay.

Measures and Procedure

Once informed consent and assent were obtained, demographic information was collected from the medical chart. Height and weight were obtained using a standardized method with a stadiometer and scale. This information was used to calculate BMI, according to the Centers for Disease Control and Prevention calculator, which is the ratio of weight in kilograms divided by the square of height in meters.²⁴

A 25-question, written survey was administered to a convenience sample of eligible parents accompanying their child to the PED (survey is available from the first author). The survey was developed specifically for this study and included items on demographics, child eating habits, physical activity, parental physical activity, and parental perception of their child's weight (eg, underweight, "just right," or overweight). Parents described the number of times the child ate at fast-food restaurants each week and the number of cups of soda their child drank each day. Parents described their child's eating habits as being in 1 of 3 categories: eats too little, eats just right, or eats too much.

Data Analysis

Data were analyzed using the Statistical Software Package for the Social Sciences 18.0 for Windows (SPSS Inc, Chicago, Ill). Two logistic regression analyses were used to examine variables related to childhood obesity and parents' openness to receiving counseling about their child's weight in an emergency room setting. The "best fit" models are presented in the Results. The first analysis examined race and parent view of whether their child had a weight problem as predictors of child obesity status (obesity was defined as BMI >95th percentile). The second logistic regression analysis examined race and obesity as predictors of parents reporting that they would like counseling to help them cope with their child's obesity in the pediatric emergency department. A third regression analysis examined eating and exercise habits as well as parent perceptions of portion sizes as predictors of child weight status.

RESULTS

Of the 213 participants, 110 (53.4%) were male, 103 (48.4%) were African American, and 103 (48.4%) were white. An additional 7 participants (3.3%) were of another race/ethnicity and were not used in the analyses for this study. The mean age of the child was 9.5 (SD, 3.52) years, and of the parent was 34.93 (SD, 8.11) years. Regardless of race, the prevalence of obesity (>95th percentile BMI) in the sample was 21.6% (n = 46), and the prevalence of overweight (85th through 95th percentile BMI) was 15.0% (n = 32). Regarding weight status, 9% of parents described their child as being underweight, 73% described their child's weight as being "just right," and 18% described their child as being overweight. Twenty percent of the sample ate at a fast-food restaurant 5 or more times a week. Very few of our parent sample said their child's regular physician had counseled them about their child's weight (7.6%), and only 9.5% of the parents reported that the physician had told them that their child was overweight. See Table 1 for more detailed demographics.

The best fit model for predictors of child obesity status included the 2 predictors, race and parent view of child weight, but not their interaction term. The χ^2 for our final model was significant ($\chi^2_2 = 21.95$, $P < 0.001$), indicating that the set of variables improved the prediction of the log odds. Our model predicted about 16% of the variance in the dependent variable (Nagelkerke $R^2 = 0.16$). Race did not have a significant influence on obesity status. Whether the parent thought that the child had a weight problem was significantly related to obesity status ($\beta = 2.04$, $SE = 0.49$, Wald statistic = 17.34, $P < 0.001$; Table 2). Parents of obese children were 7.6 times more likely to report that their child did have a weight problem than parents who had a child who was not obese. Sixty-one percent of parents whose children were obese indicated that they thought their child had a weight problem, whereas 39% of parents whose children were not obese thought that their child had a weight problem.

The best fit model for our second regression analysis included race and obesity as predictors of parent report about counseling. The interaction term did not add to the predictive power of our model, and therefore it was not included in the final model. The χ^2 for our final model was significant ($\chi^2_2 = 9.37$, $P = 0.009$), indicating that the set of variables improved the prediction of the log odds. Our model predicted 6% of the variance in the dependent variable (Nagelkerke $R^2 = 0.06$). Race had a significant influence ($\beta = 0.90$, $SE = 0.30$, Wald statistic = 8.77, $P = 0.003$; Table 3). Parents of African American children were 2.45 times more likely to report wanting counseling in the PED compared with parents of white children. Specifically, 54% of parents of African American children would like counseling in the PED about helping their child reduce obesity, whereas only 32% of the parents of white children reported that they would prefer counseling in the PED setting. The main effect for child obesity status was not significant.

Exploratory regression analyses were conducted to determine the relationship between child eating and exercise habits and child weight status. The dependent variable was child weight status (>95th percentile BMI vs 1st-94th percentile BMI). The predictors included parent description of the child's eating habits, number of cups of soda the child drinks per day, number of times each week the child eats at a fast-food restaurant, and child race. The final best fit model included the 4 predictors and the dependent variable ($F_{4,142} = 6.54$, $P < 0.001$; Table 4). This model predicted 16% of the variance in the variable capturing child obesity status. The interaction terms did not add to the predictive power of the model and thus were not included. Findings indicated that the number of times a child ate at a fast-food restaurant each week was significantly related to obesity status ($\beta = -0.39$, $SE = 0.07$, $t = -2.10$, $P = 0.038$). Children who ate more often at fast-food restaurants were more likely to be obese than those who were less likely to eat at fast-food restaurants. Parent description of their child's eating habits was also related to obesity status ($\beta = -0.35$, $SE = 0.07$, $t = -4.5$, $P < 0.001$). Children whose parents described their eating habits as "eats too much" were more likely to be obese than parents who described their eating as being "eats just right" or "eats too little." Child race and amount of soda consumption were not related to obesity status.

DISCUSSION

There were 3 main purposes of this study. The first objective was to determine if measured BMI coincides with parental perception of childhood obesity and race. Second, we sought to determine if parents were receptive to childhood obesity screening in the PED and if acceptance varied as a function of race or child weight status. Lastly, this study sought to explore predictors of childhood obesity such as portion sizes and frequency of dining at fast-food restaurants.

Studies examining parent perception of child weight status have produced mixed results. Our first model investigated the influence of child racial group and parent perceptions of child weight status on child obesity status. We hypothesized that race would have a significant influence on child obesity status, and this was not supported. The finding of the current study was inconsistent with previous literature.^{2,11} Specifically, Young-Hyman and colleagues¹⁴ found that, in an African American sample, 69% of children were overweight, but only 44% of parents believed their child's weight was problematic. Likewise, Myers and Vargas¹⁵ found that 43% of children in their Latino sample were overweight, but only 7% of parents perceived their child's weight accurately. Perhaps, in the current sample, the common factors contributing to child obesity/overweight are income and socioeconomic status (SES). In general, low-income adolescents are more at risk for obesity than middle- and high-income adolescents; however, this finding varies by ethnicity.² Our PED is located in the center of an urban city and primarily composed of a lower-income, government-insured population. As such, the link between SES and obesity may be more prominent in our setting than race/ethnicity and obesity.^{25,26} The other possible explanation is that obesity/overweight is pandemic and crosses racial/ethnic and income boundaries, supporting the notion of an obesogenic and supsize environment that affects everyone.²⁷⁻²⁹

Several studies have found parental perception of weight status to be inaccurate, and inaccuracies occur at a higher rate for children who are at risk or are overweight compared with children of normal weight,³⁰ a finding that has been replicated in several countries.¹¹ We hypothesized that there would be a significant negative relationship between parent view of child weight status and child obesity status. In the current sample, parents appeared informed and aware of their child's weight status, and in general, parental perception was accurate. In fact, 39% of our parents said their child was overweight when the child's BMI was actually within the reference range, which may suggest that some parents tend to misclassify their child's weight status in the other direction. In addition, in the present study, race was not significantly related to childhood obesity status, although previous research has indicated a higher propensity toward obesity in African American children.³¹ Further study is needed in this area.

The second model investigated race and child obesity status (measured by BMI) as predictors of parent receptivity to counseling about their child's weight in the PED. The first hypothesis that race would have a significant influence on desire for counseling was supported. As compared with white parents, African American parents were more than twice as likely to report wanting counseling about their child's weight in relation to healthy eating and exercise in the PED. Perhaps, this is due to the higher usage by and reliance on the PED

by African American families for primary care.²³ It makes sense that these parents would turn to the PED for counseling about childhood weight if they are not receiving consistent pediatric primary care elsewhere.³² The second hypothesis in this model was that parents whose children were obese (based on BMI) would want counseling in the PED more than parents of children who were not obese. This hypothesis was not supported. We found that all parents wanted counseling, irrespective of child weight status. This finding may have occurred because parents were using the PED as a source of primary care for their child and therefore rely on the PED for the information that a pediatrician typically provides.

The third model examining predictors of child weight status yielded interesting findings. First, kids who ate larger portions and who frequently ate fast food were more likely to be obese—a finding well supported by the literature.^{33–35} In contrast to current media reports, soda consumption (parent reported) was not predictive of child obesity status. This finding suggests that physicians who screen for obesity in the PED may want to ask for a description of eating habits that includes portion sizes and the frequency a child eats at fast-food restaurants. These questions may lead to discussions of lifestyle changes that would contribute to weight reduction in children.

Limitations

We used a convenience sample; thus, subjects may not represent a uniform sample of all parents and children. The study population was limited to patients and parents who presented to an urban, hospital-based PED. In addition, the subjects enrolled in this study may have a below-average SES (based on rates of government insurance) and higher rates of obesity compared with the general population. Although these characteristics are similar to other PEDs in urban locations, the results may not be generalizable to the general population. Another limitation could have been the lack of specificity in the wording of some of the questions. For example, we asked about cups of soda consumed per day and did not specify type of soda (diet vs regular) or ounces.

CONCLUSIONS

All parents, regardless of race, were receptive to obesity screening and prevention in the PED. African Americans indicated the greatest interest in screening through the PED, which may reflect high usage for primary care. Our results demonstrate that physicians who screen for obesity in the PED may want to ask for a description of eating habits, such as portion/serving sizes (using visual images and/or objects to indicate measurement) and fast-food consumption, which were found to be predictors of child obesity status. The PED offers a convenient setting for some parents to receive information about small lifestyle changes that can contribute to obesity reduction. Although screening and consistent information can be considered important first steps in childhood obesity prevention, sustained obesity reduction requires greater efforts that may include referrals to specialists in obesity management who can address readiness to change and implement interventions based on motivational interviewing and behavioral techniques.^{36,37}

The potential benefits of this study include identifying the prevalence of obesity in nonemergent patients 4 to 16 years of age seen in a PED and analyzing receptivity to

educating parents whose children are at risk for obesity in a PED setting. The identification of at-risk children in the PED is especially meaningful for individuals who have no pediatric primary physician or who have not had regular visits with their primary care physician. For those parents who are aware of the risks for obesity, screening in the PED could reinforce information and provide updated facts. Future studies should explore communication about weight status in the primary care office/clinic compared with PED usage for such issues.

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TABLE 1**Demographics of the Study Population**

Age of child, mean (SD), y	9.5 (3.52)
Age of parent, mean (SD), y	34.93 (8.11)
Child sex, n (%)	
Male	110 (51.6)
Female	96 (45.1)
Other race/ethnicity (not included in analyses)	7 (3.3)
Parent/child race, n (%)	
African American	103 (48.4)
White	103 (48.4)
Other race/ethnicity (not included in analyses)	7 (3.3)
Child BMI percentile, mean (SD) (range), percentile	58.8 (32.6) (3rd–97th)
Child obesity (BMI >95th percentile), n (%)	46 (21.6)
African American	29 (13.6)
White	17 (8.0)
Child overweight (BMI >85th–95th percentile), n (%)	32 (15.0)
African American	13 (6.1)
White	19 (8.9)
Child (BMI <85th percentile), n (%)	127 (60)
African American	61 (28.6)
White	66 (31.0)
Other race/ethnicity or missing data, n (%)	8 (3.8)
Parental education, n (%)	
Junior high school	24 (11.3)
High school	97 (45.5)
College/advanced degree	86 (40.4)
Missing	6 (2.8)
Family income, n (%)	
\$0–\$25,000	99 (46.5)
\$25,000–\$62,000	62 (29.1)
\$62,000–\$130,000	32 (15.0)
>\$130,000	7 (3.3)
Missing data	13 (6.1)

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TABLE 2

Child Race and Weight Status as Predictors of Child Obesity

Variable	β	SE	Wald	df	P	Exp(β)
Race	0.53	0.36	2.12	1	0.145	1.70
Weight problem	2.03	0.49	17.33	1	0.001	7.65

TABLE 3
Race and Obesity as Predictors of Parent Report of Counseling Received in the Emergency Room

Variable	β	SE	Wald	df	P	Exp(β)
Race	0.89	0.30	8.77	1	0.003	2.45
Obesity	0.07	0.35	0.04	1	0.849	1.07

TABLE 4

Regression Model for Questions Predicting Obesity Status *

Variable	Standardized β	SE	<i>t</i>	<i>P</i>
Times eating fast food weekly	−0.38	0.07	−2.10	0.038
Description of child eating habits	−0.35	0.07	−4.45	0.000
Cups of soda per day	−0.16	0.07	−1.11	0.268
Interaction of eating fast food and cups of soda	−0.39	0.03	1.64	0.102

* Two hundred eleven of the 213 cases were included in this analysis.