

Identification, Evaluation, and Management of Obesity in an Academic Primary Care Center

Sarah Harvey O'Brien, MD*; Richard Holubkov, PhD‡; and Evelyn Cohen Reis, MD*

ABSTRACT. *Background.* The rapidly increasing prevalence of obesity among children is one of the most challenging dilemmas facing pediatricians today. While the medical community struggles to develop effective strategies for the treatment of this epidemic, timely identification of obesity by pediatric health care providers remains the crucial initial step in the management of obesity.

Objective. Direct assessment of pediatric clinicians' performance in identifying and managing obesity in clinical practice has not been conducted to date. The objective of this study was to determine rates of identification of obesity by pediatric residents, nurse practitioners, and faculty members in an academic primary care setting and to describe the actions taken by these providers in their evaluation and management of obesity.

Design. A retrospective medical record review of all health supervision visits for children 3 months to 16 years of age, examined between December 1, 2001, and February 28, 2002, was performed. For children <5 years of age, a weight >120% of the 50th percentile of weight-for-height was defined as obese. For children ≥5 years of age, a body mass index of >95th percentile for age and gender was defined as obese.

Setting. A large, primary care practice located in a tertiary-care, academic, pediatric hospital, which serves a predominantly urban, minority (70% African American), Medical Assistance-insured (90%) population.

Participants. Primary care providers, including pediatric residents, nurse practitioners, and faculty physicians.

Results. Of the 2515 visits reviewed, a total of 244 patients met the study definition of obesity, yielding an estimated prevalence of obesity visits of 9.7% among health supervision visits for children 3 months to 16 years of age. This prevalence of obesity visits cannot be used to estimate the population prevalence of obesity, given the skewed distribution of visits toward very young children. For all children who met the study definition of obesity, providers documented obesity in their assessments in only 53% of the reviewed visits (129 visits). Although the majority of charts (69%) contained an adequate dietary history, only 15% included a description of the child's activity level or television viewing.

Obesity was noted in the physical examination in 39% of cases.

For children for whom obesity was identified as a problem by their clinicians (129 patients), 81% of charts contained an adequate dietary history, whereas 27% contained a description of the child's activity level or television viewing. Obesity was noted in the physical examination in 64% of cases. Most children identified as obese by their providers received some management specific to their obesity, including education, screening, and specialist referral. Dietary changes were recommended for 71%, increased activity for 33%, and limitation of television viewing for only 5%. Eighty-three percent of providers recommended close follow-up monitoring. Other recommendations included referral to a dietitian (22%), screening laboratory studies (13%), a food diary (9%), endocrine referral (5%), or preventive cardiology referral (3%).

Provider identification of obesity was affected by the age of the patient and by the degree of obesity. Obesity identification was lowest among preschool children (31%) and highest among adolescent patients (76%). Providers evaluating older and heavier children were also more likely to obtain activity histories, note obesity in the physical examination, recommend changes in activity, refer the patient to a nutritionist, obtain screening laboratory studies, and recommend close follow-up monitoring. Identification of obesity and other outcome variables were not significantly influenced by the level of provider training or patient gender.

Conclusions. Although the prevalence of childhood obesity has now reached epidemic proportions, it was under-recognized and under-treated by pediatric primary care providers in our study. Providers identified obesity as a problem for only one-half of the obese children examined for health supervision. The lowest rates of obesity identification occurred among children <5 years of age and those with milder degrees of obesity. Identification did not improve with additional years of pediatric training.

Even for the subset of children identified as obese by their providers, evaluation and treatment often were not consistent with current recommendations. For example, more attention was given to the role of diet, compared with activity, in the evaluation of obesity. In particular, only a small number of providers (5%) recommended a decrease in television viewing to their obese patients, despite evidence linking television viewing and pediatric obesity. This finding is of concern, because obesity is known to be a multifactorial disease that responds only to significant changes in both dietary and activity behaviors. Only 13% of providers requested laboratory studies as part of their recommendations. The American Academy of Pediatrics currently recommends obtaining a lipid profile, total cholesterol level, and screening test for type 2 diabetes mellitus as part of the evaluation of obesity. The majority of clinicians who requested labo-

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Received for publication Feb 18, 2004; accepted Mar 1, 2004.

S.H.O. received the 2002 Region III Ambulatory Pediatric Association Research Award for her abstract of this report.

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ratory studies included thyroid function tests, which are not recommended by the American Academy of Pediatrics because of the very low likelihood of hypothyroidism as a cause of obesity. Although the extent of evaluation and management for children who were recognized as obese did not meet current guidelines, it was far better than that for patients who were not identified as obese by their providers. This demonstrates the importance of timely identification as the crucial initial step in the management of obesity. The results of this study are disheartening, especially as evidence mounts regarding the importance of early intervention in preventing the medical and psychosocial sequelae of obesity, as well as the persistence of obesity into adulthood. This study highlights the need for increased awareness and identification of obesity in the primary care setting, especially among younger children and those with mild obesity. *Pediatrics* 2004;114:e154–e159. URL: <http://www.pediatrics.org/cgi/content/full/114/2/e154>; *obesity, primary care, identification*.

ABBREVIATION. BMI, body mass index.

One of the most important developments in pediatrics in the past 2 decades has been the emergence of a new chronic disease, obesity in childhood and adolescence. As expressed by Sokol¹ in an editorial “call to arms,” the Western lifestyle has led to the super-sizing of our diet and the down-sizing of our activity, with the result that obesity is now the most common chronic illness in childhood.

The rapidly increasing prevalence of obesity among children is one of the most challenging dilemmas currently facing pediatricians. Comparison of National Health and Nutrition Examination Survey data from cycle II (1976–1980) versus cycle III (1988–1994) documented an increase in the prevalence of obesity in all age, ethnic, and gender groups.² National Health and Nutrition Examination Survey data collected from 1999 to 2000 revealed a continued increase in the number of obese children.³ In that recent data collection, the prevalence of obesity (body mass index [BMI] of ≥ 95 th percentile) was 10% among children 2 to 5 years of age and 15% among children 6 to 19 years of age. When children at risk for obesity (BMI of 85th to 94th percentile) were included, the values increased to 20% and 30%, respectively. Therefore, >1 of every 4 patients examined by pediatricians either is obese or is considered to be at high risk for developing this challenging health problem.

The prevalence of obesity varies significantly among ethnic groups, and African American youths are known to be at higher risk of becoming obese than are non-Hispanic white children.^{2,3} In a 10-year study investigating the development of obesity in a cohort of 2379 girls during adolescence, Kimm et al⁴ showed that, even at age 9 years, the prevalence of obesity was twice as high among black girls (18%), compared with white girls (8%).

The medical community is struggling to develop effective strategies for treatment of this epidemic, but timely identification of obesity by pediatric health

care providers is a crucial initial step in the management of obesity. Direct assessment of pediatric clinicians' performance in identifying and managing obesity in clinical practice has not been conducted to date. The objective of this study, therefore, was to determine the rates of identification of obesity by pediatric residents, nurse practitioners, and faculty members in an academic primary care setting and to describe the actions taken by these providers in the evaluation and management of obesity.

METHODS

Study Design

This study was approved by the Human Rights Committee, the institutional review board of the Children's Hospital of Pittsburgh. We performed a chart review of 3007 health supervision visits to the Children's Hospital of Pittsburgh Primary Care Center during a continuous 3-month period, from December 1, 2001, to February 28, 2002. Patient visits were excluded if the child was <3 months of age or if the visit was subsequently identified as a follow-up visit (eg, ear check or posthospitalization visit). If a patient had >1 health supervision visit during the designated study period, the second visit was excluded from analysis. A total of 492 visits were excluded on the basis of these criteria, leaving 2515 visits for analysis.

Setting

This study was conducted in a large, primary care practice located in a tertiary-care, academic, pediatric hospital, which serves a predominantly urban, minority (70% African American), Medical Assistance-insured (90%) population.

Participants

Participants included the pediatric residents, nurse practitioners, and faculty physicians who provided care in the primary care center.

Subject Identification

The BMI or weight-for-height percentile was calculated for the 2515 remaining children on the basis of the height and weight measured at the study visit. Primary care center nurses performed the height and weight measurements as was routine in their practice; they were not trained in a specific protocol for this study. For children <5 years of age, weight of $>120\%$ of the 50th percentile of weight-for-height was defined as obese. For children ≥ 5 years of age, BMI of >95 th percentile for age and gender was defined as obese. Use of BMI of >95 th percentile is consistent with the current expert committee recommendations, in which the panel recommends the use of the term “overweight” or “obese” for BMI of ≥ 95 th percentile for age and gender.⁵ The expert committee, composed of pediatric obesity experts, was convened in 1997 by the Maternal and Child Health Bureau, Health Resources and Services Administration, and Department of Health and Human Services, to develop recommendations for the evaluation and treatment of childhood obesity.

Data Collection

For children who met the study definition of obesity, the provider's progress notes were examined to determine the extent of the medical evaluation and the type of recommendations made for the management of obesity. The age, gender, height, and weight of the patient were recorded, as was the level of training of the provider. Each chart was then examined for the presence of the following: 1) an adequate dietary history (brief notations such as “varied” or “normal” were not considered adequate), 2) a history of physical activity and/or television viewing, 3) a notation of obesity in the physical examination, 4) a listing of obesity in the provider's final assessment/problem list (identification), and 5) the presence and type of interventions outlined in the provider's plan. Finally, we examined the follow-up monitoring recommended by the provider, with close follow-up monitoring being defined as a return visit that was earlier than the next health

supervision appointment recommended by the American Academy of Pediatrics.

Data Analysis

For all visits in which the child met the study definition of obesity, including those in which the child was identified as obese by the provider, the frequency of the 5 outcome variables was determined. Bivariate analysis with χ^2 tests was performed to determine whether independent variables (patient age, gender, and degree of obesity and clinician level of training) significantly influenced the identification of obesity and other outcome measures. To describe the degree of obesity, patients were divided into quartiles, with the least obese in the 1st quartile and the most obese in the 4th quartile. The measures of relative obesity used were the ratio of the child's BMI to the age- and gender-appropriate 95th percentile BMI for patients ≥ 5 years of age and the ratio of the patient's weight to the gender-appropriate 50th percentile weight-for-height value for children < 5 years of age. Data were analyzed by using SPSS 11.0 for Windows (SPSS, Inc, Chicago, IL).

RESULTS

A total of 244 patients met the study definition of obesity, creating an estimated prevalence of obesity visits of 9.7% (244 of 2515 visits) among health supervision visits for children 3 months to 16 years of age in our clinic population. The obese patients were equally distributed according to gender, with 48% boys and 52% girls. Levels of provider training were diverse, with 62% of patients being examined by resident physicians (equally distributed according to level of training), 25% by nurse practitioners, and 13% by attending physicians.

Among the children who met the study definition of obesity, providers documented obesity in their assessments for only 53% of the reviewed visits (129 visits). Although the majority of charts (69%) contained an adequate dietary history, only 15% included a description of the child's activity level or television viewing. Obesity was noted in the physical examination in 39% of cases (Table 1).

For the children for whom obesity was identified as a problem by the clinician (129 patients), 81% of the charts contained an adequate dietary history, whereas 27% contained a description of the child's activity level or television viewing. Obesity was noted in the physical examination in 64% of cases.

Most children who were identified as obese by their providers received management specific to their obesity, including education, screening, and

specialist referral. Dietary changes were recommended for 71%, increased activity for 33%, and limitation of television viewing for only 5%. Eighty-three percent of providers recommended close follow-up monitoring. Other recommendations included referral to a dietitian (22%), screening laboratory studies (such as cholesterol, lipid profile, fasting glucose, or thyroid function tests) (13%), maintenance of a food diary (9%), endocrine referral (5%), and preventive cardiology referral (3%).

Provider identification of obesity was affected by the age of the patient (Table 2) and by the degree of obesity (Table 3). Obesity identification rates were lowest among preschool children (31%) and highest among adolescent patients (76%). Although the analysis suggested that there might be an interaction between age and severity of obesity (Fig 1), a logistic regression model including both age group and obesity quartile as predictors of identification did not detect a statistically significant interaction between these 2 variables. This might be attributable to the relatively small numbers of adolescent children in each obesity category.

Providers evaluating older and heavier children were also more likely to obtain activity histories, note obesity in the physical examination, recommend changes in activity, refer the patient to a nutritionist, obtain screening laboratory studies, and recommend close follow-up monitoring (Tables 4 and 5). Identification of obesity and other outcome variables were not significantly influenced by the level of provider training or by patient gender, with the exception that providers were more likely to recommend close follow-up monitoring for male patients (75%), compared with female patients (57%), when they identified the patient as obese ($P = .005$).

DISCUSSION

Pediatricians' identification and management practices regarding childhood and adolescent obesity have not been well described. Recently, a national survey of pediatricians, pediatric nurse practitioners, and registered dietitians revealed that, whereas most practitioners reported recommending weight control for school-aged and adolescent patients identified as obese, only 49% intervened in

TABLE 1. Primary Care Provider Practices in the Evaluation and Management of Patients With Obesity

	Incidence, %		
	Children Meeting Study Definition of Obesity (N = 244)	Obese Children Identified as Obese by Provider (N = 129)	Obese Children Not Identified as Obese by Provider (N = 115)
Evaluation			
Diet history	69	81	56
Activity history	15	27	2
Obesity noted in examination	39	64	10
Obesity noted in assessment	53	100	0
Management			
Dietary counseling	40	71	6
Increased activity advised	17	33	0
Decreased television viewing advised	3	5	0
Referral to nutritionist	12	22	0
Laboratory studies	7	13	0
Close follow-up monitoring advised	66	83	48

TABLE 2. Rates of Provider Identification of Obesity According to Child's Age

Age of Child, y	No. of Obese Children	% of All Obese Children Identified as Obese
<5	78	31
5-11	129	60
12-16	37	76
Total	244	$P < .001$

TABLE 3. Rates of Provider Identification of Obesity According to Degree of Obesity

Degree of Obesity	% of All Obese Children Identified as Obese
1st (lowest) quartile of obesity	18
2nd quartile	49
3rd quartile	68
4th quartile	82
	$P < .001$

cases of preschool obesity.⁶ Most respondents also described diet and activity interventions consistent with recent expert committee recommendations (see above).⁵ The study's findings were limited by reliance on self-reporting and a low response rate (<33%), with responding providers being more likely to be concerned about childhood obesity. The questionnaire format did not provide measurements of the frequency of identification of obesity or of interventions for the study population in daily practice.

As expected, obesity was found to be a common disease in our clinic visits, with a prevalence of obesity visits of 9.7%. This prevalence of obesity visits cannot be used to estimate the population prevalence of obesity, because of the skewed distribution of visits toward very young children. Because our practice follows the American Academy of Pediatrics recommended schedule for health supervision visits, approximately one-half of our well-child care visits are for children ≤ 24 months, who are less likely to be obese.

In our study population at an academic center, primary care providers (including resident physicians, nurse practitioners, and attending physicians) identified obesity as a problem for only one-half of the obese children examined in the clinic. These results are consistent with those of the needs assessment questionnaire study described above, in which 50 to 61% of responders reported the initiation of treatment for overweight children with no obesity-associated conditions.⁷ Rates of obesity identification in our study did not vary according to the type of provider.

The lowest rates of obesity identification occurred among children <5 years of age. Obesity in this preschool age group deserves our attention. Obese 3- to 5-year-old children have a significantly greater risk of adult obesity, compared with their peers.⁸ Intervention in this age group is also more likely to be successful. Young children require smaller shifts in calorie balance to yield substantial changes in dietary intake, and habits are more easily changed

when a few weeks or months represent a larger proportion of their total experience.⁹

Even for the subset of children identified as obese by their health care providers, evaluation and management often were not consistent with current recommendations. For example, more attention was given to the role of diet, rather than activity, in the evaluation of obesity. The great difference in clinician attention to dietary versus activity factors is of concern, because obesity is known to be a multifactorial disease that responds only to significant changes in both dietary and activity behaviors.¹⁰ Helping families create opportunities for activity at home has become critically important, in an era in which <50% of children receive daily physical education at school.²

Only a small number of providers (5%) recommended a decrease in television viewing to their obese patients, despite evidence linking television and pediatric obesity.¹¹⁻¹⁵ The average child watches 3 hours of television each day; this does not include time spent watching videotapes or playing video or computer games.¹⁶ One study of low-income preschool children showed that the amount of time spent viewing television and videotapes was significantly related to the prevalence of obesity within the population.¹⁷ Pediatricians may also be unaware of the growing popularity of placing television sets in children's bedrooms and thus do not counsel against this practice. A television in the bedroom is even more strongly related to the risk of obesity than is the number of viewing hours.¹⁷ One-third of 2- to 7-year-old children and 65% of 8- to 18-year-old youths have television sets in their bedrooms.¹⁶

Only 13% of providers requested laboratory studies as part of their recommendations. The expert committee recommends obtaining a lipid profile, a total cholesterol level, and a screening test for type 2 diabetes mellitus as part of the evaluation of obesity.⁵ Also, the majority of clinicians who requested laboratory studies included thyroid function tests, which are not recommended by the expert committee because of the very low likelihood of hypothyroidism as a cause of obesity.

It is worth noting that, although the extent of evaluation and management among children who were recognized as obese did not meet current guidelines, it was far better than that among children who were not identified as obese by their providers. This demonstrates the importance of timely identification as the crucial initial step in the management of obesity.

One limitation of this study was the reliance on the documentation of health care providers, which might not reflect completely the provider's observations of the patient or the discussion with the patient and family that took place during the health supervision visits. Future research is needed to determine whether documentation of obesity is an accurate indication of provider recognition and actions.

CONCLUSIONS

Although the prevalence of childhood obesity has reached epidemic proportions, it was under-recog-

Fig 1. Percentages of children identified as obese by their providers, according to child age and severity of obesity.

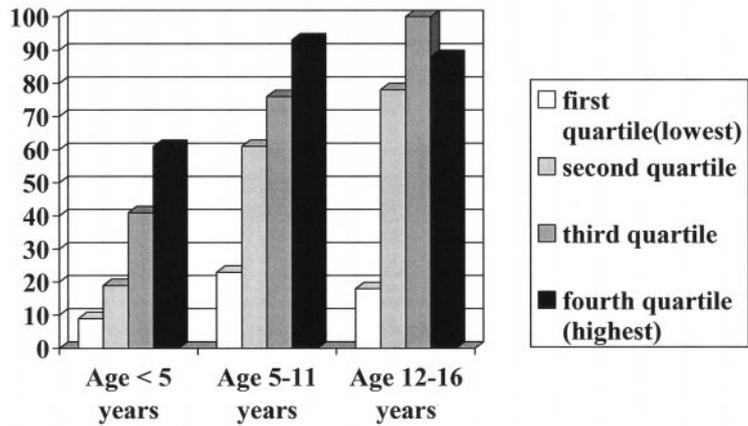


TABLE 4. Provider Practice Behaviors According to Age Range of Obese Children

	Incidence, %			
	<5 y (N = 78)	5-11 y (N = 129)	12-16 y (N = 37)	
Diet history	73	68	65	NS
Activity history	1	16	38	P < .001
Obesity noted in examination	21	43	62	P < .001
Dietary counseling	33	43	43	NS
Increased activity advised	4	22	30	P < .001
Decreased television viewing advised	3	3	0	NS
Referral to nutritionist	6	10	27	P = .003
Laboratory studies	1	6	22	P < .001
Close follow-up monitoring advised	54	71	73	P = .025

NS indicates not significant

TABLE 5. Provider Practice Behaviors According to Severity of Obesity

	Incidence, %				
	1st Quartile (Least Obese)	2nd Quartile	3rd Quartile	4th Quartile (Most Obese)	
Diet history	67	61	77	73	NS
Activity history	2	12	16	32	P < .001
Obesity noted in examination	10	26	50	73	P < .001
Dietary counseling	19	41	46	57	P < .001
Increased activity advised	5	20	16	30	P = .001
Decreased television viewing advised	2	0	4	5	NS
Referral to nutritionist	3	7	9	28	P < .001
Laboratory studies	0	8	5	15	P = .003
Close follow-up monitoring advised	48	61	73	83	P < .001

NS indicates not significant

nized and undertreated by pediatric health care providers in our study. Our chart review revealed that providers failed to identify obesity in one-half of their health supervision visits with obese patients, especially when evaluating preschool children and those with milder degrees of obesity. Also, identification did not improve with additional years of pediatric training. Although two-thirds of providers obtained an adequate dietary history, only 15% included a description of the child's activity level or hours of television viewing. Only one-third of providers noted obesity in the physical examination, and only 7% ordered any laboratory evaluations. Finally, although the majority of providers recommended dietary changes for their obese patients, the important topics of activity level and television viewing often were not discussed with families.

The results of this study are disheartening, espe-

cially as evidence mounts regarding the importance of early intervention in preventing the medical and psychosocial sequelae of obesity, as well as the persistence of obesity into adulthood. This study highlights the need for increased awareness and identification of obesity in the primary care setting, especially among younger children and those with mild obesity.

ACKNOWLEDGMENTS

This project was supported by the Department of Pediatrics, Children's Hospital of Pittsburgh.

We thank Drs Ellen Wald and Alejandro Hoberman for their support and thoughtful critique of the manuscript.

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Pediatrics 2004;114:e154

DOI: 10.1542/peds.114.2.e154

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