



Patient Attendance and Outcomes in a Structured Weight Management Program

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Objectives To determine service utilization and identify patient characteristics associated with service utilization in youth with obesity presenting for structured weight management, and to explore weight-related outcomes associated with service utilization.

Study design In this retrospective study conducted between January 2008 and December 2013, we examined variables associated with the care of 2089 patients aged 2-18 years presenting for an initial visit to 2 tertiary care-based, multidisciplinary structured weight management clinics.

Results Only 53% of patients returned for a second visit, 29% returned for a third visit, and virtually none (0.5%) completed the recommended 6 visits within 6 months. Patients who were Hispanic, government-insured, and whose parent/s spoke Spanish were more likely to return to clinic. Of those patients who returned for at least a second visit, 70% demonstrated a reduction in or maintenance of body mass index z-score.

Conclusions Patient retention remains a significant barrier to effective pediatric weight management. Structured weight management programs should increase their efforts to engage patients and families at the initial visit and identify and address barriers to follow up. (*J Pediatr* 2016;176:30-5).

The early onset of conditions typically encountered in adulthood, as well as the increased likelihood of chronic obesity, have led to numerous investigations of ways in which weight loss can be achieved in children and adolescents.¹⁻⁴ A reduction in obesity impacts conditions associated with excessive weight.^{5,6}

In 2007, an Expert Committee generated recommendations regarding the prevention, assessment, and treatment of child and adolescent obesity. The treatment recommendation includes a series of 4 progressively intensive stages: Prevention Plus (Stage 1), Structured Weight Management (Stage 2), Comprehensive Multidisciplinary Intervention (Stage 3), and Tertiary Care Intervention (Stage 4).⁷ Children and adolescents advance from Stage 1 to Stage 2 if an adequate reduction in body mass index (BMI) is not achieved within 6 months. Although targeted behaviors do not change between the stages, Stage 2 interventions include additional support and structure to help children and adolescents accomplish the desired behavioral modifications. Advancement to Stage 2 provides the family with access to additional providers (eg, dietitian, behavioral specialist, physical activity specialist), and encourages monthly office visits to assess progress.

The benefit of Stage 2 over regular visits with a primary care provider (Stage 1) has not been well documented, although outcomes in selected populations appear promising. One Stage 2 treatment program for 3- to 5-year-old children who were overweight or obese yielded favorable results up to 2 years postintervention.⁸ In a primary care-based Stage 2 program, Dolinsky et al⁹ reported a mean BMI SDS reduction of 0.10 and improvements in blood pressure and laboratory values in 2- to 19-year-old participants (mean age 11 years).

Furthermore, information on the achievement of service utilization recommendations (ie, recommended frequency of visits) put forth by the Expert Committee is limited. Dolinsky et al⁹ found that only 13% of participants completed the 6 recommended monthly visits in their aforementioned Stage 2 program. Cheng et al¹⁰ reported that children referred to a 12-month program housed within an academic primary care clinic that recommended 6 visits in 1 year had an average of only 2.7 visits in 2 years.

Similarly, predictors of achievement of Stage 2 treatment service utilization recommendations (ie, attending the recommended number of visits) are not well described. Dolinsky et al¹¹ found that white non-Hispanic and Hispanic children were more likely than non-white non-Hispanic children to complete the number of recommended Stage 2 program visits, in agreement with findings from an earlier study.¹² Researchers from another Stage 2 clinic-based program did not identify

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BMI	Body mass index
zBMI	Body mass index z-score
PHIT Kids	Promoting Health In Teens and Kids

these or any other demographic predictors of program completion, but did find that participants with higher initial BMI z-score (zBMI) and a weight-related comorbidity were more likely to complete treatment.¹³

In Stage 2 interventions, predictors of weight loss success have been more widely studied and include such factors as age,¹⁰ length of clinic intervention, absence of family history of obesity, and sex.⁶ Although these factors provide a valuable first step, the findings are typically based on small sample sizes and frequently lack heterogeneity, thereby warranting a large-scale investigation.

In the present study, we reviewed a large cohort of children and adolescents with obesity for demographic, social, and clinical features that describe those individuals most commonly seeking treatment. The primary aim of the study was to determine service utilization and identify patient characteristics (eg, sex, insurance status, race/ethnicity, baseline weight status) associated with service utilization. A secondary aim was to explore weight-related outcomes associated with service utilization.

Methods

Participants were drawn from Stage 2 Structured Weight Management clinics, Promoting Health In Teens and Kids (PHIT Kids) and Healthy Hawks, at 2 midwestern pediatric facilities between January 2008 and December 2013. Inclusion criteria included a BMI \geq 95th percentile for age and sex.

The PHIT Kids and Healthy Hawks clinics provide multidisciplinary evaluation and treatment for children with obesity aged 2-18 years. Children are referred to the clinics by a community primary care provider or a hospital-based primary care provider or subspecialist. Parents/caregivers called or were called to schedule initial clinic appointments, were sent a mailing with a letter and other clinic information, and received an automated reminder call 48-72 hours in advance of the appointment. Parents/caregivers scheduled follow-up clinic visits at the clinic's front desk or by phone, and received automated reminder calls for those appointments as well.

The PHIT Kids clinic recommended a visit every 4-6 weeks, during which the patient met with a pediatrician or pediatric nurse practitioner, social worker, and dietitian during each visit, and with a physical therapist at the second visit. In addition, a psychologist was available for individual consultations with families as needed. In the Healthy Hawks clinic, patients met with a dietitian, nurse practitioner, and psychologist every 4-6 weeks. Neither clinic had a defined end date; that is, patients could continue to come for visits indefinitely. In both clinics, visit content was targeted based on patient and family needs, and included motivational interviewing to encourage behavioral strategies, such as goal-setting, self-monitoring, and behavior modification techniques related to physical activity and nutrition education.

Patient anthropometric data (ie, height and weight) were measured at each clinic visit by trained medical assistants, and were used to calculate BMI, BMI percentile, and zBMI

using the Centers for Disease Control and Prevention BMI calculator for the SAS program (SAS Institute, Inc, Cary, North Carolina; <http://www.cdc.gov/nccdphp/dnpao/growthcharts/resources/sas.html>). Data on home language, racial/ethnic group, insurance status, and sex were collected from the medical record.

The demographic and anthropometric data and visit history used in this study were obtained from the electronic medical record. Before data collection, the study was approved by the Institutional Review Boards of The Children's Mercy Hospital and The University of Kansas Medical Center.

Statistical Analyses

All analyses were conducted with SPSS version 23 (IBM, Armonk, New York). To address the first aim of the study, a time frame of 6 months was set to best approximate adherence to the recommendations of the Expert Committee for Stage 2 Structured Weight Management (ie, monthly visits for 6 months). Attendance was captured by number of return visits within this window. Participants were grouped according to service use category as follows: category 0, no follow up within 6 months (1 visit total); category 1, one follow-up within 6 months (2 visits total); category 2, two follow-ups within 6 months (3 visits total); category 3, three follow-ups within 6 months (4 visits total); category 4: four follow-ups within 6 months (5 visits total); category 5, five follow-ups within 6 months (6 visits total).

Given difficulties in feasibility of scheduling monthly appointments, all analyses were completed with 9 months of the initial appointment (ie, 1 visit every 6 weeks). However, we found no significant differences in attendance or outcomes between the 6-month and 9-month categorizations, and thus present results for the 6-month time frame only.

Demographic predictors of follow-up to clinic were assessed. The categorical predictors (racial group, language, sex, insurance status) were assessed with cross-tabs analysis and χ^2 hypothesis testing. The continuous predictor (age) was assessed with an independent-samples *t* test. "No follow-up" and "follow-up to clinic at least once" were set as the comparison groups. For categorical predictors, expected counts were generated from the percentages of all participants presenting to the first session. To explore the associations between baseline weight status and service utilization, 1-way between-groups ANOVA was conducted between service use categories and baseline weight status.

To address the second aim of the study, we present outcomes related to change in zBMI by service use category. As a function of the clinical nature of the programs, participants varied in their usage of clinic services in terms of number of visits and time between visits. To account for variance in time between visits, monthly change in zBMI was calculated for each service use category (instead of overall change in zBMI). Change in zBMI for each category represents the average monthly change in zBMI between visit 1 and the final visit. Category names (ie, categories 1-5) are equal to the total number of visits minus 1 (eg, category 1 captures individuals

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