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Outcomes from an Orientation Model to Reduce Attrition in Pediatric Weight Management

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Abstract

We aimed to reduce attrition of newly referred patients in a pediatric weight management program by implementing an Orientation to address families' expectations and screen for and support behavioral and mental health problems and psychosocial stressors at program outset. Orientation impact was monitored with run charts with percentages of scheduled encounters completed. Long-term impact was assessed by comparing patients in the initial 6 months of the Orientation to a baseline group of referred patients during the same 6-month time interval in the prior year (Pre-Orientation Group). The outcome measure was program attrition within 15 months. Groups were compared using Kaplan-Meier survival analysis and Cox proportional hazards regression modeling. Patients in the Orientation group had a 23% increased odds of attrition compared to patients in the Pre-Orientation group (aHR 1.23; 95% CI 1.01, 1.51) and shorter median duration of follow-up (2.0 vs. 2.9 months, p=0.004). An increase in BMI z-score of 1 unit resulted in a nearly 5-fold increased odds of attrition (aHR 5.24; 95% CI 2.95, 9.3). An orientation for new patients did not reduce attrition within 15 months. We suggest that ongoing retention strategies should be embedded into the treatment phase of the program.

Keywords

Attrition; paediatric obesity; quality improvement; weight management

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INTRODUCTION

Attrition from pediatric weight management programs ranges from 27 to 73% in recent reports.[1] Investigations of attrition have implicated family and demographic factors [e.g. race/ethnicity, insurance status, and patient and parental body mass index (BMI)],[1-6] program logistics and content (e.g. inconvenient appointment times and unclear expectations),[1,3,5,7-11] and behavioral and mental health problems in both caregivers and patients.[2,8,12] Methods to address attrition have shown variable impact.[11,13,14] However, an orientation session has the potential to address these issues and has been used with success in low income, minority adolescents.[13] Pediatric obesity has increasingly been recognized as a chronic illness,[15] and ensuring a durable relationship with the healthcare team is recognized to be an important component of successful treatment.[5]

In the Optimal Weight for Life (OWL) Program, a pediatric weight management program at Boston Children's Hospital (BCH), attrition has been as high as 50% by 6 months.[16] To address this problem in our program, we undertook a multifaceted quality improvement (QI) project in 2012 that consisted of a program orientation to address families' expectations about program participation and screening as well as support for significant psychosocial stressors (PS) and behavioral and mental health problems that might pose barriers to successful initial participation. Our report describes the impact of this multifaceted QI project in a large and diverse referral program for overweight and obesity in children and adolescents.

MATERIALS AND METHODS

Setting and Population

The OWL Program is open to patients 2-21 years of age and receives approximately 10 - 15 new patient referrals per week. At the time of the QI project launch, the OWL Program operated on both the main BCH campus and in one satellite clinic in a local Boston suburb. The program's full- and part-time staff includes medical providers (physicians and nurse practitioners), dietitians, behavioral medicine specialists (psychologists and social workers), a resource specialist, and a physical activity specialist.

Prior to implementing the QI project, newly referred patients were scheduled for medical and nutrition consultations, and insurance permitting, a behavioral specialist consultation. All consultation visits were 60 minutes. Subsequent follow-up in the program was not prescriptive, but generally occurred every 1-3 months for medical, nutrition and behavioral medicine appointments.

Orientation

In January 2012, we established an inter-professional project team consisting of a nurse practitioner, dietitian, resource specialist, psychologist, project coordinator, program administrators, and physicians. The team reviewed literature with focus on best practices and published recommendations, and identified gaps between practice and evidence. Based on local experience and the review, we prioritized the need to effectively educate families about program delivery and expectations for participation and to screen for and support identified

PS and behavioral and mental health problems that might pose initial barriers to ongoing participation. Through an iterative process, we developed an OWL Orientation that all newly referred patients and adult caregiver(s) were required to attend to help them to make an informed decision about participation prior to full enrollment.

The OWL Orientation was comprised of the following components which all occurred on the same day: (1) PS, behavioral, and mental health screening completed by patients and adult caregivers (PACs); (2) viewing an orientation video[17] that provided a programmatic overview with emphasis on provider roles within the inter-professional team, clinic visit objectives, the typical course of treatment, and expectations for follow-up; (3) a medical evaluation (60 minute encounter); and (4) a visit with a behavioral specialist (30 minute non-billable encounter for English speaking patients and 60 minute non-billable encounter for non-English speaking patients) during which the screening results were reviewed and recommendations provided. When indicated, PACs met with a resource specialist to address needs identified in the abovementioned screening.

At Orientation completion, PACs were given the option to enroll in the OWL Program. PACs who enrolled were scheduled for a 3-month return medical visit and the next available new nutrition and behavioral specialist visits, generally 1 – 4 weeks later. PACs declining enrollment were discharged to their primary care providers with medical recommendations and psychosocial assessment summaries.

Psychosocial Stressors and Behavioral and Mental Health Screening

The screening tools used for PS (e.g. limited financial resources, school difficulties, safety concerns due to emotional, verbal, physical threats, or assaults), behavioral health problems (e.g. attention difficulties, peer relationship problems), mental health problems (e.g. mood and anxiety concerns, suicidal ideation), and disordered eating were selected for their clinical relevance[18-23] (Table 1). Additional details regarding the screening tools have been reported elsewhere.[22,23]

Crisis intervention services were mobilized or consulted for recommendations for patients or adult caregivers with urgent mental health concerns (e.g. severe clinical depression without treatment in place or active suicidal ideation with a plan for suicide) or if domestic violence, abuse or neglect was uncovered with imminent safety concerns. For these PACs, full enrollment in the OWL Program was temporarily deferred pending behavioral specialist phone contact at 1 week and 4 weeks to assess whether imminent safety concerns were mitigated (e.g. contacted mental health services, residing in shelter, etc.). PACs with less urgent mental health concerns were given the option of full enrollment upon completion of the Orientation and referred to mental health services outside of the OWL Program for additional evaluation and management.

Implementation

The OWL Program committed to at least a 6-month evaluation of the Orientation (May 1 – October 31, 2012). A project coordinator assisted with implementation, organization, patient flow, measurement, and evaluation. Using the Model for Improvement, we identified mechanisms to implement specific processes and evaluated program impact using Plan-Do-

Study-Act (PDSA) cycles.[24] According to policies at Boston Children's Hospital, this work met criteria for operational improvement activities exempt from ethics review.

Measurement

Ongoing Program Evaluation—To facilitate implementation and inform PDSA cycles, PACs were asked to complete a voluntary, anonymous feedback survey that rated the importance of the information from each Orientation component in assisting with their decision about enrollment.[25,26] The survey also included an adaptation of O'Connor's Decision Self-Efficacy Scale[27] with 11-items that measured self-confidence in the ability to make decisions regarding enrollment. These questions were answered on 3-point Likert scales (0 = "not confident", 2="a little confident", 4 = "a lot confident"). Overall confidence in decision-making was assessed with the summary score on a 100-point scale (0=not confident to 100=extremely confident), and only respondents answering all questions could be assigned a score.[27]

Data Collection—To monitor the impact of the Orientation during its initial evaluation, proxy measures for attrition were tracked monthly. These included the percentages of scheduled encounters completed for all visit types per month. Balancing measures specific to decision-making regarding enrollment included the percentage of no-shows (i.e. failure to present for a scheduled encounter) per month to behavioral medicine and nutrition visits.

To determine the overall impact of the Orientation, a baseline group (Pre-Orientation Group) was identified at the start of the project and was comprised of all newly referred patients to the OWL Program during the same initial 6-month interval in the year prior to the OWL Orientation (May 1 – October 31, 2011). The pre-specified outcome measure was program attrition defined as no further encounters in the OWL Program up to 15-months following the initial encounter. A clinical encounter was defined as an OWL Program visit with an individual provider of any discipline. Given that the OWL Program did not have a treatment course with a defined completion date and follow-up visits generally occurred every three months, we chose a time horizon of up to 15 months to ensure that we captured families intending a 12-month follow up but who might have fallen just outside this timeframe and would have therefore been misclassified as having dropped out.

Patient characteristics including age, sex, race, language, BMI, BMI z-score, and insurance status were obtained from the electronic health record. All patients were included regardless of weight classification status to reflect the distribution of the referred population. Statistical Analyses

Descriptive statistics of patients in the Orientation and Pre-Orientation Groups were presented as proportions, medians and interquartile ranges (IQR) (25^{th} and 75^{th}), or means and standard deviation (SD), as appropriate. The characteristics of patients in the two groups were compared using Chi-square, Student's t-tests, and Wilcoxon Rank Sum where appropriate.

Run charts, a quality improvement tool used to graphically display data over time, were used to evaluate visit performance variables during implementation of the Orientation, including

visit completion and no-show, and were analyzed for nonrandom signals of change.[28] For these analyses, performance over the prior 12 months was felt to represent a reasonable baseline. Therefore, baseline performance for run charts included OWL Program attendance rates from May 2011 - April 2012.

A Kaplan–Meier survival curve was used to compare attrition between the Orientation and Pre-Orientation Groups within 15 months of starting the OWL Program. Cox proportional hazards regression modelling was then used to evaluate the impact of patient characteristics. Those characteristics deemed clinically important and/or associated with attrition (at $P \leq 0.20$) in bivariate analyses were included in the final multivariable Cox proportional hazards regression model. Statistical significance was defined as a $p<0.05$. All statistical analyses were performed with SAS version 9.3 (SAS Institute, Inc., Cary, NC).

RESULTS

Patient Characteristics

Descriptive statistics for the Orientation (N = 237) and the Pre-Orientation (N = 302) Groups are presented in Table 2. There were no significant differences in patient age, BMI, or BMI z-score at the first visit. For both groups, a greater proportion of patients were female. However, significant differences between the two groups were observed with respect to race, primary language, and insurance.

Behavioral and Mental Health Screening

The detailed results of the psychosocial stressor, disordered eating, and behavioral and mental health screening measures are presented in detail elsewhere.[22,23] Notably, PS were present in almost half of PACs, and nearly 11% of patients screened positive for urgent mental health concerns.[23] Nine patients screened positive for binge eating disorder by parent-proxy report and two by self-report.[22]

Ongoing Program Evaluation

Administration of the feedback survey commenced at the start of the Orientation on May 1, 2012 and was retired on August 1, 2012 due to consistently high ratings for the importance of information from all components of the Orientation in helping families make a decision about enrollment (data not shown). Eighty-six of 134 caregivers (64%) completed the survey. Of these, 72 (84%) enrolled, 1 (1%) declined, 7 (8%) requested more time to consider, and 6 (7%) did not indicate a decision. Caregivers were most confident in their abilities to ask questions about OWL (97% “a lot confident”) and to ask for advice (96% “a lot confident”). They were least confident in their abilities to handle unwanted pressure about enrolling (87% “a lot confident”) and to get the facts about the expectations placed on their family by enrolling (81% “a lot confident”). Overall, caregivers (N=70 with complete responses) felt extremely confident in their decision to enroll [median 100 (IQR 95, 100)].

Encounter Completion Rates and Balancing Measures

Analyses of run chart data indicated that the Orientation had no impact on the monthly no-show rates for new behavioral medicine and nutrition visits. Completion rates for new

nutrition visits had demonstrated a significant downward trend just prior to the implementation of the Orientation. However, following Orientation there was a sustained shift downward in the proportion of completed new nutrition visits (Figure 1). We observed an expected decrease in completion rates for new behavioral medicine visits due to lack of appointments for one month after the start of the Orientation (Figure S1). Visit completion rates then returned to levels observed prior to the start of the Orientation (Figure S1). There was no observed change in the completion rate for new medical visits (Figure S2) that were required as part of the Orientation. Given the lack of observed improvement in no-show rates and potentially negative impact on visit completion rates as well as the resource intensive nature of the program, the Orientation was made optional in December 2012 and then discontinued in January 2013. Encounter completion data continued to be collected for analysis of the pre-specified outcome measure (15-month attrition).

Orientation and Pre-Orientation Group Analyses

Patients in the Orientation and Pre-Orientation Groups had a similar number of clinical encounters as well as BMI outcomes (Table 3). A greater proportion of patients in the Orientation Group discontinued OWL within 15-months when compared to the baseline Pre-Orientation Group (89% vs. 79%; p=0.002). The Kaplan-Meier survival curve displaying the differential patterns of attrition between the Pre-Orientation and Orientation Groups over time is presented in Figure 2. Both groups demonstrated the most substantial attrition relatively soon after weight management initiation. However, separation between the groups occurred early with the median time spent in the OWL Program for the Orientation Group being 2.0 months vs. 2.9 months for the Pre-Orientation Group (p=0.004).

As shown in Table 4, patients in the Orientation Group had a 23% increased odds of attrition within 15 months compared to patients in the Pre-Orientation Group (aHR 1.23; 95% CI 1.01, 1.51). Patient age, sex, race, language, insurance, and BMI z-score at the first visit were not significant predictors of attrition. However, adjusted for all other characteristics, an increase in BMI z-score of 1 unit increased the odds of attrition within 15 months by approximately 5-fold (aHR 5.24; 95% CI 2.95, 9.3).

DISCUSSION

Overall, we found that the patients participating in a comprehensive Orientation in a pediatric weight management program had increased odds of attrition within 15 months compared to a baseline Pre-orientation group. In the short-term, the OWL Program Orientation was discontinued after 8 months of implementation as there was no initial evidence to support a reduction in no-show rates and some evidence suggesting a negative impact on completion rates for new nutrition visits. Since one of the aims of the Orientation was to address families' expectations about program participation, one interpretation of our primary findings may be that the Orientation achieved more effective communication with families about the program's offerings and expected commitments. Consequently, PACs may have been better informed and more self-confident in their decision to discontinue the OWL Program sooner if their own expectations and goals were not being met. This conclusion is supported by the Kaplan-Meier survival analysis, which shows the most significant decline

in program participation immediately following the initial visits in the Orientation Group and shorter median time to attrition compared to the Pre-Orientation Group. However, other programmatic and temporal differences between the Orientation and Pre-Orientation Groups must also be considered.

Some studies have suggested that mismatched expectations are a common reason for families to discontinue care in pediatric weight management programs.[4,8,10,29,30] While clarifying program content at the start of a program, as was done in our Orientation, is an initial key step, it is not sufficient to keep families engaged in a weight management program. Families likely need a variety of options to meet their needs in content, intensity, and format.[10,29,31] In one study that did demonstrate a successful use of an orientation to reduce attrition for pediatric weight management, the patients were limited to low income minority adolescents.[13] Use of tools to facilitate assessment of family's interests and goals for pediatric weight management will inform whether this match does indeed help lead to ongoing engagement.

Our findings also indicated that an increase in BMI z-score was a predictor of attrition within 15 months. If weight loss was among the families' goals, it might follow that an increase in body mass index could promote attrition. This highlights the importance of having clinicians work with families to set realistic and healthy expectations for weight loss.[32] Although individual clinicians typically discuss weight loss expectations with newly referred families, this was not a standardized part of the Orientation. Given this result, we will consider reinforcing and standardizing the messaging about realistic weight loss expectations in future iterations.

Although there were differences in race and insurance type between the Orientation and Pre-Orientation groups and some studies have implicated race/ethnicity and insurance in patterns of attrition,[1-6] these patterns did not emerge in our analyses. Similar to other work, we did not find the age at program initiation to be a predictor of attrition.[1-6] Nevertheless, the variability in these findings across settings suggests that these sociodemographic factors likely remain important to consider in the development and implementation of local interventions so that the highest risk groups are appropriately identified. Similarly, behavioral and mental health problems have been associated with attrition from pediatric weight management[2,33] and should remain important considerations in these efforts.

The strengths of our project include the multifaceted nature of the QI intervention, the relatively large sample size, and the systematic collection of data. However, the project has several limitations. For practical purposes, we were unable to include formal diagnostic psychological interviews in the Orientation, and therefore, we are not able to examine the effect of behavioral and mental health diagnoses on attrition. Similarly, although we tracked the provision of resources, we did not routinely follow-up with families to determine if their needs had been sufficiently met or whether additional resources were required. Perhaps more active assistance to address significant resource limitations would have facilitated program attendance and resulted in reduced attrition. Further limitations included the use of a historical comparison group and potentially unaccounted for confounders that could have led to attrition. Additionally, the implementation of the Orientation led to capacity and

scheduling constraints, which may have contributed to the difference in the number of patients in the Orientation Group as compared to the Pre-Orientation Group. Lastly, the Orientation was resource intensive requiring both additional personnel and the provision of non-billable services supported by philanthropy.

In conclusion, our QI initiative did not reduce attrition as was its primary goal. However, positive byproducts for our program included renewed focus on program content and curriculum development as was required for the Orientation, standardization of treatment within our program's disciplines for the Orientation, recognition of the importance of consistent program messaging, initiation of discussion regarding the potential value of different program tracks of varying intensity, and development of a collective understanding of the importance of embedding ongoing retention strategies into the program. Moreover, staff and providers, who had no previous experience with QI were actively engaged in program planning and evaluation. We believe that there is inherent value in addressing expectations at initiation of paediatric weight management to help empower families to make informed decisions about their appropriateness, match and readiness for a program's offerings; however, if families are to be successful in the long term, efforts may also need to be directed at embedding retention strategies, including appropriate weight management goals, into the treatment phase of the program.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

Dr. Zenlea conceptualized and designed the quality improvement project, designed the data collection instruments, was responsible for oversight of data collection, contributed to the analytic design, and drafted the initial manuscript. Ms. Milliren conceptualized the analytic design, and performed the statistical analyses. Ms. Herel contributed to the design of the quality improvement project, and participated in ongoing program evaluation and data collection. Dr. Burton contributed to the design of the quality improvement project and designed the behavioral and mental health screening. Ms. Askins contributed to the design of the quality improvement project and design of the data collection instruments and coordinated and supervised data collection. Dr. Ludwig contributed to the design of the quality improvement project. Dr. Rhodes conceptualized and designed the quality improvement project, and contributed to the analytic design. All authors critically reviewed the manuscript and approved the final manuscript as submitted. The authors thank Gathi Abraham, MD, MPH for his assistance with database design and Joyceanna Fidalgo MEd and Patrick McCabe, LICSW, MBA for administrative support. Portions of this project were presented in part at the Pediatric Academic Societies' 2013 Annual Meeting, May 4-7, 2013, Washington D.C.

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Abbreviations

aHR	adjusted Hazard ratio
BCH	Boston Children's Hospital

BMI	Body Mass Index
CI	confidence intervals
IQR	interquartile range
OWL	Optimal Weight for Life
PACs	patients and adult caregivers
PS	psychosocial stressors
SDQ-P	Strengths and Difficulties Questionnaire Parent Proxy Version
QI	quality improvement
SDQ-S	Strengths and Difficulties Questionnaire Self-Report Version

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What is already known about this subject.

- Attrition from pediatric weight management programs is high.
- Family and demographic factors, program logistics and content, and behavioral and mental health problems in both caregivers and patients may contribute to attrition.
- An orientation session has the potential to address these issues.

What this study adds.

- An orientation for new patients did not reduce attrition within 15 months.
- An increase in body mass index z-score was associated with greater odds of attrition.
- Ongoing retention strategies should be embedded into the treatment phase of the program.

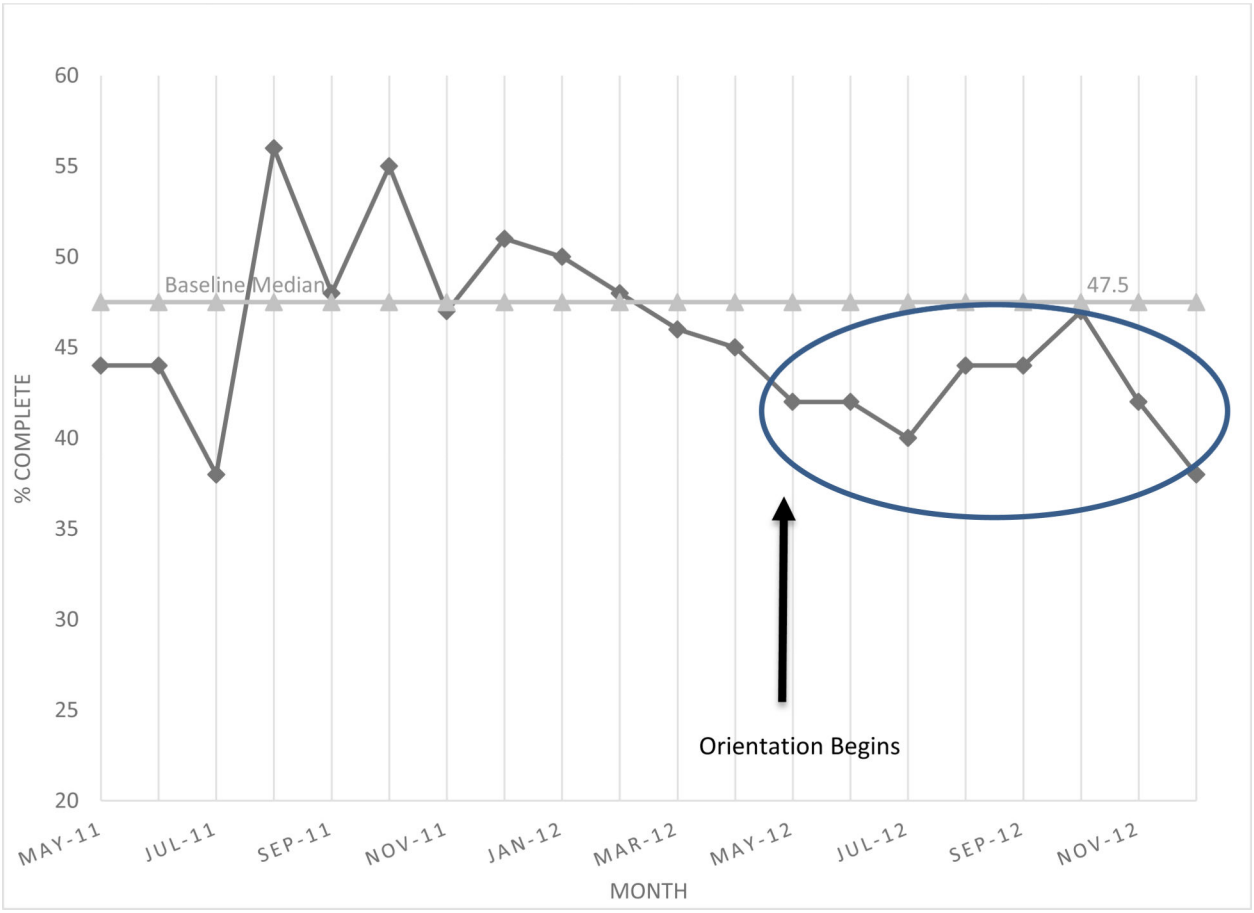

Figure 1.
New nutrition visit completion over time.

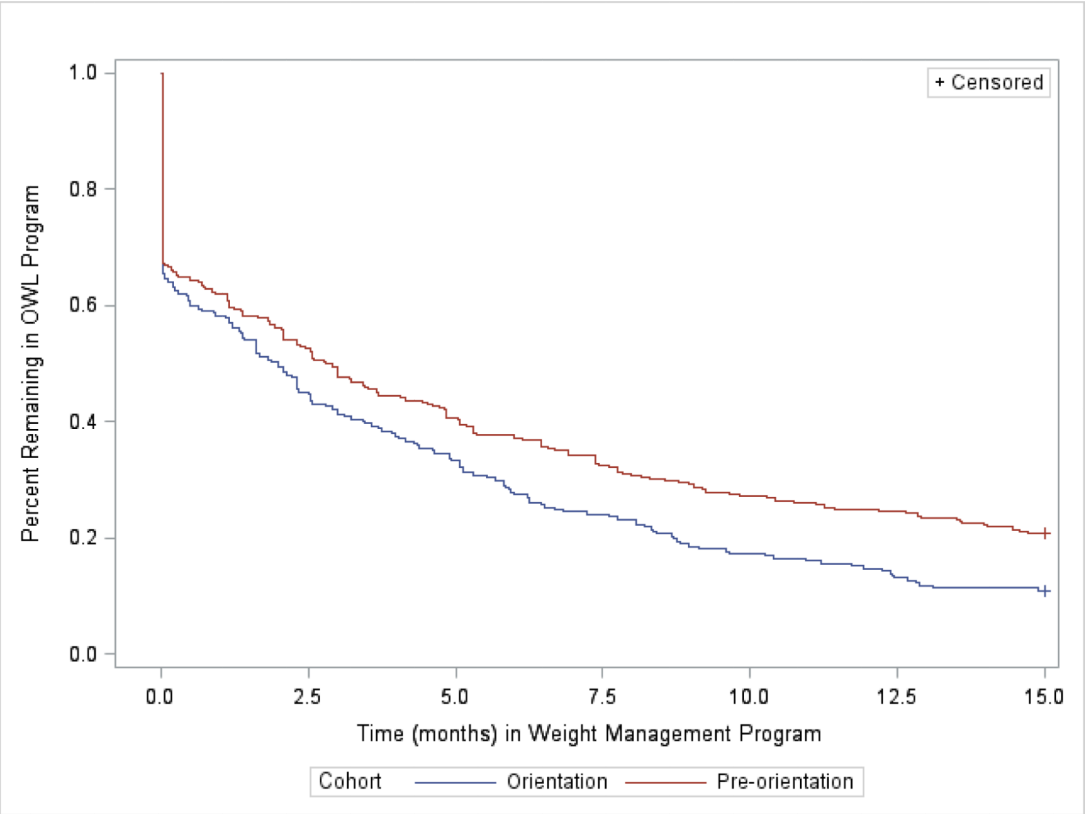

Figure 2.
Kaplan-Meier survival curve: Comparison of Attrition in Pre-Orientation and Orientation Group.

Table 1

Behavioral and Mental Health Screening

	Patient Age			Parent/Caregiver
Tool	**4 – 10 years**	**11 – 17 years**	**18 years or older**	
SDQ-S*		X		
SDQ-P†	X	X		
Urgent Mental Health Problems Self-Report‡		X	X	
Urgent Mental Health Problems Parent-Proxy §	X	X	X	
CES-D‖			X	X
Psychosocial Stressors-Self Report			X	
Psychosocial Stressors-Parent (Self and Proxy)	X	X	X	
QEWP-P††	X	X	X	
QEWP-A‡‡		X	X	

Adapted from Table 1 in Zenlea et al.[23]

An “X” indicates completion by the group indicated.

*Strengths and Difficulties Questionnaire Self-Report Version[18]

†Strengths and Difficulties Questionnaire Parent-Proxy Version[19]

‡Assessment of suicidal ideation, homicidal ideation and self-injurious behaviors, Self-Report

§Assessment of suicidal ideation, homicidal ideation and self-injurious behaviors, Parent-Proxy Report

‖Center for Epidemiologic Studies Depression Scale[20]

††Questionnaire on Eating and Weight Patterns Parent Version (completed by caregivers of youth ages 6 – 18 years)[21]

‡‡Questionnaire on Eating and Weight Patterns Parent Adolescent Version[21]

Table 2

Characteristics of Pre-Orientation and Orientation Groups

	n (%) or Mean (SD)		
Variable	**Pre-Orientation (N = 302)**	**Orientation (N = 237)**	**p-value**
Age at 1st visit (years)	11.2 (3.5)	11.3 (3.8)	0.63
BMI (kg/m^2) at 1st visit	31.3 (7.0) *	31.4 (6.9)	0.86
BMI z-score at 1st visit	2.41 (0.56) *	2.36 (0.47)	0.35
Female	180 (60%)	147 (62%)	0.57
Race			<0.001
White	149 (49%)	97 (41%)	
Black	36 (12%)	64 (27%)	
Other	70 (23%)	34 (14%)	
Unknown	47 (16%)	42 (18%)	
Primary Language			0.017
English	256 (85%)	219 (92%)	
Spanish	36 (12%)	12 (5%)	
Other	10 (3%)	6 (3%)	
Insurance			0.005
Private †	193 (64%)	123 (52%)	
Public ‡	109 (36%)	114 (48%)	

* n = 293 due to missing

† Coverage by a health plan provided through an employer or union or purchased by an individual from a private health insurance company

‡ Plans funded by governments at the federal, state, or local level e.g. Medicaid

Table 3

Attrition and Clinical Outcomes of Pre-Orientation and Orientation Groups

	n (%), Mean (SD), or Median (25th, 75th IQR)		
Variable	**Pre-Orientation (N = 302)**	**Orientation (N = 237)**	**p-value**
BMI (kg/m^2) at last visit	31.6 (7.2)†	31.7 (7.0)‡	0.88
BMI z-score at last visit	2.34 (0.54)†	2.30 (0.46)‡	0.34
Change in BMI	0.29 (1.86)**	0.25 (2.1)‡	0.83
Change in BMI z-score	−0.06 (0.17)	−0.06 (0.15)	0.54
Total Encounters *	4.0 (2.0, 8.0)	4.0 (2.0, 6.0)	0.71
Attrition at 15-months	239 (79%)	211 (89%)	0.002
Duration in Program (mo.)	2.9 (0.03, 11.4)	2.0 (0.03, 6.7)	0.004

* Number of visits to any provider within the OWL Program

† n= 298 due to missing

‡ n = 211 due to missing

** n = 293 due to missing

Table 4

Adjusted Hazard Ratios for Attrition*

Characteristic	Adjusted Hazard Ratio (95% CI)	p-value
Group		
Orientation	1.23 (1.01, 1.51)	0.04
Pre-Orientation	1.00 (Ref)	
Age at 1st Visit	0.99 (0.96, 1.02)	0.58
Female	1.09 (0.89, 1.34)	0.41
Race		0.57
White	1.00 (Ref)	
Black	0.89 (0.67, 1.17)	
Other	1.01 (0.74, 1.37)	
Unknown	1.13 (0.85, 1.5)	
Primary Language		0.20
English	1.00 (Ref)	
Spanish	0.73 (0.47, 1.12)	
Other	1.28 (0.73, 2.23)	
Insurance		0.65
Private	1.00 (Ref)	
Public	0.95 (0.77, 1.18)	
BMI z-score at 1st visit	1.11 (0.88, 1.41)	0.38
Change in BMI z-score	5.24 (2.95, 9.3)	<0.001

*N = 504 due to missing