

Research Article

Pediatric Obesity in Primary Care: Examining Patient Access Across Service Delivery Models

Teryn Bruni

Department of Pediatrics, Michigan Medicine, 1540 E. Hospital Drive, SPC 5718, Ann Arbor, MI 48109, USA

Bethany Gaffka

Department of Pediatrics, Michigan Medicine, 1540 E. Hospital Drive, SPC 5718, Ann Arbor, MI 48109, USA

ABSTRACT

Background: Appointment failure is a major barrier to the delivery of pediatric weight management treatment. The purpose of this pilot study was to compare appointment follow-through data and associated variables (appointment wait time and distance to travel to clinic) across two weight management service delivery models within the same health system. Changes in weight and BMI z-score were also calculated and compared across each setting.

Method: A quasi-experimental, matched comparison design was used to compare appointment follow-through, initial appointment wait time, distance to travel to clinic, and changes in weight and BMI z-score across the two treatment settings. Demographic, anthropometric, and appointment data were collected over a six-month interval. Data were obtained through retrospective chart review using the institutional electronic health record (EHR) scheduling report function through Epic Systems software (Epic, Verona, WI).

Results: Participants (N=30), ages 5 through 18 were scheduled in two pediatric weight management clinics. Independent sample t-tests were performed to examine mean differences in appointment follow-through, wait-time, and distance travelled across each clinic (n=15). Significantly fewer appointment failures (no shows and cancellations combined) were documented within the primary care setting. Additionally, patients waited significantly less time for their initial appointment and travelled a significantly shorter distance to clinic. No significant differences were found in appointment completion and weight metrics across the two clinics.

Conclusion: Limitations of this study include a small sample size and lack of randomization between groups. Further research is needed to measure the impact of integrated models of care on pediatric obesity treatment.

Keywords: Appointment follow-through; pediatric obesity; Integrated behavioral health; Primary care; Psychology.

Abbreviations: EHR: Electronic Health Record; BMI: Body Mass Index.

Introduction

Enterococci Childhood overweight and obesity is a significant and pervasive problem among the pediatric population across the United States. The American Academy of Pediatrics and the American Medical Association estimate one third of all children are considered overweight or obese [1,2]. Increases in childhood obesity and overweight over the last several decades can be attributed to poor dietary habits among children and families, along with increases in sedentary activity (i.e., engagement in screen time) [2]. Potential long-term consequences of childhood overweight include increased risk for cardiovascular disease, diabetes, and obesity in adulthood [3,4]. In addition, obesity and overweight in childhood is associated with increased reports of depression and anxiety, particularly among teens [5,6]. Fortunately, well-researched and effective weight management strategies exist to help children and families achieve healthy weight. A recent meta-analysis found comprehensive, family lifestyle behavioral interventions that address dietary factors, physical activity, and behavior of the entire family have the greatest impact on childhood obesity [7-10].

Attrition and follow-through

A major barrier to the effective delivery of pediatric weight management is lack of appointment follow-through. It has been reported that close to one third of patients do not show to their initial appointment [11]. Program attrition rates as high as 83% have been estimated among patients who initiate treatment, with the highest dropout occurring among low-income populations [12]. Scheduling problems, logistical concerns (i.e., distance to travel to clinic and parking), and discrepant patient expectations on the focus and duration of treatment are common barriers identified by parents and patients [11,13,14]. Interestingly, despite discontinuation of treatment, few families (<7%) reported the primary reason for discontinuing treatment was because they no longer required help or support with their weight loss efforts [14]. This suggests despite the continuing need for treatment, patients and families are disengaging from treatment prematurely.

Weight management in primary care

Most patients receive weight management counseling through their primary care provider [15]. This is conducted either in the context of routine health maintenance exam or through referrals to onsite dietitians or nutrition specialists [15-18]. Although primary care physicians will regularly engage in some degree of weight management counseling, most feel they do not have the time nor the skills to make meaningful treatment gains among patients with overweight and obesity [15]. Recently there has been a growing emphasis on the provision of integrated behavioral health services within pediatric primary care. Such integrated models increase access to mental healthcare, result in positive patient mental health outcomes, and increase pediatrician satisfaction [19]. Integrated primary care also saves the pediatrician time and removes the burden of providing behavioral health services in the context of medical appointments [20-22]. Given the prevalence of pediatric obesity in primary care and the recent movement toward integrated healthcare delivery, an integrated primary care service delivery model appears to be well-suited for pediatric weight management. Weight management delivered in the context of primary care could address some of the logistical barriers identified by patients, including travel time, transportation, and parking [12,17]. It appears that no published studies have examined the use of this model specifically in treating pediatric obesity.

The purpose of the following pilot study was to compare appointment follow-through data and associated variables including appointment wait time and distance to travel to clinic across two weight management service delivery models, housed within the same health system. Changes in weight and BMI z-score were also calculated and compared across each setting. The service delivery models included a multidisciplinary outpatient model (hospital setting) and a co-located integrated primary care model (multidisciplinary model delivered in primary care setting). The two settings implemented the same treatment approach, delivered by the same two psychology providers. It is hypothesized that the primary care setting would provide better access to care and thereby increase appointment follow-through and shorten scheduling wait times.

Methods

A quasi-experimental, matched comparison design was used to compare appointment follow-through, initial appointment wait time, distance to travel to clinic, and changes in weight and BMI z-score across the two treatment settings. Demographic, anthropometric, and appointment data were collected over a six-month interval. Data were obtained through retrospective chart review using the institutional electronic health record (EHR) scheduling report function through Epic Systems software (Epic, Verona, WI).

Participants and setting

Participants included regularly scheduled patients who were referred to one of two pediatric weight management clinics within a Mid-Western medical system. Half the patients were seen in within an affiliated primary care clinic housed off-site from the medical campus. The remaining participants were seen in the hospital outpatient clinic that was located on the main hospital campus. Across both settings, participants were connected to the program by a referring provider (typically a primary care physician or specialty provider) and were assigned one of two clinicians based on provider availability. To obtain the final sample of participants, the total number of participants seen within a six-month period across the primary care setting was matched to the sample of participants in the hospital outpatient setting. Participants were matched on age, gender, and initial BMI z-score. A total of 30 participants were included, with 15 in each group.

Study variables

The independent variable examined in this study was treatment setting. The type of treatment provided was the same across each setting. Both programs offered individualized family-based behavioral weight management services with psychology and nutrition appointments available each visit. Services were provided by two psychologists and two registered dietitians. Both psychologists saw patients across both settings, however registered dietitians were specific to each clinic. Patients in the primary care sample were typically referred by their primary care provider, who was housed within the clinic they were to also receive weight management treatment. Referring providers in the primary care setting could access all patient records and view progress notes readily. They could engage in face-to-face consultation regarding patient care when providers were present in the primary care clinic and could communicate easily through the EHR provider messaging system. The hospital sample included referrals from within and outside the medical system, by both specialists and primary care providers. If patients were referred from outside health systems, records were not easily accessible by the referring provider and releases were required to communicate directly with outside providers regarding patient care. Logistically, the primary care setting was more easily accessible and had free parking that was readily available. The hospital outpatient clinic was located in an urban center, where patients paid a fee to park and spaces were sometimes limited.

Appointment follow-through: Data on appointment follow-through were extracted using scheduling reports generated by the institutional electronic charting system. The number of appointment failures (number of patient no-shows and cancellations combined), no-shows, cancellations, and completed appointments were calculated for each patient over a six-month period. Completed appointments were the number of appointments scheduled and attended. Cancellations were considered any appointment in which the patient attempted to contact the clinic any time prior to the appointment time. A no-show was recorded if a call was never made to cancel the appointment. Appointment failures were a combination of cancelations and no-shows initiated by the patient.

Wait time: Data on wait time was also extracted using the same scheduling report generated for examining appointment follow-through. Information was provided in the report on the date in which the appointment was initially made (when the patient called or was called to schedule) and the date of the initial appointment. The duration was presented in days between the time the appointment was made and when the first opening was available.

Distance to travel: Distance to travel to each clinic was estimated using the most up to date zip code documented in each patient's medical record. Online software was then used to calculate the estimated distance from the patient's home zip code to the zip code of each respective clinic location (zip-codes.com). Distance was reported in terms driving miles.

Weight and BMI z-score change: For each patient their weight, height, BMI, and BMI z-score were calculated at their first intake appointment. As a standard of care, weight and height measurements are taken at each subsequent appointment. Weight and BMI z-score change was calculated for each patient by subtracting their initial measurements by their final appointment measurement that fell within the six-month study period. Weight and BMI z-score changes were then compared across settings.

Procedure

Approval by institutional ethics review board was obtained prior to data collection efforts associated with this study. A six-month study period was selected and demographic data was extracted from the medical record upon each patient's initial visit. At the end of the study period, participants were matched based on key demographic variables and a report was generated using the institutional electronic medical record system, which allowed for examination of the above study variables. Cancellations made in error or cancellations by providers were excluded in final appointment count.

Analysis

Prior to running analyses, groups were matched using statistical software (IBM SPSS statistics 24) on key demographic variables. These variables included gender, age, and initial BMI z-score. Once groups were defined, remaining demographic variables (i.e., race, ethnicity, and insurance type) were statistically compared using a Chi-Square test to ensure equal groups. Independent sample t-tests were conducted to compare appointment follow-through data, wait time, distance to travel, and weight change across the two groups. Due to the sample size and efforts to match groups on key variables, a multi-factorial design was not used.

Results

Upon completion of matching procedure, 30 total participants were included in the final sample, with 15 participants in each group. Demographics data for the total and group samples are presented in Table 1. The 15 participants in each group were compared across unmatched variables, including race, ethnicity, and insurance type. No significant differences were found between the two groups. The average age across all participants was 148.8 months of age and the majority of patients were female (63.3%). Across the total sample 46.7% of patients were publicly insured. Most patients were Caucasian (60%) and non-Hispanic (83.3%).

Table 1: Patient Demographic Variables: Total Sample and Matched Comparison Data.

	Total (N= 30)	NHC (n=15)	MH (n=15)
Age (months)	148.8 (43.25)	145.93 (45.77)	151.67 (41.98)
Gender (% females)	63.3%	66.7%	60%
Race[a]			
Caucasian	60%	60%	60%
African American	20%	26.7%	13.3%
Asian	6.7%	13.3%	0%
Other	13.3%	0%	26.7%
Non-disclosed	0%	0%	0%
Ethnicity[b]			
Hispanic	16.7%	6.7%	26.7%
Non-Hispanic	83.3%	93.3%	73.3%
Insurance (% Public Pay)[c]	46.7%	40%	53.3%

Note: Groups did not differ significantly on unmatched demographic variables [abc]. Standard deviation of average patient age appears in the parentheses.

Appointment follow through, initial appointment wait time, and distance traveled to clinic are reported in Table 2. There was a significant difference between the primary care group (M=1.00, SD=1.07) and the hospital outpatient group (M=2.07, SD=1.49) on the number of appointment failures (no-shows and cancellations) that occurred during the six-month study period, t (28)=2.26, p=.03, d=0.83. Average wait time in days from the scheduling date to initial appointment

date was significantly less in the primary care group (M=16.40, SD=7.24) compared to the hospital outpatient group (M= 83.67, SD=50.03), t (28) = 5.15, p=0.000, d=1.88. Distance to travel was also significantly less for the patients in the primary care sample (M=13.24 SD=8.96) compared to the hospital outpatient group (M=50.9, SD=41.75), t (28) = 3.42, p=0.006, d=1.25. When no-shows and cancellations were examined in isolation, no significant differences were found. Number of total completed appointments were not significantly different between the two groups. Finally, no differences were found in the average total weight change in kilograms between the two groups or in changes in BMI z-score. Weight and BMI Z-SCORE data are presented in Table 3.

Table 2: Appointment Data, Wait time, and Distance to Travel Data Comparisons Across Treatment Settings.

	PC (n=15)	HO (n=15)	t	df	d
Completed Appointments	2.8 (3.33)	3.6 (6.80)	0.36	28	0.15
Patient Cancelations	0.80 (1.04)	1.6 (1.72)	1.55	28	0.56
Patient No Show	0.33 (0.62)	.47 (0.52)	0.64	28	0.24
Failed Appointments	1.0 (1.06)	2.07 (1.48)	2.26*	28	0.83
Time to Schedule	16.4 (7.2)	83.67 (50.03)	5.15***	28	1.88
Distance to travel	13.24 (8.96)	50.9 (41.75)	3.42**	28	1.25

Note. N=30. PC= Primary Care group, HO= Hospital Outpatient group. * = p<.05, ** = p<.01, *** = p<.001. Standard deviations appear in parentheses.

Table 3: Comparisons of Weight Change and Z-BMI Changes from Initial Appointment.

	PC (n=15)	HO (n=15)	t	df	d
Weight (kg)	-0.09 (1.51)	0.81 (1.63)	1.57	28	0.57
Z-BMI	.00 (.03423)	-0.44 (.255)	1.17	28	0.43

Discussion

This study examined how treatment setting impacts appointment follow-through, wait time, distance to travel, and weight outcomes among patients participating in a family-based behavioral weight management program. Scheduling data, including appointment failure, no-shows, cancellations, appointment completion, and initial appointment wait time were extracted using reports generated through electronic health records (EHR). Patient zip codes were obtained from the medical record to calculate distance to travel to each clinic. Changes in weight and BMI z-score were also calculated over the six-month study period and compared across the two treatment settings.

Attrition has been a widely studied topic within both the pediatric weight management literature [11,23] and the general healthcare literature [24-26]. Studies often focus on the associated costs of appointment failure including professional costs, disruption of workflow [23], financial costs [23-25,27], and ultimately poorer patient outcomes [23]. Factors found to impact appointment attendance include patient satisfaction [24], clinic type (specialty care versus primary care) [25], wait time to initial appointment [24-26], and distance to travel to the appointment [26]. Consistent with these findings, patients in the primary care sample waited significantly less time between scheduling and attending their first appointment and they were required to travel a shorter distance to the clinic. Additionally, previous research suggests that primary care settings have been found to have better appointment follow-through than specialty clinics [25,28]. This has been attributed to the convenience and familiarity of the primary care environment, along with the established relationship patients have with primary care providers and the feeling of membership associated with primary care settings [25].

The above results are also consistent with previous research evaluating outcomes of integrated primary care. Integrated models increase patient follow-through with physician referrals for behavioral health treatment and increase patient access to care [19,29]. Integrated behavioral health also results in improved and more regular collaboration between behavioral health providers and physicians. Such increased coordination results in better preventative care, enhancing patient long-term mental and physical health [30]. Integrated primary care programs are also more convenient and less stigmatizing than traditional outpatient services [20].

In the context of weight management service provision, treatment that is integrated into the primary care setting may also be advantageous due to the long-term nature of treatment. It has been found that effective treatment programs typically range from 15-26 h of direct treatment [11,23,31]. This diverges however from traditional integrated primary care treatment models, which recommend more brief and focused treatment [21]. The benefit of brief treatment warrants further study in the context of weight management service provision. Because behaviors related to healthy weight are difficult to change, short-term treatment may not be appropriate for more acute cases of overweight and obesity. That being said, the long-term, ongoing interventions typically provided by specialty clinics may be more effective when provided within an environment a patient is likely to visit on a regular basis.

The increased coordination with medical providers within a familiar setting could provide additional accountability for the achievement and maintenance of lifestyle changes and healthy weight goals.

Additionally, the above findings highlight a possible link between initial appointment attendance and scheduling wait time. This is an important finding, particularly as it may relate to patient motivation. If the length between referral (discussing with a pediatrician at a well-child visit) and the actual new patient appointment being scheduled is too long, it is possible that other things in a patient's or family's life get prioritized, and motivation to pursue treatment decreases over time. Capturing families when they are most motivated to engage in weight management efforts is critical. Following a well-child visit with a trusted medical provider, and likely a discussion about weight concerns and impact of continued weight gain on health, families might be most motivated to make changes and to see a specialist for additional assistance. However, if a family schedules a new patient appointment in a weight management clinic, and then has to wait several months to be seen, it is possible that motivation has lowered and they do not prioritize keeping the appointment. More research is needed on the link between motivation to change and appointment timing. Although motivation was not measured in this study, the above findings point to an important area of future study related to the impact of treatment setting and wait time on patient motivation to follow-through with referrals to weight management treatment.

Finally, this study adds to the adherence literature as it highlights some possible important factors associated with appointment follow-through among patients and families referred for weight management treatment. Treatment setting appears to be an influential variable, which impacted appointment follow-through in this small pilot sample. It is possible that decreased wait time to schedule and convenience of the primary care setting may address important barriers to treatment, facilitating treatment initiation and maintenance. Attending the initial appointment is a critical first step in treatment engagement. If providing treatment within the primary care setting increases the likelihood patients will engage in treatment, it could have cascading effects on continued attendance and engagement in treatment. More research is needed to examine the relationship between treatment setting, initial appointment attendance, and engagement in treatment; however, this pilot study provides some preliminary data to suggest that treatment within the primary care setting may have an influence on treatment engagement among weight management patients and families.

Limitations

Several limitations should be considered when interpreting the results of this study. First, the sample size was small. Only fifteen patients were included in each group, resulting in low statistical power. The data were also retrospective in nature, which limited experimental control and precluded randomization. Limitations were also present in the type of data available through scheduling reports. For example, reasons for lengthy wait-times for each patient could not be isolated. Therefore, it is possible that appointment timing was initiated by patient, rather than clinic variables (e.g., lack of availability of earlier appointments times). Additionally, the study time-frame may have impacted investigators ability to detect changes in weight and BMI. The duration of treatment differed across patients depending on when they initiated treatment. Change in weight is typically slow, despite better use of skills and healthier lifestyle changes [17]. Treatment effects tend to improve with more intensive and long-term treatment approaches. Finally, due to the applied nature of this study, idiosyncratic differences in style and approach to treatment delivery between providers was not controlled, particularly with nutrition services. Patients in primary care received nutrition counseling from a different dietitian than patients who were in the hospital outpatient group.

Future Research

The above pilot study provides some initial data to support further research examining the impact of treatment setting and level of integration on appointment follow-through among pediatric weight management patients. Further research on the delivery of pediatric weight management in primary care is needed to better understand the factors impacting appointment attendance and patient outcomes. Patient motivation to change and the impact of initial appointment attendance on future treatment engagement are important areas of future study. Additionally, with increased control and randomization, the specific factors unique to the primary care setting can be more carefully examined, such as collaboration between providers and patient perspectives of their own accountability within different treatment settings. It would also be important to examine different models of integrated primary care. In the current study a co-location model of integrated care was examined; however, more integrated models also exist and warrant further study among pediatric weight management patients. Finally, more long-term examinations are likely needed in order to capture differences in weight outcomes over time.

References

1. Committee on Nutrition. Prevention of pediatric overweight and obesity. Pediatrics 2007; 119: 405-405.
2. Thompson AE. Childhood Obesity. JAMA 2015; 314: 850.
3. Juonala M, Magnussen CG, Berenson GS, Alison V, Trudy LB, et al. Childhood adiposity, adult adiposity, and cardiovascular risk factors. N Engl J Med 2011; 365: 1876-1885.
4. Reilly JJ, Kelly J. Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: systematic review. Int J Obes 2011; 35: 891-898.
5. McElroy SL, Kotwal R, Malhotra S, Nelson EB, Keck PE, et al. Are mood disorders and obesity related? A

review for the mental health professional. J Clin Psychiatry 2004; 65: 634-651.

6. Puder JJ, Munsch S. Psychological correlates of childhood obesity. Int J Obes 2010; 34: 37-43.
7. Janicke DM, Steele RG, Gayes LA, Lim CS, Clifford LM, et al. Systematic review and meta-analysis of comprehensive behavioral family lifestyle interventions addressing pediatric obesity. J Pediatr Psychol 2014; 39: 809-825.
8. Aragona J, Cassady J, Drabman RS. Treating overweight children through parental training and contingency contracting. J Appl Behav Anal 1975; 8: 269-278.
9. Germann JN, Kirschenbaum DS, Rich BH. Child and parental self-monitoring as determinants of success in the treatment of morbid obesity in low-income minority children. J Pediatr Psychol 2006; 32: 111-121.
10. Robinson TN. Behavioral treatment of childhood and adolescent obesity. Int J Obes Relat Metab Disord 1999; 23: 52-53.
11. Hampl S, Paves H, Laubscher K, Eneli I. Patient engagement and attrition in pediatric obesity clinics and programs: Results and recommendations. Pediatrics 2011; 128: 59-64.
12. Dhaliwal J, Nosworthy NMI, Holt NL, Zwaigenbaum L, Avis JL, et al. Attrition and the management of pediatric obesity: An integrative review. Child Obes 2014; 10: 461-473.
13. Barlow SE, Ohlemeyer CL. Parent reasons for nonreturn to a pediatric weight management program. Clin Pediatrics 2006; 45: 355-360.
14. Kitscha CE, Brunet K, Farmer A, Mager DR. Reasons for non-return to a pediatric weight management program. Can J Diet Pract Res 2009; 70: 89-94.
15. Story MT, Neumark-Stzainer DR, Sherwood NE, Holt K, Sofka D, et al. Management of child and adolescent obesity: Attitudes, barriers, skills, and training needs among health care professionals. Pediatrics 2002; 110: 210-214.
16. Forman-Hoffman V, Little A, Wahls T. Barriers to obesity management: A pilot study of primary care clinicians. BMC Fam Pract 2006;7: 1-35.
17. Saelens B, Sallis J, Wilfley D, et al. Behavioral weight control for overweight adolescents initiated in primary care. Obesity 2002; 10: 22-32.
18. Tsai A, Wadden T. Treatment of obesity in primary care practice in the United States: A systematic review. J Gen Intern Med 2009; 24: 1073-1079.
19. Kolko DJ, Campo J, Kilbourne AM, Hart J, Sakolsky D, et al. Collaborative care outcomes for pediatric behavioral health problems: A cluster randomized trial. Pediatrics 2014; 133: 981-992
20. Campo JV, Bridge JA, Fontanella CA. Access to mental health services. JAMA Pediatr 2015; 169: 299-300.
21. Cummings NA, O'Donohue WT, Cummings JL. The financial dimension of integrated behavioral primary care. J Clin Psychol Med Settings 2009; 16: 31-39.
22. Cooper S, Valleley RJ, Polaha J, Begeny J, Evans JH. Running out of time: Physician management of behavioral health concerns in pediatric primary care. Pediatrics 2006; 118: 132-138.
23. Skelton JA, Beech BM. Attrition in paediatric weight management: A review of the literature and new directions. Obes Rev 2011; 12: 273-281.
24. Lacy N, Paulman A, Reuter M, Lovejoy B et al. Why we don't come: patient perceptions on no-shows. Ann Fam Med 2004; 2: 541-545.
25. Bean A, Talaga J. Predicting appointment breaking. J Heal Care Mark 1995; 15: 29-34.
26. Lee V, Earnest A, Chen MI, Krishnan B et al. Predictors of failed attendances in a multi-specialty outpatient centre using electronic databases. BMC Health Serv Res 2005; 5: 51-58.
27. Owens PL, Hoagwood K, Horwitz SM, Leaf PJ, Poduska JM, et al. Barriers to children's mental health services. J Am Acad Child Adolesc Psychiatry 2002; 41: 731-738.
28. Sharp DJ, Hamilton W. Non-attendance at general practices and outpatient clinics. BMJ 2001; 323: 1081-1082.
29. Rushton J, Bruckman D, Kelleher K. Primary care referral of children with psychosocial problems. Arch Pediatr Adolesc Med 2002; 156: 592-598.
30. Stancin T, Perrin EC. Psychologists and pediatricians: Opportunities for collaboration in primary care. Am Psychol. 2014; 69: 332-343.
31. Llabre MM, Bennett G, Brantley PJ, Jamy D, Barbara Fiese, et al. Clinical practice guideline for multicomponent behavioral treatment of obesity and overweight in children and adolescents: Current state of the evidence and research needs from the guideline development panel (GDP) for obesity treatment of the American Psychological Association 2018; 10: 1-109.

ADDRESS FOR CORRESPONDENCE:
Teryn Bruni, Department of Pediatrics, Michigan Medicine, 1540 E. Hospital Drive, SPC 5718, Ann Arbor, MI 48109, USA, E-mail: tbruni@med.umich.edu

Submitted: Oct 19, 2018; Accepted: Nov 15, 2018; Published: Nov 22, 2018