



Staged Treatment for Childhood Obesity in a Medical Home: A Feasibility Study

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Authors' contributions

This work was carried out in collaboration between all authors. Author LZ contributed to the study design, study implementation, performed data extraction and management and wrote first draft of manuscript. Author SAM contributed to study implementation, reviewed and approved the manuscript.

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ABSTRACT

Introduction: In 2007, a committee of experts made evidence-informed recommendations for the treatment of childhood obesity that proposed a stepwise approach to treatment of overweight and obese children. The aim of this study is to assess the feasibility and efficacy of a staged intervention for obese and overweight children in a large medical home.

Methods: A staged intervention approach to treating childhood obesity was implemented for patients enrolled in a large Medicaid managed care organization in Houston, Texas. Patients were eligible if they were between the ages of 7 and 13 years and had a BMI greater than the 85th percentile. After one year, patients EMR was reviewed to compare final & initial BMI as well as patient participation.

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Results: 51 children were enrolled over a period of 3 months. Participation was low with only 18% of all completed problem-oriented visits focusing on healthy weight counseling (stage 1). Despite a high acceptance rate for enrollment into the Keep Fit classes (stage 2), patients did not continue to attend classes over the course of the year, on average attending only 21% of scheduled classes. The stage 3 group program was not offered. There was no improvement in BMI status and no relationship between the frequency of documented weight counseling and BMI change.

Discussion: Exposure to the planned program was low and thus we were unable to ascertain the efficacy of a staged intervention for childhood obesity. In assessing feasibility, there are several reasons that could explain the high rate of attrition, including scheduling conflicts, lack of transportation, and poor motivation.

Keywords: Obesity; childhood; medical home; staged obesity treatment, feasibility.

1. INTRODUCTION

The epidemic of childhood obesity is well known. Nationally representative data from 2007-2008 indicate that 16.9% of children 2 to 20 years old are obese, defined as having a BMI above the 95th percentile, and an additional 14.8% are overweight, defined as having a BMI of 85th to 94.9th percentile [1]. Obesity in childhood is associated with high rates of cardiovascular disease risk factors, fatty liver disease (especially in Latino children), pre-diabetes, musculoskeletal injury, and impaired quality of life [2-6]. Levels of childhood obesity seem to have plateaued [1] but have not decreased, and treatment is very challenging.

Brief, office based counseling by primary care providers has not led to measurable improvement [7,8], although a pilot study of motivational interviewing for obesity showed promise [9], and results from large multisite motivational interviewing in pediatric offices are expected [10]. US Preventive Services Task Force's evidence review concluded that moderate to high intensity interventions can lead to modest but measurable and sustainable improvement in relative BMI and medical comorbidities [11]. However, such programs are generally not reimbursed by public or private insurance and therefore are often not available, and clinical programs experience high attrition [12].

In 2007, a committee of experts in childhood obesity recognized the importance of primary care involvement in treating such a highly prevalent condition but also the barriers to intensive treatment in that setting. Evidence-informed recommendations proposed starting treatment of overweight and obese children initially in less intensive but broadly available interventions. Children who do not improve

should then advance to more intensive programs [13]. Each stage increases in intensity and involves more specialists or community support. Stages 1 and 2 are based in the child's medical home. Stage 3 usually requires a dedicated obesity program, rather than a primary care office, in order to access multidisciplinary specialists. Stage 4 should be in a tertiary center for obesity care. Although the components of these recommendations were based on available evidence, the system as a whole has not been evaluated.

This initiative provided a unique opportunity to implement the stages of treatment for childhood obesity recommended by the Expert Committee and assess its feasibility, especially as limitations in clinic operating hours have been identified as a potential barrier to continued childhood obesity treatment [14]. The aim of this study is to assess the feasibility and efficacy of a staged intervention for obese and overweight children in a large medical home.

2. METHODS

This pilot study assesses the feasibility of a staged intervention for childhood obesity set in a medical home where staffing and access are particularly strong.

2.1 Setting

Texas Children's Health Plan (TCHP) is the largest Medicaid managed care organization in the Houston area, with over 300,000 members. The organization's vision is to provide high quality care, care coordination across multiple systems, and improved access, in order to improve the health of the community and achieve cost savings. To implement these goals, TCHP has opened a patient and family centered medical home based on a sustainable financial

model. This site, The Center for Children and Women Greenspoint (Center), is located in the Greenspoint area of Houston, Texas. The Center is staffed by primary care medical providers, dietitians, health educators, behavioral health therapists, social workers, case managers, and patient navigators. It has extended weekday and weekend hours. At the time that this study took place The Center on average saw approximately 3,000 patients per month and had over 10,000 patients total. Patients were primarily Hispanic (67.3%) and Black (24.9%) and 97.6% of patients were TCHP members. The Center serves members in a Medicaid managed care plan, namely TCHP, therefore, this is an indigent population with an income level at or near the federal poverty level. IRB approval was obtained prior to implementation of study.

2.2 Design

Following the 2007 Expert Committee Recommendations for the Treatment of Child and Adolescent obesity, three different stages of care were designed, with a strategy to have all subjects start at the first (least intensive) stage for 3-6 months and, if no BMI improvement was seen, to advance to the more intensive program for 3-6 months as depicted in Fig. 1. If the patient continued to display no improvement in BMI, they were advanced to the most intensive program.

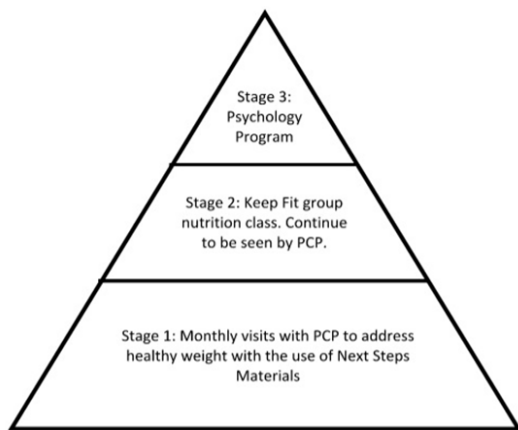


Fig. 1. Three stage model

Stage 1: Monthly visits with primary care providers (“problem oriented” encounters) to address healthy weight. Material to support brief counseling, called Next Steps, was provided that included: i) a poster menu of 17 topics about health and wellness, ii) a flip chart with a page for

each of the poster themes with simple graphics and messages, designed for providers to use as basis for brief discussion, and iii) an activity book given to child and family, again using the same themes but adding some interactive games and challenges. Material was provided in both English and Spanish. Providers were encouraged to use this material at any visit.

Stage 2: Patients and their families were enrolled in Keep Fit, a 7-session weekly group nutrition class led by health educators with a curriculum of basic wellness strategies. A shorter version of this program was offered continuously at the center. For the purposes of this study, a 7 week program was scheduled. Patients continued to be seen by their primary care provider.

Stage 3: Patients were then enrolled in a 15 week program led by a psychologist.

Patients were all at the Center, a free-standing staff-model practice provided for patients enrolled in a large Medicaid Managed Care organization in Houston. Patients were eligible if they had a BMI \geq 85th percentile and were between ages 7 years and 13 years.

With the help of volunteer pediatric residents during one-month rotations at the healthcare site, families were approached when qualifying children were attending well child visits or problem-oriented visits and invited to join the study. Families signed a consent, which included consent for access to medical records to assess visit attendance and also clinical measures of weight and height throughout the year. They were weighed and measured. No incentives were offered.

At the end of the year, data was gathered from the patients’ electronic health records. The number of visits, visit type (PCP problem oriented, well child check, dietician visit, behavioral health visit), visit outcome (completed, cancelled, no show), weight counseling, and patient’s weight and height over the course of the year were recorded and analyzed.

3. RESULTS

3.1 Enrollment and Participation

Fifty-one children (43 families) enrolled over a period of about 3 months. Most families who were approached agreed to participate. The

sample was a convenience sample; intensity of recruitment depended on time and availability of residents during their rotations.

Table 1 shows the demographic and anthropometric characteristics. The population was predominantly Hispanic, and 39% of parents preferred the Spanish language. About 40% had BMI percentile in the severe category (>120% of obesity cutpoint, which is approximately 99th percentile BMI).

Table 1. Patient characteristics

Patient characteristics (n=51)	
Age	Years
Range	7.0-13.7
Median	9.47
BMI	Percentile
Range	86.7 %-99.6%
Median	98.20%
Gender	Percent of patients
Female	51%
Male	49%
Ethnicity	
Hispanic	80%
Non-Hispanic	20%
Race	
Caucasian	39%
African American	18%
Other	21%
No answer	22%
Language	
English	61%
Spanish	39%

Though there were a high number of total scheduled appointments, completion rate in general was low with, on average, patients completing only 49% of their scheduled visits (see Table 2). This was reflected in treatment program participation with very few patients attending focused healthy weight sessions with the primary care provider. On average, over the course of the year, altogether, the 51 participants attended 26 PCP problem-oriented visits where weight counseling was documented. These 26 visits represent 18% of all completed problem-oriented visits, which is less than 1 visit per participant.

Varying from the initial protocol, all families were invited to enroll in the Stage 2 7-session Keep Fit class (group nutrition class). Families were contacted by phone, with 3 attempts made,

including evenings and weekends. Table 3 shows responses to those calls. Almost 40% accepted the invitations although 2 families no longer qualified because of loss of Medicaid coverage. One-fourth had non-working phone or no voicemail. About 10% actively declined participation. The remainder (about one-fourth) did not respond to messages. Despite a high acceptance rate, only two families attended any session of the 7 week program. However, other study subjects did attend the 3-session version of Keep Fit, which the site continued to offer throughout the year.

The stage 3 group program was not offered.

Table 2. Visit attendance

Visit attendance	
Scheduled visits	
Total	590
Range	1.0-35.0
Average	11.4
Median	11
Completed visits	
Total	288 (49%)
Range	0.0-23.0
Average	5.64
Median	4

Table 3. Family response to telephone calls to invite them to Stage 2 (7-session Keep Fit program). Two families attended at least 1 session

Telephone response to invitations to Keep Fit class	Number of patients
n = 51 (43 families)	
Said yes	15 (14 families)
Interested but insurance had lapsed	2 (2 families)
Said no	7 (4 families)
Voicemail messages left (3)	13 (12 families)
No voicemail available	6 (5 families)
Telephone disconnected	8 (6 families)

3.2 Visit Type and Attendance over the Year

Given that a number of different visits are opportunities to provide healthy behavior counseling and that visit completion rates for focused healthy weight sessions and group nutrition classes were low, we examined the

number and type of scheduled visits for these 51 patients and whether the visits were completed, cancelled, or not attended.

Table 4 and the accompanying graph (see Fig. 2) show that the most common scheduled visit type was problem-oriented visit, 244 total visits scheduled (42% of all scheduled visits) with a completion rate of 59%. There were 36 well child appointments scheduled, 94% completed. Scheduled dietitian visits totaled 97, 41% completed. There were 95 scheduled psychology appointments, 57% completed. There was a total of 118 nutrition classes scheduled and only 21% completed.

Table 4. Scheduled visit distribution

Scheduled visit distribution by type	Number of appointments
PCP Well child appointments	
Total scheduled	36
Completed	34 (94%)
Patient cancel	1 (3%)
Patient no show	1 (3%)
Provider cancel	0
PCP problem appointments	
Total scheduled	244
Completed	145 (59%)
Patient cancel	32 (13%)
Patient no show	67(27%)
Provider cancel	0
RD visits	
Total scheduled	97
Completed	40 (41%)
Patient cancel	24 (25%)
No show	33 (34%)
Provider cancel	0 (0)
Keep fit appointments	
Total scheduled	118
Completed	25 (21%)
Patient cancel	11 (9%)
Patient no show	56 (47%)
Provider cancel	26 (22%)
Psychology appointments	
Total scheduled	95
Completed	54 (57%)
Patient cancel	17 (18%)
Patient no show	22 (23%)
Provider cancel	2 (2%)

The dietitian visits and the Keep Fit class sessions were nutrition and lifestyle focused,

while the problem-oriented visits and psychology visits included a broad array of visit indications, such as acute illness, behavior problems, etc.

3.3 Weight Counseling Documentation and BMI Change

Table 5 shows the documentation of weight counseling by visit type. All dietitian visits, all Keep Fit class visits, and almost all well child visits had documented weight counseling. About 20% of problem-oriented visits and about a third of behavior health visits documented weight counseling. Documented use of Next Steps material was very low. Table 6 shows the BMI measures at baseline and at the end of year, with no improvement in BMI status. In addition, Fig. 3 shows no relationship between the frequency of documented weight counseling and BMI change.

Table 5. Weight counseling

Documented weight counseling	
Problem oriented	
Total # of completed visits	145
weight counseling %	26 (18%)
documented Next Steps %	4 (3%)
Well child visits	
Total # of completed visits	34
weight counseling %	32 (94%)
documented Next Steps %	0
Behavioral health visits	
Total # of completed visits	54
weight counseling %	9 (33%)
documented Next Steps %	0%
Keep Fit	
Total # of completed visits	25
weight counseling %	25 (100%)
documented Next Steps %	0%
RD visits	
Total # of completed visits	40
weight counseling %	40 (100%)
documented Next Steps %	0%

The validity of weight counseling documentation is uncertain. Encounter templates include standard language about nutrition and physical activity, particularly for the well child visit. Therefore, the chart abstraction cannot determine the extent or individualization of documented counseling. Conversely, lack of documentation does not necessarily indicate lack of counseling; Next Steps material may have been used more often but was not documented or other counseling may have occurred without documentation.

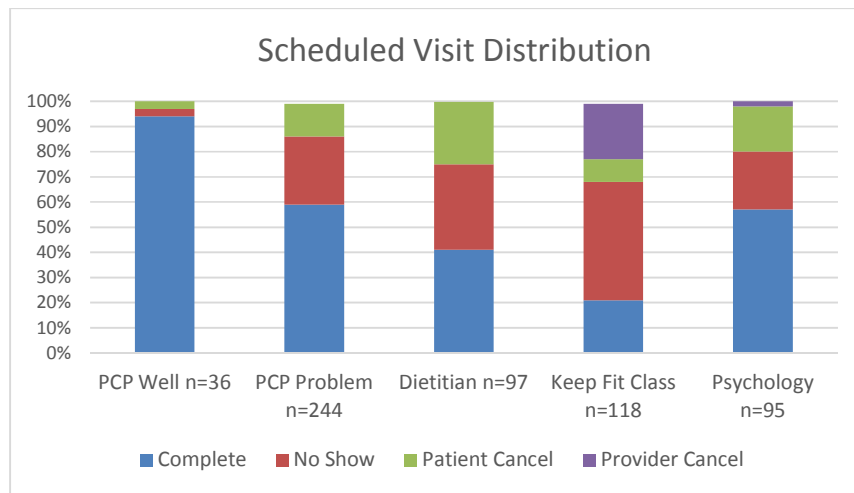


Fig. 2. Scheduled visit distribution

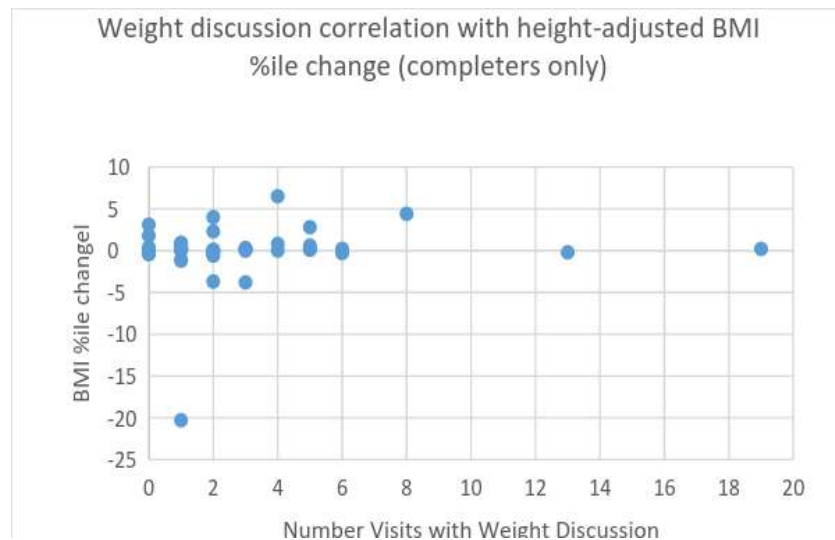


Fig. 3. Weight discussion correlation with BMI percentile change

Table 6. BMI comparisons

BMI comparison for 44 participants with 1 year weight and height available									
	Baseline				Final				
	BMI	BMI z-score	BMI percentile	BMI % of 95 percentile	BMI	BMI z-score	BMI percentile	BMI % of 95 percentile	
average	26.3	2.0	97.0	117%	27.9	2.1	97.0	121%	
median	25.8	2.1	98.1	113%	26.4	2.2	98.6	120%	
min	20.4	1.1	86.7	87%	19.6	0.6	70.7	80%	
max	42.5	2.7	99.6	171%	43.4	2.8	99.7	172%	
Distribution of BMI % of 95 percentile									
Baseline				Final					
85-95				5	85-95				3
96-120				23	96-120				21
121-140				11	121-140				14
>140				5	>140				6
Total				44	Total				44

4. DISCUSSION AND CONCLUSION

Exposure to the planned program was low. This study would have benefited from dedicated staff at the Center to assist with scheduling, follow-up, measures, and championing the Next Steps material. An unplanned limitation was large staff turnover between provider training in motivational interviewing in June 2014 and study enrollment that started in September 2014. The new providers did not have the benefit of training. In addition, many of them were recent residency graduates with a high learning curve for full-time practice and likely less able to add brief weight counseling to encounter time. Another administrative challenge was the inability to schedule appointments more than 4 weeks out.

Low attendance at visits may be similar at most Center encounters and may reflect the transportation and scheduling challenges experienced by families with limited resources. This result would be consistent with previous studies on feasibility of obesity treatment programs that cite higher dropout rates in families living in lower socioeconomic areas, likely secondary to lack of transportation, scheduling conflicts, and changing family circumstances [14]. This is also reflected in the high number of scheduled appointments but with low total completion rate. Strategies to study further include integration of weight counseling into better-attended problem-oriented visits as well as telemedicine counseling, which has yet to be studied in the realm of obesity treatment. Although previous studies suggested that appointments offered only during work hours were a barrier to follow-up [14], the Center's extended weekend and evening hours did not improve rates of attrition for this obesity treatment program.

Interest expressed in the Stage 2 program was higher than attendance suggested, which is consistent with the following preferences: i) a focus on healthy living as opposed to weight loss ii) programs that offer social interaction, iii) programs that offer practical advice, and iv) programs that allow for the parent and child to interact and support each other [14]. However, as continued attendance for the stage 2 program was also low, we must consider other barriers that could disincentivize families from attending, such as class inconvenience or perceived attendance at a class as less important than attendance at an individual visit.

The importance of family motivation and a family centered approach to obesity treatment has been demonstrated in the literature [14] and future work would benefit from assessing family attitudes regarding obesity and taking steps to improve motivation when it is low, prior to scheduling visits. Additionally, given that attendance was higher for physician visits than dietitian/behavior counseling visits, one should consider combining the provider and dietitian visit. A visit that is with a medical provider may lead to higher show-rate, while having the dietitian or health educator available at the same time may result in more effective delivery of the necessary counseling.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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