Effectiveness of a publicly funded clinical paediatric weight management program on obesity outcomes

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OBJECTIVE: To determine the effectiveness of a publicly funded, paediatric weight management clinic in decreasing obesity.

METHODS: A retrospective chart review of patients four to 16 years of age, from 2006 to 2009, was performed at a medically supervised weight management clinic (n=121). Patients participated in monthly visits and were educated about the cognitive behavioural and nutritional aspects of weight management.

RESULTS: The sample included 51 male and 70 female patients with a mean (± SD) initial age of 11.7±3.0 years. Patients participated in 6.4±6.5 visits (range one to 31 visits) over 13.7±15.3 months and 7.4% of patients discontinued treatment after their initial visit. Of the patients who attended the clinic >1 time, 66.1% attended for at least four months, 48.2% attended for >8 months and 33.0% attended for >1 year. Over the course of their treatment, patients experienced a weight gain of 3.8±9.5 kg, but a reduction in body mass index (BMI) percentile (−1.1±3.6%). Post-treatment, the prevalence of obesity decreased from 96.7% to 87.5%. Patients with longer treatment times (>12 months) attained significantly lower final BMI percentiles than patients with shorter treatment times; however, there was no difference in the rate of reduction. Initial treatment age, sex and medical conditions were not related to BMI percentile change.

CONCLUSIONS: This paediatric weight management program effectively reduced the prevalence of obesity. Patients who had longer treatment times experienced greater reductions in obesity. Overall, the present study highlights that long-term patient attendance may be needed to better support paediatric weight management patients.

Key Words: Management; Paediatric; Treatment time; Weight

L’efficacité d’un programme public de gestion du poids en pédiatrie clinique sur les résultats de l’obésité

OBJEKTIF : Déterminer l’efficacité d’une clinique pédiatrique publique de gestion du poids pour réduire l’obésité.


RÉSULTATS : L’échantillon était composé de 51 patients et de 70 patients d’un âge initial moyen (± ÉT) de 11,7±3,0 ans. Les patients ont assisté à 6,4±6,5 rendez-vous (plage de un à 31) répartis sur 13,7±15,5 mois, et 7,4 % d’entre eux ont mis un terme au traitement après leur premier rendez-vous. Chez les patients qui avaient fréquenté la clinique plus d’une fois, 66,1 % étaient traités pendant au moins quatre mois, 49,2 %, plus de huit mois et 33,0 %, plus d’un an. Pendant la durée de leur traitement, les patients ont pris 3,8±9,5 kg, mais ont réduit leur percentile d’indice de masse corporelle (IMC). Après le traitement, la prévalence d’obésité diminuait de 96,7 % à 87,5 %. Les patients traités plus longtemps (plus de 12 mois) obtenaient un percentile d’IMC final considérablement plus faible que ceux traités moins longtemps, mais on ne constatait pas de différence dans le taux de perte de poids. L’âge, le sexe et l’état de santé au début du traitement n’étaient pas liés au changement de percentile d’IMC.

CONCLUSIONS : Ce programme pédiatrique de gestion du poids assurait une réduction efficace de la prévalence d’obésité. Les patients qui étaient traités plus longtemps devenaient moins obèses. Dans l’ensemble, la présente étude démontre qu’une participation plus longue au programme s’impose peut-être pour mieux soutenir la gestion du poids des patients d’âge pédiatrique.

The weight of children and adolescents in Canada and the United States has increased over the past three decades, with obesity prevalences of 8% to 17% (1,2). It is now well recognized that some of the main influences of childhood obesity are multifactorial, including biological, behavioural, psychological and environmental factors (1). Excessive weight gain is linked with adverse effects to many biological systems, including endocrine, cardiovascular, metabolic and many others (3). Moreover, childhood obesity is associated with long-term health consequences such as an increased risk for becoming an obese adult (1,4-6).

Many weight management programs focus on nutritional and physical activity behaviour modification (7,8). Although some of these programs are offered free of charge, paediatric weight management programs can have attrition rates between 27% and 73% (9). Early program discontinuation is disappointing, given that interventions providing greater patient contact hours (>25 h) are generally reported to be more effective at inducing significant changes in body composition (10,11). However, there are very few studies that report the long-term efficacy of weight management programs (10-12) and, particularly, for weight management programs that exist within the public health care system. Given the high prevalence of childhood obesity (1), it is imperative that research examining the effectiveness of weight management programs is conducted to help establish best practice guidelines. Therefore, the objective of the present study was to determine the effectiveness of a paediatric weight management clinic in decreasing obesity in overweight and obese patients.

METHODS

The patients and the clinic

The sample included 123 patients, four to 16 years of age, from a publicly funded, community-based, interdisciplinary, paediatric weight management clinic located in Toronto, Ontario. The services offered were covered by the Ontario Health Insurance Plan and offered at no cost to the families. Patients were referred to the clinic by their paediatrician or another licensed physician (family

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Table 1

Patient characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Pretreatment</th>
<th>Post-treatment</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>11.7±3.0</td>
<td>12.8±2.8</td>
<td></td>
</tr>
<tr>
<td>Female sex</td>
<td>70 (57.9)</td>
<td>66 (58.9)</td>
<td></td>
</tr>
<tr>
<td>Prevalent medical condition*, %</td>
<td>51 (42.1)</td>
<td>50 (44.6)</td>
<td></td>
</tr>
<tr>
<td>Follow-up visits, n</td>
<td>6.4±6.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment time, months</td>
<td>13.7±15.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height, cm</td>
<td>153.4±16.2</td>
<td>158.4±14.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>76.8±27.4</td>
<td>81.7±27.4</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>31.6±6.5</td>
<td>31.8±6.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>BMI z-score</td>
<td>2.36±0.40</td>
<td>2.18±0.48</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>BMI percentile, %</td>
<td>98.6±1.4</td>
<td>97.5±3.6</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>BMI percentile category¹</td>
<td></td>
<td></td>
<td>0.0009</td>
</tr>
<tr>
<td>Normal weight</td>
<td>0 (0)</td>
<td>2 (1.8)</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>4 (3.3)</td>
<td>12 (10.7)</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>117 (96.7)</td>
<td>98 (87.5)</td>
<td></td>
</tr>
</tbody>
</table>

Continuous data are presented as mean ± SD and categorical data are presented as n (%). Group differences were determined using t tests and χ² tests. Pre-post variations in weight, body mass index (BMI) percentile and BMI percentile category were analyzed using repeated measures ANCOVA, with adjustment for baseline values age, sex and treatment time. Significance was defined as P<0.05. *Medical conditions: asthma, hypothyroidism, hyperthyroidism, hypertension, diabetes, constipation, food allergies, dysphagia, vomiting, aspirations, pneumonia, Asperger and Kleinfelter syndrome. ¹Percentiles categories: normal weight ≥5th and <85th percentile, overweight ≥85th and <95th percentile, and obese ≥95th percentile.

The program

At the initial visit, patients underwent a clinical evaluation by the medical team and participated in an information session. Interested patients and their parents/guardians were encouraged to maintain monthly visits, but could attend more frequently if clinically indicated. Patients were educated about the cognitive-behavioural and nutritional aspects of weight loss by a medical team, including registered dieticians and physicians. All staff members underwent standardized training on clinic philosophies, policies and protocols to promote consistency in patient counselling. Visits were generally 30 min to 60 min in duration, and included anthropometric measurements, blood analysis (when indicated), indirect calorimetry (optional), educational information, tracking of food records and counselling. At the beginning of each visit, a registered dietician conducted a motivational interview in regard to the patient’s progress since their last visit and discussed any barriers that may have occurred; both the child and the parent were invited to participate in this discussion. Dieticians also provided parent-child educational information sessions that included topics such as hunger and satiety interpretation, food and portion choices, meal patterning, psychological adaptations, physical activity and pertinent contributors to lifestyle dysfunction. Caloric goals were generally not enforced, rather, the patients were encouraged to make healthier food choices and have appropriate portions, using the Canadian Food Guide as a reference. The dietician, the patient and their guardians would conclude the visit after seeing the physician to review any medical concerns, review treatment progression and finalize individualized treatment goals for their next visit. There was no predetermined length of treatment or treatment intensity.

The sample included 51 male and 70 female paediatric patients, with BMI percentiles ranging from 92.4% to 99.9%, who attended the interdisciplinary weight management clinic. Patients were 11.7±3.0 years of age and participated in 6.4±6.5 visits (range one to 31) over 13.7±15.5 months (Table 1). Asthma was the most prevalent medical condition (28 of 50 [56.0%] patients).

RESULTS

The sample included 51 male and 70 female paediatric patients, with BMI percentiles ranging from 92.4% to 99.9%, who attended the interdisciplinary weight management clinic. Patients were 11.7±3.0 years of age and participated in 6.4±6.5 visits (range one to 31) over 13.7±15.5 months (Table 1). Asthma was the most prevalent medical condition (28 of 50 [56.0%] patients).
During treatment, patients experienced a weight gain of 3.8±9.5 kg, but decreased their BMI z-score by −0.18±0.32 and BMI percentile by −1.1±3.6% (Table 1). Initial treatment age (P=0.16), sex (P=0.69) and medical conditions (P=0.60) were not related with BMI percentile change. Treatment time was associated with BMI percentile change (r=0.40; P<0.05), and patients with longer treatment times (>12 months) were able to attain a significantly lower final BMI percentile than patients with short treatment times (<12 months; BMI percentile 95.3±0.5 versus 98.2±0.3; P=0.008; Figure 1). However, the rate of BMI percentile reduction between short and long treatment times did not differ (BMI percentile/month −0.14±0.6 versus −0.09±0.1; P=0.50).

After treatment, 37 (15.2%) patients attained ≥5% weight loss, with 20 (17.8%) patients attaining >10% body weight reduction. Post-treatment, the prevalence of obesity decreased from 96.7% to 87.5%, including 12 (10.7%) patients moving from obese to overweight status and two (1.8%) patients moving from overweight to normal weight status (Table 1).

Of the entire sample, nine (7.4%) patients discontinued treatment after their initial visit. There was no significant difference in age, presence of medical conditions, sex, height, weight or BMI percentile (P>0.05) among patients who continued treatment after the initial visit versus those who did not. However, patients who proceeded with treatment had a significantly higher initial BMI (32.0±6.5 kg/m²) compared with those who only attended once (26.9±3.5 kg/m²) (P=0.024). Of the remaining 112 patients who attended the clinic >1 time, 74 (66.1%) attended for at least four months, 54 (48.2%) attended for >8 months and 37 (33.0%) attended for >1 year (Figure 2).

DISCUSSION

Results from the present study suggest that this paediatric weight management program was successful at reducing obesity and preventing further increases in obesity. While attending the clinic, patients who had longer treatment times experienced greater reductions in absolute BMI percentile than patients with shorter treatment times; however, similar rates of reduction were observed. Therefore, long-term patient attendance has the potential to better assist paediatric patients in attaining their weight management goals.

Weight management programs commonly have attrition rates between 27% and 73% (4); however, most observe a rate >50% (9) within the first six to 12 months. The present program was successful at retaining patients after the initial visit, with an initial dropout of 7.4%, while other studies have reported initial dropout rates of 33% to 49% (4). Treatment interventions typically have discontinuation rates of 62% to 73% by the eighth month (4), which is significantly higher than the observed discontinuation rate in the present program of 52% at eight months, and is comparable with the 67% attrition rate observed at one year of treatment. The reasons behind the attrition rates could not be ascertained because the program did not collect follow-up data for the patients after discontinuing treatment.

The literature suggests that poor insurance coverage, scheduling issues, transportation/parking, focusing the education on the patient instead of the family, and mismatched expectations between families and clinicians may be some of the reasons why paediatric patients discontinue treatment (4,9,14). Characteristics of the current paediatric weight management program that may explain the low attrition rates observed may include: no cost of treatment, free and ample proximal parking, flexible appointment availability (both morning and evening) and our family-centred structure. Indeed, the success of paediatric weight management interventions has been associated with a supportive family structure that fosters a child’s development of responsibility and positive self-image (15). The low attrition rate may also indicate that the patients who were referred to the program may have had a good understanding of what they were being referred for and had realistic expectations before their first visit. Furthermore, the program was primarily delivered by a registered dietician, which has been linked with increased patient and family satisfaction in paediatric weight management (14).

The low continuation rates in paediatric weight management programs are problematic, given that a recent meta-analyses reported that interventions with the greatest number of patient contact hours (>25 h) induce the greatest differences in BMI (10). Patients in the present program generally received a relatively low number of contact hours (≤25 h). Nevertheless, we observed a 1.1±3.6% reduction in BMI percentile and the attainment of a nonobese weight status in 9.2% of patients, with an average treatment intervention of <7 h. Furthermore, the improvement in BMI z-score of −0.18±0.32 units was better than the reductions generally reported in paediatric research clinical interventions (BMI z-score of −0.03 to −0.05, respectively [16]), which provide a significantly higher number of contact hours. However, in our study, we observed that the number of treatment hours was positively associated with decreased BMI percentile over time. Thus, patients with the longest treatment times were most likely to attain the greatest improvements in obesity (10). Despite the differences in obesity reduction according to treatment time, the rate of obesity reduction was similar between patients with longer and shorter treatment times. This is in contrast with what is typically observed in adult studies (17-19), and may indicate that there is a greater potential for treatment success if adherence can be improved. Therefore, future programs should aim to decrease attrition rates to better treat obesity.

Clinically, obesity reduction during childhood is of great importance, given that 3.2% to 3.6% of adolescents have hypertension, and 22% to 43% of overweight and obese youth have abnormal lipid levels (20). Overall, the reported prevalence of hypertension and dyslipidemia in the present sample was 4% and 7.3%, respectively. The lower than anticipated prevalence of dyslipidemia in the present sample could be attributed to the fact that some of the participants were quite young, and that several of the children who had a family history and/or prevalent risk factors for dyslipidemia did not undergo screening (20). Identification and subsequent tracking of medical conditions was performed by family physicians and was not included in the present program. Therefore, we were unable to assess clinical biomarkers throughout

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treatment. Nevertheless, other programs with smaller reductions in BMI z-score (−0.13 to −0.15) compared with the present study (−0.18±0.32) report significant improvements in total cholesterol, triglycerides, high-density lipoprotein, low-density lipoprotein, ratio of total cholesterol to high-density lipoprotein and insulin levels (21,22). Therefore, even the small improvements in body composition observed in our study would likely have numerous positive changes on health status (21,22) and, consequently, quality of life into adulthood (5).

The present study had limitations and strengths. The data were obtained through a retrospective chart review; therefore, some patient demographics, such as ethnicity, socioeconomic status and details surrounding reasons for attrition, were not available. Because our patients were referred by a physician, they may have been more highly motivated than the general paediatric weight management population. This is an ongoing program at a real-world clinic that exists within the current health care system and is available at no cost to the patient, making it available to families that are traditionally most vulnerable to obesity; however, the generalizability of these results in different funding structures or populations is unclear. Furthermore, the present program had no specified treatment length; therefore, treatment and education were provided as long as the patients and their families deemed necessary, as opposed to some research interventions that may not be viable long-term due to programming costs and lack of resources.

REFERENCES


CONCLUSION

The present publicly funded, paediatric weight management program resulted in noticeable decreases in obesity. Patients who participated in longer treatment durations experienced greater reductions in obesity; however, similar rates of obesity reduction as patients with shorter treatment times was observed. Future research is needed to track weight status after program discontinuation and, perhaps, improve on attrition rates.

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ETHICS APPROVAL: This study was approved by the North York General Hospital and York University Research and Ethics Boards.