Outcome of a hospital based multidisciplinary weight loss program in obese Filipino children

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Abstract

Background: Childhood obesity is becoming a problem for Filipino children with an increasing national prevalence of pediatric overweight and obesity. A multidisciplinary approach combining behavioral therapy with diet and exercise is often advocated as having the greatest impact in pediatric weight management.

Objective: To determine the effects of a weight loss program, which is a staged 3-mo, multidisciplinary intervention consisting of combined dietary, exercise, and behavioral methods in obese children.

Research methods and procedures: Prospective study done in a hospital-based weight management center; duration of study: 15 mo (November 2005 to January 2008); participants: 44 obese children (aged 5–17 y; body mass index [BMI] 85th–99th percentile); outcome measures: change in weight, BMI, BMI z-score (SD score); secondary measures included changes in waist circumference, blood pressure, and body fat. Statistical tests: paired t tests, χ² test, Wilcoxon ranked sum test, regression analysis, and ANOVA.

Results: At the end of the program, the patients demonstrated a decrease in weight, BMI, BMI z-score, body fat, systolic blood pressure, and waist circumference. Mean weight loss is 4.2 kg (P < 0.01) with an average of 5.3% weight loss; BMI decreased by 1.5 units (P < 0.01), BMI z-score by 0.15 (P < 0.004), body fat by 14% (P < 0.01), systolic blood pressure by 7.25 mm Hg (P < 0.05), and waist circumference by 5.4 cm (P < 0.05). Decrease in weight, BMI, and body fat were significantly correlated with number of sessions attended.

Conclusion: The use of a multidisciplinary 3-mo staged program resulted in an effective weight loss in obese Filipino children, which was directly related to the frequency of sessions attended.

Introduction

Obesity is the scourge of the new millennium. The incidence of adult and childhood obesity has soared to epidemic proportions in the United States [1–3], Canada [4,5], and Asia [6,7]. In the United States the prevalence of obesity (body mass index or BMI of 95th percentile) was 10% among children 2 to 5 y of age and 15% among children 6 to 19 y of age [8]. These values increased to 30% when children at risk for obesity (BMI of 85th to 94th percentile) between the ages of 6 and 10 y were included. In the Philippines, the latest national nutrition survey (2003) documented an increasing trend in the incidence of overweight and obesity in Filipino children [9]. As of 2003, the prevalence of overweight and obesity among children 11–19 y was 3.5%.

Pediatricians are managing more patients with weight-related chronic diseases such as metabolic syndrome, type 2 diabetes, and hypertension, which used to be the domain of internists. It is therefore paramount that effective programs be developed to address this issue. Behavioral modification appears to be one key in addressing pediatric obesity. Epstein et al. [10] have shown that long-term weight reductions can be achieved using family-based behavior treatment. Other studies have tried weight reduction programs utilizing the school [11,12], church [13], or internet [14]. Obesity appears to be a multifactorial condition; hence, a multidisciplinary approach is often advocated for its management. There are few published studies on outcomes of ambulatory weight management program for Asian children [15], hence this study, which describes the experience of one center in treating overweight and obese children in the Philippines.

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Objective

This study aimed to describe the population of overweight and obese children who enrolled at a pediatric ambulatory weight management program and to analyze the outcome of the program. The outcome measures include weight, BMI, BMI z-score, body fat, blood pressure, and waist circumference. The specific objectives were as follows: 1) to determine changes in weight, BMI, BMI z-score, body fat, blood pressure, and waist circumference among patients who participated in the program; and 2) to determine the minimum number of sessions needed to achieve results.

Materials and methods

The St. Luke’s Medical Center Obesity and Weight Management Program offers a multidisciplinary approach that involves a pediatrician, endocrinologist, cardiologist, registered dietician, rehabilitation medicine physician, physical therapist, and psychiatrist. All patients are initially screened by a pediatric consultant who determines which program would best suit their needs. For overweight and obese patients, an individualized behavioral modification and exercise program is implemented. The program aims to modify dietary intake and eating habits, increase physical activity, and explore motivations for eating.

Treatment components

Diet

Patients are seen and monitored by a dietician for a total of six sessions over a 3-mo period. Each patient is given a food diary and encouraged to submit a completed food diary weekly. The dietary plan is made by the dietician in consultation with the physician based on the individual’s unique needs. The diet is based on the food pyramid (U.S. Department of Agriculture/U.S. Department of Health and Human Services) with 1200–1500 calories/d utilizing the rule of thumb for energy determination [16] composed of three meals and two snacks. Dietary modifications done were based on the American Academy of Pediatrics policy statement on dietary recommendations for children [17]. Meetings are set twice a month with the patient and parent or primary caregiver. Patients and parents are educated on nutrition and receive information on the food pyramid, food choices, food labels, and preparation and identifying “triggers” that stimulate overeating.

Physical activity

All patients receive an individual exercise program designed by a rehabilitation medicine physician. Patients exercise at a gym located inside the center under the supervision of the physical therapist. Twenty-four sessions (1 h per session) are included in the 3-mo program. In addition, patients are encouraged to exercise on their own a minimum of 30 min/d (walking, exercise DVD), which is increased by 10-min increments each time weight goals are met.

Behavior management

Patients have a series of one-on-one and family sessions supervised by a psychiatrist for the following objectives: to identify triggers for overeating, to find the possible reasons for being overweight, and to address dysfunctional behaviors in the family. A total of four sessions is included. Behavior therapy to manage eating disorders and anxiety disorders are also implemented at this time.

Follow-up

Patients are seen by the physician every 2 wk to monitor their progress. Weight and height are checked with every visit. Body fat and waist circumference are measured at the 12th and 24th session. The children are asked to attend the program at least twice a week for a total of 24 sessions. Each program lasts 3 mo. Patients had the option to re-enroll in a maintenance program upon completion of the initial therapeutic program.

Program goals

The aim of the program is for the patient to lose at least 5% of their initial body weight at the completion of the 24 sessions.

None of the subjects had an organic cause for his or her obesity. There was also no history of intake of medications that might have contributed to weight problems (eg, corticosteroids, thyroid hormone, appetite supplements). Two pediatricians conducted the initial screening and follow-up for all patients. Weight, height, and body fat were measured with the patients wearing clothes, but without shoes. Children were weighed with a calibrated medical weight scale (model CN20, Detecto, Webb City, MO, USA). Height was assessed by a standard calibrated stadiometer (Detecto). Measurements were completed using standard methods. Body fat was measured using body fat analyzer (Tanita bioelectric impedance analysis machine. South Clearbrook Drive, Arlington Heights, IL, USA). A single trained individual performed the measurement for all patients included in the study. Height and weight were obtained at each visit. Waist circumference and body fat were obtained on the 12th and 24th session.

Blood pressure and waist and hip circumferences were measured. BMI was calculated as the ratio of weight to height squared (kg/m²). Waist circumference was taken midway between the lowest rib and the superior border of the iliac crest in the midaxillary line, and the measurements were taken to the nearest 0.1 cm. The average of two readings was used for the analysis. Blood pressure was taken from the non-dominant arm after at least 5 min of rest using the Omron (Matsusaka, Japan) blood pressure device.

Statistical analysis

SPSS (version 10.0, SPSS Inc., Chicago, IL, USA) was used for the statistical analyses. The paired t test was used for normally distributed data, while the Wilcoxon test was used for non-normal data. χ² test and ANOVA were used for nominal data or for three or more groups. For correlation purposes, correlation coefficient and regression analysis were used. Statistical significance was assigned at P < 0.05.

Results

A total of 44 obese patients were included in the study. There were 28 males and 16 females with a male-to-female ratio of 1.7:1. Age ranged from 5 to 17 y with median age of 13.3 y. Patients were further classified based on age as pre-adolescent (5–9 y), early adolescent (10–13 y), mid adolescent (14–16 y), and late adolescent (17–18 y) (Table 1).

The mean weight at the start of the program was 79.31 kg among all age groups. Mean weight loss was 4.2 kg, which was significant (P < 0.05) with an average of 5.3% weight loss. BMI declined by 1.5 units (P < 0.05) and BMI z-score by 0.15 (P < 0.05). There was also a decrease in body fat by 14.1% (P < 0.05) and waist circumference by 5.4 cm (P < 0.05). Systolic blood pressure decreased by 6.3% (P < 0.05). No significant change in diastolic blood pressure was seen (Table 2).

There was no effect of age in the outcome measures of weight, body fat, BMI, BMI z-score, waist circumference, and systolic and diastolic blood pressure using one-way ANOVA (Table 3). There was also no gender difference in relation to the observed changes in the measured parameters.

In terms of compliance, 13/44 (29.5%) patients completed fewer than 12 sessions. Twenty-seven of 44 (59.1%) patients completed between 12 and 24 sessions and 6/44 (13.6%) patients completed all 24 sessions. There was a statistically significant difference in outcome measures of weight, BMI, and body fat among patients who attended 12 or more sessions (Fig. 1).

Discussion

There is growing awareness of the rapid increase in the number of overweight and obese children in the Philippines. However up to the present there is no concrete national program developed or implemented to address the issue. The current programs and studies have focused on preventive programs for obese adults with its associated comorbidities. At present, management of pediatric obesity in the Philippines has been confined to individual practitioners in their clinics and has been limited to individual diet counseling and follow-up. This has in
most cases not been successful, leaving both pediatrician and parents frustrated.

The basic paradigm of this program was to adapt the family-based behavioral treatment first developed by Epstein et al. [19]. Effective components of therapy elucidated by other studies such as use of exercise in addition to diet [20–22], reduction of sedentary activity [23], and partnership with parents as active participants in treatment [24] were included in the treatment plan. Previous studies have shown that the use of comprehensive interventions integrating changes in diet and physical activity with behavioral therapy are more successful in improving long-term weight control [25]. However, such comprehensive interventions require a multidisciplinary obesity care team [26]. At present, this center is the first in the Philippines to present a formal structured program for weight management for overweight and obese children.

Our study showed the favorable effects of a combined behavioral-nutritional-exercise intervention program under a multidisciplinary obesity care team. The patients presented significant changes in weight, BMI, BMI z-score, body fat, systolic blood pressure, and waist circumference over a 3-mo period. Weight (−4.2 kg) and BMI (−1.5 units) changes in this study are comparable to an earlier study illustrating the beneficial effects of a short-term combined dietary-behavioral-physical activity intervention program in weight (−2.8 kg) and BMI (−1.7 units) [27]. Another study in Asian children reported a decrease in BMI (−2.6 units) over a 2-y period [15]. The decrease in the body fat (−4.9%) is similar to the results of another ambulatory weight management study wherein patients lost 4% of body fat over a 1-y period [28].

A significant change in BMI z-score (0.15) was seen in our study. Comparable intensive studies utilizing other settings such as a school [BMI z-score = −0.07] [29] and a residential weight loss camp [BMI z-score = −0.28] showed similar results [30].

The favorable outcome of the program is quite heartening. It is hoped that the early gains during the initial 3-mo phase may be sustained on long-term follow-up. This will be the subject of future studies by the team. At the very least, it is hoped that these patients have been educated on the importance of maintaining their present weight loss along with the development of a healthier lifestyle.

One of the problems with the program is that only 13% of patients were able to complete all 24 sessions, while 72% completed 12 or more sessions. The attrition rate is on the high side compared to other programs with reported dropout rates between 31% [31] and 60% [32]. The reason for the high dropout rate is the subject of another ongoing study but one study

Table 1
Patient profile and baseline values (n = 44)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Obese (%)</th>
<th>Male:Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-adolescent (5–9 y)</td>
<td>9 (20.5%)</td>
<td>5 M:4F</td>
</tr>
<tr>
<td>Early adolescent (10–13 y)</td>
<td>14 (31.8%)</td>
<td>11 M:3F</td>
</tr>
<tr>
<td>Mid-adolescent (14–16 y)</td>
<td>18 (40.9%)</td>
<td>9 M:9F</td>
</tr>
<tr>
<td>Late adolescent (17–18 y)</td>
<td>3 (6.8%)</td>
<td>3 M:0F</td>
</tr>
<tr>
<td>Total</td>
<td>44 (100%)</td>
<td>28 M:16F or 1.7 to 1</td>
</tr>
</tbody>
</table>

F, female; LCL, lower class limit; M, male; UCL, upper class limit
\* \(r^2\), not significant.

Table 2
Outcome of the weight management program

<table>
<thead>
<tr>
<th>Variable (patient number)</th>
<th>Start</th>
<th>End</th>
<th>Difference</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>79.31 (25.5)</td>
<td>75.14 (22.82)</td>
<td>4.17 (5.74)</td>
<td>5.3</td>
</tr>
<tr>
<td>Body fat (kg)</td>
<td>34.38 (7.91)</td>
<td>29.54 (6.86)</td>
<td>4.84 (4.96)</td>
<td>14.1</td>
</tr>
<tr>
<td>BMI</td>
<td>32.92 (5.78)</td>
<td>31.36 (5.24)</td>
<td>1.56 (1.88)</td>
<td>4.7</td>
</tr>
<tr>
<td>BMI z-score</td>
<td>2.34 (0.71)</td>
<td>2.19 (0.72)</td>
<td>0.15 (0.36)</td>
<td>6.4</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>99.78 (14.03)</td>
<td>94.38 (12.55)</td>
<td>5.4 (5.22)</td>
<td>5.4</td>
</tr>
<tr>
<td>Systolic blood pressure (mm Hg)</td>
<td>115.22 (14.7)</td>
<td>107.97 (7.65)</td>
<td>7.25 (11.5)</td>
<td>6.3</td>
</tr>
</tbody>
</table>

All data expressed as mean (SD).
* \(P < 0.05\), Wilcoxon signed rank test.
** \(P < 0.05\), paired t test.

Table 3
Mean changes in weight, body fat, BMI, waist circumference, systolic and diastolic blood pressure by age group

<table>
<thead>
<tr>
<th>Variables</th>
<th>Age group</th>
<th>Number</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight change (kg)*</td>
<td>Pre-adolescent</td>
<td>9</td>
<td>2.88</td>
<td>3.04</td>
</tr>
<tr>
<td>Early adolescent</td>
<td>14</td>
<td>2.21</td>
<td>2.87</td>
<td></td>
</tr>
<tr>
<td>Mid-adolescent</td>
<td>18</td>
<td>5.16</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Late adolescent</td>
<td>3</td>
<td>11.23</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>4.17</td>
<td>5.74</td>
<td></td>
</tr>
</tbody>
</table>

Systolic blood pressure (mm Hg)*
| Pre-adolescent | 9 | 4.44 | 10.13 |
| Early adolescent | 14 | 2.85 | 10.69 |
| Mid-adolescent | 18 | 11.66 | 12 |
| Late adolescent | 3 | 9.66 | 10.5 |
| Total | 44 | 7.25 | 11.5 |

Diastolic blood pressure (mm Hg)*
| Pre-adolescent | 9 | −4.44 | 11.3 |
| Early adolescent | 14 | 1.42 | 6.62 |
| Mid-adolescent | 18 | 3.33 | 6.85 |
| Late adolescent | 3 | −3.33 | 5.77 |

** \(P < 0.05\), ANOVA.

Fig. 1. Number of sessions versus outcome; BMI, body mass index. * \(P < 0.05\), regression analysis, ANOVA; ** \(P < 0.05\), Wilcoxon rank sum test.
reported higher parental and adolescent BMI at the onset as well as ethnic minority status to be associated with attrition [33]. Our program may need to further develop the weight control intervention to make it more appealing for the participants. Some studies which have shown significant results with low dropout rates include the Parenting, Eating, and Activity for Child Health (PEACH) and Mind, Exercise, Nutrition ... Do It (MEND) programs [34]. The challenge of increasing parental involvement to decrease attrition rate and foster cooperation is currently being addressed by the program. Definitely a strong support through either the government or a dedicated weight management program run by professionals, which gives parents more involvement in their children’s weight management efforts, would be a strong boost to the success of the project.

Other studies utilizing subjects who completed at least 50% of sessions observed a decrease in weight, BMI and BMI z-score [35]. This study also showed that patients who attended at least half (12 or more) of the sessions were able to achieve a significant decrease in measurements of weight and BMI compared to those who attended less than 12 sessions. No significant difference was seen in blood pressure and waist circumference, but this may be due to the paucity of data (patient left the program before follow-up measurements were obtained).

One of the potential concerns of the program is its cost. Considering the number of health professionals and allied health personnel involved, the program is quite reasonable at US $345.02 (Table 4). The cost is cheaper compared to other parent- and family-based interventional programs where costs has been estimated to range from US $521 to $872 [36], school-based obesity prevention programs US $558 [37], or primary care-based programs such as Linking Employers and Empowered People (LEEP), which costs AU $873 [38].

Conclusion

The use of a multidisciplinary 3-mo staged program was effective in promoting weight loss in obese Filipino children with corresponding decreases in BMI, BMI z-score, body fat, systolic blood pressure, and waist circumference. The degree of weight loss, BMI change, and body fat loss were directly correlated with the frequency of sessions attended. A follow-up study is needed to assess long-term (1 y and 5 y) effects of weight management program in this population.

References


