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Results From a Clinical Multidisciplinary Weight Management Program

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Abstract

Background/Objective—Published data regarding outcomes of pediatric behavioral weight management are mainly from research interventions. The authors wished to explore outcomes from a clinical program.

Methods—A retrospective analysis of data from obese adolescents enrolled in the Michigan Pediatric Outpatient Weight Evaluation and Reduction program (April 2007 to June 2008). The multidisciplinary program included group sessions, individual visits, and exercise classes. Linear regression was used to explore associations between change in body mass index (BMI) and age, sex, race, and insurance.

Results—N = 67. Mean age was 14.5 years; 71% female, 50% Medicaid enrollees, and 30% African American. Mean initial BMI was 40. Mean change in BMI was -2.3 for those completing the 24-week program ($n = 48$; $P < .01$). Reduction in BMI was not associated with participants' demographic characteristics.

Conclusions—A clinical multidisciplinary weight loss program for adolescents can lead to decreases in BMI after 24 weeks. Further work is needed to assess long-term outcomes.

Keywords

obesity management; adolescents; multidisciplinary; behavioral intervention; treatment outcomes

Introduction

The prevalence of childhood obesity has increased dramatically since the early 1970s.^{1–4} National Health and Nutrition Examination Survey data from 2007 to 2008 estimate that the overall prevalence of obesity among adolescents has increased from 5% in the late 1960s to 16.9%.⁵ Not only has the proportion of obese adolescents increased but the severity of obesity among adolescents has also steadily increased over this time period.⁶

This epidemic of childhood obesity is associated with serious short-term and long-term health consequences and increased medical expenditure.^{7–9} Compared with their normal weight peers, obese adolescents are more likely to suffer from conditions such as dyslipidemia, type 2 diabetes, sleep apnea, hypertension, nonalcoholic fatty liver disease, polycystic ovarian syndrome, orthopedic disorders, and psychosocial problems.^{10–19} Obese adolescents are likely to become obese adults and suffer from a myriad of obesity-related

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illnesses.^{20–22} Along with increased morbidity, obesity in adolescents is associated with an increased risk of mortality from all causes including cardiovascular diseases.²³

Furthermore, the consequences of obesity results in significant health care costs. Nationally, obesity-attributable expenses were estimated to be more than \$75 billion in 2003.²⁴ Whereas most of these costs are accrued during the adult years, obesity in childhood has been associated with incremental charges for hospitalizations and outpatient care.^{9,25} This burden of disease makes it essential that effective modalities are developed for the treatment of obesity in childhood.

The treatment of obesity among adolescents, as with adults, is challenging; to date, weight loss interventions in childhood have shown only modest success.^{26,27} It is generally believed that multicomponent programs including behavioral counseling, promotion of physical activity, parent training/modeling, and dietary counseling are required for the most effective treatment of obesity in children and adolescents.^{28–32} In accordance with this philosophy, the American Academy of Pediatrics and the American Medical Association recommend treatment in a multidisciplinary weight management program for adolescents when primary care efforts to address their obesity have failed to achieve satisfactory results.³² A number of such multidisciplinary weight management interventions have been developed to meet the needs of adolescents.³³ Though some outcomes have been published from research interventions, few clinical multidisciplinary programs have published outcomes data.^{26,27}

The Michigan Pediatric Outpatient Weight Evaluation and Reduction (MPOWER) program was established in 2007 at the University of Michigan for the treatment of obesity in adolescents. The objective of this study is to explore the effect of this intensive, clinical, multidisciplinary weight loss program on body mass index (BMI) and percent body fat, over the course of 24 weeks.

Methods

Study Design

We performed a retrospective analysis of obese adolescents 12 to 18 years old treated in the MPOWER program.

Sample and Recruitment

To participate in the MPOWER program adolescents required a referral from their primary care physician and had to have a BMI at or above the 95th percentile for age and sex. Adolescents were included in this analysis if they enrolled in the MPOWER program between April 2007 and June 2008. MPOWER participants using obesogenic medications (i.e., steroids) and those with moderate to severe mental illness (e.g., bipolar disorder or depression) were excluded from this analysis.

Program Overview

The MPOWER program is a 6-month, intensive, multidisciplinary weight management program for adolescents 12 to 18 years old developed and implemented at the University of Michigan. This family-focused program incorporates medical evaluation and monitoring along with nutrition and physical activity educational components. In addition, it incorporates an intense behavioral protocol built on evidenced-based obesity interventions to optimize the likelihood of improved outcomes.^{34–36} To increase adherence to treatment plans, motivational interviewing is used as the platform to deliver behavior modification

techniques. The MPOWER program is designed to increase intrinsic motivation and self-efficacy, using the self-determination theory of behavior change.³⁷

The MPOWER program is delivered over 24 weeks by a multidisciplinary team of providers including a pediatrician, psychologist, dietitian, social worker, and exercise physiologist. Adolescents join the program on a rolling basis and attend group and individual sessions alternating on a biweekly schedule, in conjunction with weekly exercise classes. At their initial consultation, participants undergo a medical evaluation (including laboratory tests), a clinical psychological interview, a fitness assessment, an assessment of dietary habits and food preferences, along with an assessment of needs, barriers, strengths, and family resources. These assessments are all repeated for each participant at their midpoint evaluation (week 12) and at the completion of the program (week 24).

At each individual session, participants set goals related to one of 6 target behaviors: reduction of screen time, regular consumption of a healthy breakfast, decreased consumption of sweetened beverages, decreased consumption of fast food, increased consumption of fruits and vegetables, and increased physical activity. Group sessions with parents and adolescents together address nutrition topics such as dining out, food labels, snacks/beverages, and the food pyramid recommendations. For behavioral topics the parents and adolescents meet in separate groups to explore topics such as self-esteem, eating triggers, core values, and problem solving.

Measurements

Weight was measured at each visit via electronic scale. Height was measured at the initial and final visits with a portable stadiometer. Percent body fat was assessed at the initial and final visits by bioelectrical impedance.

Data Analysis

After verification of data entry we calculated BMI and determined mean changes in weight and BMI. Simple linear regression was used to explore associations between change in BMI and age, sex, race, and insurance. All analyses were conducted using STATA 8.0 (Stata Corporation; College Station, TX). This study was approved by the institutional review board of the University of Michigan Medical School.

Results

Between April 2007 and June 2008, 67 adolescents enrolled in the MPOWER program who met the inclusion criteria. The majority of these patients were female (71%) and Caucasian (51% Caucasian, 30% African American, and 19% other). The other category included Asian, Native American Indian, and Middle Eastern. No participants identified themselves as Hispanic. A large number of participants were from low-income families. Fifty percent of our participants were Medicaid enrollees, and the majority of the participants were from households with an income of less than \$25,000 per year (53%) (9% between \$25,000 and less than \$50,000; 13% between \$50,000 and less than \$75,000; 25% \$75,000 and more). The mean age was 14.5 years, the mean initial BMI was 40 (range = 29–70), and mean percent body fat was 43% (range = 33% to 62%).

The mean change in BMI over 6 months was –2.3 units for those who completed the 24-week program (n = 48), with a mean change of –0.7 BMI units for patients who did not complete the program. Reduction in BMI was not associated with age, sex, race, or insurance. The mean change in percent body fat was –5.1%. Reduction of percent body fat was not associated with the covariates measured.

Discussion

In this retrospective review of a clinical multidisciplinary program, we found that adolescents significantly reduced their BMI and percent body fat over the course of 24 weeks. The program appears to have had similar effects for patients of both genders and all ages included in the study. In addition, there was no difference in effect by race or insurance status (as assessed by Medicaid vs private insurance coverage). This is of particular importance as obesity is known to most severely affect minority and low-income populations. It is likely that this similarity in effect for all the demographic groups evaluated is due to the inclusion of individual sessions in the program, which allows for tailoring of content during those sessions to specific patient needs.

The findings of this study suggest that a 24-week multidisciplinary weight management program for adolescents in the medical setting can result in a clinically significant reduction in BMI. However, since multidisciplinary programs of this nature are most feasible at academic centers with the personnel and infrastructure to maintain them, it is unlikely that these can be located in all the areas where there are patients that could benefit from their services. Consequently, patients often travel long distances to attend a multidisciplinary clinic. This is likely a burden for families, and finding ways to deliver the components of such programs to families wherever they live is a pressing need.

Although these results are promising, it is well acknowledged that maintenance of weight loss is a considerable challenge. It is likely that continued contact with patients after the completion of the intensive phase of the program is required. For the MPOWER program we have developed a “booster phase” of monthly group visits for adolescents and their parents in the 2 years following completion of the intensive program. The results of this phase have not yet been evaluated.

The issues of reaching larger numbers of patients and providing long-term interaction naturally prompt the consideration of costs. In general, obesity care in pediatrics is thought to be poorly reimbursed by insurance carriers. In particular, behavioral therapies for obesity treatment are often not covered benefits. Consequently, delivering comprehensive obesity care in a clinical setting may have negative financial implications for the institutions in which they are housed. This has ramification for the longevity and growth of these multidisciplinary programs.

Limitations

The MPOWER program was established as a clinical program and thus was not created with a comparison group. However, from other studies of obese adolescents with control groups, it is typical for the controls to gain weight over the course of the studies.²⁷ Consequently, we believe the results shown here, which show a decrease in BMI during the program, is a conservative assessment of the effect of the program and that if a control group were available it is likely that a comparison of the change in BMI for the MPOWER participants versus nonintervention controls would show even greater significance. In addition, the results reflect changes over a 24-week period. Long-term effects of the program are not known.

Conclusion

A multidisciplinary weight loss program for adolescents can lead to clinically meaningful decreases in BMI and percent body fat after 24 weeks. Further work is needed to assess the effects of the program in more patients and over a longer period of time.

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References

1. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999–2000. *JAMA*. 2002; 288:1728–1732. [PubMed: 12365956]
2. Strauss RS, Pollack HA. Epidemic increase in childhood overweight, 1986–1998. *JAMA*. 2001; 286:2845–2848. [PubMed: 11735760]
3. Troiano RP, Flegal KM, Kuczmarski RJ, Campbell SM, Johnson CL. Overweight prevalence and trends for children and adolescents. The National Health and Nutrition Examination Surveys, 1963 to 1991. *Arch Pediatr Adolesc Med*. 1995; 149:1085–1091. [PubMed: 7550810]
4. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *JAMA*. 2004; 291:2847–2850. [PubMed: 15199035]
5. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KH. Prevalence of high body mass index in US children and adolescents, 2007–2008. *JAMA*. 2010; 303:242–249. [PubMed: 20071470]
6. Jolliffe D. Extent of overweight among US children and adolescents from 1971 to 2000. *Int J Obes Relat Metab Disord*. 2004; 28:4–9. [PubMed: 14652618]
7. Dietz WH. Health consequences of obesity in youth: childhood predictors of adult disease. *Pediatrics*. 1998; 101(3, pt 2):518–525. [PubMed: 12224658]
8. Woolford SJ, Gebremariam A, Clark SJ, Davis MM. Persistent gap of incremental charges for obesity as a secondary diagnosis in common pediatric hospitalizations. *J Hosp Med*. 2009; 4:149–156. [PubMed: 19301381]
9. Woolford SJ, Gebremariam A, Clark SJ, Davis MM. Incremental hospital charges associated with obesity as a secondary diagnosis in children. *Obesity*. 2007; 15:1895–1901. [PubMed: 17636109]
10. Ciba I, Widhalm K. The association between nonalcoholic fatty liver disease and insulin resistance in 20 obese children and adolescents. *Acta Paediatr*. 2007; 96:109–112. [PubMed: 17187615]
11. Franks S. Polycystic ovary syndrome. *N Eng J Med*. 1995; 333:853–861.
12. Manoff EM, Banffy MB, Winell JJ. Relationship between body mass index and slipped capital femoral epiphysis. *J Pediatr Orthop*. 2005; 25:744–746. [PubMed: 16294129]
13. Rhodes SK, Shimoda KC, Waid LR, et al. Neurocognitive deficits in morbidly obese children with obstructive sleep apnea. *J Pediatr*. 1995; 127:741–744. [PubMed: 7472827]
14. Steinberger J, Moorehead C, Katch V, Rocchini AP. Relationship between insulin resistance and abnormal lipid profile in obese adolescents. *J Pediatr*. 1995; 126(5, pt 1):690–695. [PubMed: 7751990]
15. Caprio S, Hyman LD, McCarthy S, Lange R, Bronson M, Tamborlane WV. Fat distribution and cardiovascular risk factors in obese adolescent girls: importance of the intraabdominal fat depot. *Am J Clin Nutr*. 1996; 64:12–17. [PubMed: 8669407]
16. Must A, Strauss RS. Risks and consequences of childhood and adolescent obesity. *Int J Obes Relat Metab Disord*. 1999; 23(suppl 2):S2–S11. [PubMed: 10340798]
17. Schwimmer JB, Burwinkle TM, Varni JW. Health-related quality of life of severely obese children and adolescents. *JAMA*. 2003; 289:1813–1819. [PubMed: 12684360]
18. Strauss RS, Pollack HA. Social marginalization of overweight children. *Arch Pediatr Adolesc Med*. 2003; 157:746–752. [PubMed: 12912779]
19. Guo SS, Roche AF, Chumlea WC, Gardner JD, Siervogel RM. The predictive value of childhood body mass index values for overweight at age 35 y. *Am J Clin Nutr*. 1994; 59:810–819. [PubMed: 8147324]
20. Serdula MK, Ivery D, Coates RJ, Freedman DS, Williamson DF, Byers T. Do obese children become obese adults? A review of the literature. *Prev Med*. 1993; 22:167–177. [PubMed: 8483856]

21. Srinivasan SR, Bao W, Wattigney WA, Berenson GS. Adolescent overweight is associated with adult overweight and related multiple cardiovascular risk factors: the Bogalusa Heart Study. *Metabolism*. 1996; 45:235–240. [PubMed: 8596496]
22. Must A, Jacques PF, Dallal GE, Bajema CJ, Dietz WH. Long-term morbidity and mortality of overweight adolescents. A follow-up of the Harvard Growth Study of 1922 to 1935. *N Eng J Med*. 1992; 327:1350–1355.
23. Gunnell DJ, Frankel SJ, Nanchahal K, Peters TJ, Davey Smith G. Childhood obesity and adult cardiovascular mortality: a 57-y follow-up study based on the Boyd Orr cohort. *Am J Clin Nutr*. 1998; 67:1111–1118. [PubMed: 9625081]
24. Finkelstein EA, Fiebelkorn IC, Wang G. State-level estimates of annual medical expenditures attributable to obesity. *Obes Res*. 2004; 12:18–24. [PubMed: 14742838]
25. Hampl SE, Carroll CA, Simon SD, Sharma V. Resource utilization and expenditures for overweight and obese children. *Arch Pediatr Adolesc Med*. 2007; 161:11–14. [PubMed: 17199061]
26. Kirk S, Zeller M, Claytor R, Santangelo M, Khoury PR, Daniels SR. The relationship of health outcomes to improvement in BMI in children and adolescents. *Obes Res*. 2005; 13:876–882. [PubMed: 15919841]
27. Savoye M, Shaw M, Dziura J, et al. Effects of a weight management program on body composition and metabolic parameters in overweight children: a randomized controlled trial. *JAMA*. 2007; 297:2697–2704. [PubMed: 17595270]
28. Preventing Childhood Obesity: Health in the Balance. Washington, DC: National Academies Press; 2005. Institute of Medicine Committee on Prevention of Obesity in Children and Youth.
29. Davis MM, Gance-Cleveland B, Hassink S, Johnson R, Paradis G, Resnicow K. Recommendations for prevention of childhood obesity. *Pediatrics*. 2007; 120(suppl 4):S229–S253. [PubMed: 18055653]
30. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, Styne D. Assessment of child and adolescent overweight and obesity. *Pediatrics*. 2007; 120(suppl 4):192–227.
31. Spear BA, Barlow S, Ervin C, et al. Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics*. 2007; 120(suppl 4):253–287. [PubMed: 17671050]
32. Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007; 120(suppl 4):S164–S192. [PubMed: 18055651]
33. Eneli, I.; Patel, D.; Cunningham, A.; Hinton, T.; Stephens, J.; Murray, R. Pediatric obesity programs in US children's hospitals. Paper presented at: Pediatric Academic Societies Annual Meeting; Honolulu, HI. 2008.
34. Sothorn MS, Schumacher H, von Almen TK, Carlisle LK, Udall JN. Committed to kids: an integrated, 4-level team approach to weight management in adolescents. *J Am Diet Assoc*. 2002; 102 suppl(3):S81–S85. [PubMed: 11905462]
35. Brownell KD. Diet, exercise and behavioural intervention: the nonpharmacological approach. *Eur J Clin Invest*. 1998; 28(suppl 2):19–21. [PubMed: 9777323]
36. Epstein LH, Myers MD, Raynor HA, Saelens BE. Treatment of pediatric obesity. *Pediatrics*. 1998; 101(3, pt 2):554–570. [PubMed: 12224662]
37. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. 2000; 55:68–78. [PubMed: 11392867]