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Power-Up: A Collaborative After-School Program to Prevent Obesity in African American Children

Shahid Choudhry, MPH¹, Lori McClinton-Powell, BS², Marla Solomon, RD, CDE¹, Dawnavan Davis, PhD¹, Rebecca Lipton, PhD³, Amy Darukhanavala, MD³, Althera Steenes¹, Kavitha Selvaraj, BS⁴, Katherine Gielissen, BS⁴, Lorne Love², Renee Salahuddin, MA², Frank K. Embil, MA², Dezheng Huo, PhD⁵, Marshall H. Chin, MD, MPH¹, Michael T. Quinn, PhD¹, and Deborah L. Burnet, MD, MA^{1,2}

¹University of Chicago Department of Medicine

²Woodlawn Community School

³University of Chicago Department of Pediatrics

⁴University of Chicago Pritzker School of Medicine

⁵University of Chicago Department of Health Studies

Abstract

Background—Schools represent a key potential venue for addressing childhood obesity.

Objective—To assess the feasibility of Power-Up, an after-school program to decrease obesity risk among African American children, using community-based participatory research (CBPR) principles.

Methods—Teachers led 14 weekly nutrition and physical activity sessions during after-school care at the Woodlawn Community School on Chicago’s South Side. Forty African American children ages 5 to 12 participated; their 28 parents discussed similar topics weekly at pickup time, and families practiced relevant skills at home. Pre- and post-intervention anthropometrics, blood pressure, dietary measures, and health knowledge and beliefs for children and parents were compared in univariate analysis.

Results—At baseline, 26% of children were overweight; 28% were obese. Post-intervention, mean body mass index (BMI) *z* scores decreased from 1.05 to 0.81 ($p < .0001$). Changes were more pronounced for overweight (−0.206 *z*-score units) than for obese children (−0.062 *z*-score units; $p = .01$). Girls decreased their combined prevalence of overweight/obesity from 52% to 46%; prevalence across these categories did not change for boys. The prevalence of healthful attitudes rose, including plans to “eat more foods that are good for you” (77% to 90%; $p = .027$) and “planning to try some new sports” (80% to 88%; $p = .007$).

Conclusion—Children in the Power-Up program reduced mean BMI *z* scores significantly. The after-school venue proved feasible. The use of CBPR principles helped to integrate Power-Up into school activities and contributed to likelihood of sustainability. Engaging parents effectively in the after-school time frame proved challenging; additional strategies to engage parents are under development. Plans are underway to evaluate this intervention through a randomized study.

Keywords

After-school; childhood obesity; community-based participatory research; African American; nutrition; physical activity

Schools are an important site to address childhood obesity.¹ Children spend a considerable time in school, consuming one to two meals daily, and school provides a natural setting for nutrition and physical education.^{2,3} School-based obesity prevention studies are needed, especially among minority youth.⁴ Results of school-based obesity interventions to date have been variable, with modest outcomes at best.⁵⁻⁸ Several controlled trials have improved knowledge and behaviors but not significantly reduced BMI or percent body fat.⁹⁻¹⁵ The most common components of school-based interventions have been changes in school curriculum, altering the foods available in schools, and modifying physical education class.¹⁶⁻¹⁹ Family involvement has been supported as a logical component of obesity interventions, but has been implemented robustly in only a few studies. Some studies showed poor parental response; however, school-based programs that have successfully involved parents have demonstrated significantly improved nutritional behaviors among children.^{20,21} The multicenter HEALTHY study²² found modest improvement in BMI *z* scores among intervention schools compared with controls, but no overall differences in prevalence of obesity and overweight.

One possible explanation for the mixed results to date from school-based interventions could be competing priorities and necessary emphasis on academic subjects during the school day. Many schools now offer after-school programs as a form of child care for busy families; this trend is increasing nationwide.²³ In Chicago, approximately one quarter of all public schools now hold the designation of “community school,” which includes significant after-school programming and child care.²⁴ The after-school setting is less studied to date, but offers an ideal potential venue in which to promote healthy lifestyle behavior change.²⁵ There have been fewer studies to date on after-school programs to address childhood obesity; in general, after-school obesity prevention programs have proven feasible, but have not yet demonstrated consistent outcomes related to obesity.²⁶⁻³²

The use of a CBPR approach enhances collaborative work with communities.³³ University of Chicago (UC) investigators developed a relationship with leaders at the Woodlawn Community School (WCS) on Chicago’s South Side. Together, we implemented and pilot-tested the Power-Up healthy nutrition and physical activity intervention for children and families within the after-school setting at WCS, with the following aims: (1) To test the feasibility of integrating a family-oriented healthy nutrition and exercise program into the after-school environment for a sample of African American youth in grades K through 6 and their parents, using a CBPR approach; and (2) as an exploratory aim, to determine effects of the Power-Up intervention on BMI *z* scores for both overweight and normal weight school children, and on BMI for their parents.

METHODS

Partnership Development

While attending various community meetings in order to build relationships, a UC investigator (DD) met one of the founding board members of the WCS.³⁴ WCS, a public elementary school on Chicago’s South Side, was established in 1996 as part of a Chicago Public Schools (CPS) initiative to create smaller, “community” schools³⁵ in partnership with community organizations. Community schools stay open beyond regular school hours to provide after-school care and serve as an important resource to communities in other ways. WCS places special emphasis on students’ African heritage, which serves as a source of self-esteem and a motivating factor for academic and social success. Students enroll at WCS based on residency in the catchment area; families residing outside the catchment area can also apply for enrollment, and are admitted by lottery. As of 2008–2009, there were 222 students enrolled at WCS from grades pre-K through 6, of which 70 children were enrolled in the WCS after-school program. The student population at WCS is 100% African

American; 91% of students are from low-income households and 87% are eligible for free lunch.³⁶ Most students are driven to school or bused, with a small fraction taking public transportation.

In January 2008, UC investigators were introduced to Kweku Embil, WCS Principal, by another community leader who was a founding board member for WCS. Over 1 year's time, the UC investigators explored the possibility of partnership and cultivated relationships with WCS leadership, teachers, parents, and students through interactions at PTA meetings, coffees, and other school functions. Parents indicated their interest in a healthy nutrition and physical activity program in the after-school setting and offered program suggestions. By fall 2009, the UC investigators began working collaboratively with WCS after-school teachers and exploring the feasibility of these teachers leading healthy nutrition and activity sessions within the after-school program. We met frequently during the planning phase and talked openly about expectations and how to work together. After-school teachers voiced some suspicion arising out of previous experience in which researchers took all the academic credit; we discussed up front what the academic benefits were likely to be and how these could be shared. We continued to meet weekly with WCS staff throughout the Power-Up program to debrief sessions, resolve conflicts or misunderstandings, and plan our continued work together.

Our group of investigators had formerly developed and implemented the Reach-Out diabetes prevention project for youth on Chicago's South Side.³⁷ Reach-Out was a community-based, family-oriented, lay-led group intervention for overweight African American children at risk for diabetes. To adapt curricular materials from Reach-Out for use in the after-school program at WCS, UC staff, including a dietitian, pediatrician, behavioral psychologist, and community health specialist, worked with WCS teachers to address the broader age range served at WCS and logistics of the after-school setting. Reach-Out targeted 9- to 12-year-old children and their parents whereas the after-school program included children from grades K through 6; we also adapted the curriculum for larger class groups and incorporated Afrocentrism and other values embraced at WCS. For example, a morning ritual at WCS involves reciting seven values espoused by ancient African peoples, one of which is Balance. Building on this theme, we emphasized the need for "balancing" different food groups in a healthy diet. The new after-school program was named Power-Up to reflect interests of the school children.

The Power-Up Intervention

Like Reach-Out, the Power-Up intervention is based on a conceptual model³⁸ synthesized from behavior change theories which address intrinsic beliefs as well as social, environmental, and community factors impacting behavior. The Power-Up intervention comprised 14 interactive, hour-long, weekly sessions on nutrition and physical activity for children led by CPS teachers in the after-school setting. Children were grouped by ages (grades K-2, 3-4, and 5-6), with approximately 15 children per group. The teachers used a structured curriculum and educational materials to deliver the sessions. On-going meetings and support for the teachers occurred throughout the program. The WCS teachers helped to adapt the curriculum to be age-appropriate for the various grades in each classroom group, develop hands-on activities for each session, and identify key vocabulary words to highlight each week. Weekly topics addressed concepts in nutrition and physical activity. In one session, children visited a mock grocery store set up within the school to practice identifying choices with lower fat and sugar contents, and the "Nutrition Jeopardy" game engaged children in learning about food groups. Another session with a physical activity theme was called "Muscle Mania"; older children learned the structure and function of various body parts, while younger children participated in an art project making skeleton figures from pipe cleaners to learn about healthy bones and muscles. Afterward, both groups danced to

music that incorporated key vocabulary words from the day's lesson. Other activities include recipe development, role playing, and open group discussions regarding healthy nutrition and physical activity choices. We were able to incorporate some regular physical activity into the after-school sessions, including dance, stretching, and other physical activities feasible in the classroom setting. In addition, children and families were encouraged to engage in a wider variety of physical activities at home and in their community.

Topics addressed in the children's sessions each week were also discussed at a weekly, 30-minute parent session led by our team dietitian at pick-up time, at the end of the after-school program. Parents tended to drop in variably as they picked up their children; attendance was somewhat sporadic, but informal discussion often lasted up to an hour for those who did attend. Some Power-Up parent sessions included guest speakers in addition to the dietitian; for example, a behavioral psychologist and an endocrinologist discussed healthy lifestyle behavior changes on different occasions. To help empower children to become their family's "nutrition expert," each child took home a family "homework" assignment; families practiced these Power-Up skills at home together throughout the week.

Training and Support

The leaders for the Power-Up healthy nutrition and activity program were the three after-school teachers at WCS and one snack coordinator. These were experienced teachers; however, the Power-Up program involves motivating participants for health behavior change, which uses different skills. Before implementing the Power-Up after-school sessions, the teachers participated in 9 hours of training with UC staff at WCS, divided over three bi-weekly sessions. Training sessions were led primarily by our behavioral psychologist (MQ), and were designed to give leaders sufficient background regarding health behavior change interventions and practice in skills for motivating participants for behavior change. We reviewed the structure, format, and content of the overall program and of individual sessions. Project staff first modeled presentation of behavior change modules, and WCS teachers subsequently practiced teaching additional session modules in the training setting. This approach provided for direct experience with preparation and presentation of sessions, as well as opportunity for feedback from project staff and peers. Subsequent training sessions were held monthly over the course of the program and focused on eliciting WCS teachers' experience with the sessions, perceived strengths, and suggested modifications. Ongoing training also addressed brief counseling skills that could be used to help promote dietary and physical activity problem solving and behavior change with children and their parents. These skills included using open-ended questions and reflective listening, engaging participants in an empathic and supportive relationship, and helping participants to set goals, monitor progress, and cope with obstacles. This component of training was activity driven and made extensive use of case vignettes and role play with feedback. Pilot grant funding from the UC CTSA award was shared with WCS; the after-school teachers and snack coordinator received modest stipends for their work in the Power-Up program.

Environmental Changes and Social Reinforcement

Environmental changes in the school complemented and reinforced the Power-Up behavioral intervention. Power-Up healthy nutrition and activity themes were highlighted through displays in hallway bulletin boards and showcases (e.g., food pyramid and other educational materials). A Power-Up logo art contest successfully engaged the after-school children; the winning logo was prominently featured at school, and imprinted on Power-Up backpacks, lunch bags, and T-shirts for program participants. We worked with the after-school snack coordinator to choose healthier foods for children after school; water replaced juice drinks, and fruits, vegetables, and low-fat granola bars replaced cookies and chips.

Power-Up leaders and participants were prominently recognized for their accomplishments as part of the year-end “All School Festival.”

Participant Recruitment

The Power-Up pilot study was approved by the UC Institutional Review Board and the CPS Research Review Board. To recruit participants for this study, encouragement and support for the program from WCS leadership was crucial. Principal Embil set the stage for this process through announcements at school and informational flyers sent home to families. UC investigators were invited to PTA meetings and other school events to talk about the issue of childhood obesity and the opportunity to participate in the Power-Up program. Collaboratively, we made many opportunities available for information, questions, and discussion before the formal consent process was begun. Formal recruitment and enrollment took place in January 2009, 1 year after our initial contacts. UC research staff attended after-school sessions to obtain written consent from parents and assent from children to participate and to conduct data collection before program implementation in February 2009. All 70 children enrolled in the after-school program participated in the Power-Up curriculum, but only those consented as research participants were studied for outcomes.

Research Design

Because this pilot study was designed to assess feasibility of integrating a healthy nutrition and activity program within the after-school setting, we did not employ a control condition. Rather, we compared before and after measures for participating children and their parents. Children’s BMI z score served as the primary outcome. BMI normally changes over time in children; z score is a commonly used statistical method for standardizing how far a particular data point is from the population mean, which allows one to directly compare children of different ages and genders. A z score of +2, for instance, means an individual’s BMI is 2 standard deviations above the population mean, or at approximately the 98th percentile. We also collected process measures (e.g., challenges of implementation for teachers, appeal and acceptability of various activities for children and families) and qualitative feedback to optimize the intervention before conducting a future large-scale study.

Data Collection

Data for participating families (children and parents) were collected pre- and post-intervention. Parent and child physical outcomes included body habitus as measured through BMI³⁹⁻⁴¹ (z scores for children) and blood pressure⁴² (age-, gender-, and height-specific z scores for children). Dietary behaviors were measured using the Harvard Children’s Nutrition Questionnaire.⁴³ Data were compared using paired and unpaired t tests, chi-square tests, and correlation coefficients, as appropriate. Multivariate analyses were not conducted owing to the small number of pilot study participants, nor were p values adjusted for multiple comparisons. All statistical analyses were conducted using SPSS version 17.⁴⁴ The UC Institutional Review Board and the CPS Research Review Board approved this study.

Statistical Analyses

Descriptive statistics included counts, percents, and standard deviations (Tables 1 and 2; Figure 1). To control for gender and age in the analysis of BMI, z scores were calculated using the Centers for Disease Control and Prevention growth charts.⁴⁵ Change in BMI z score or blood pressure from baseline to post-intervention for each individual was compared using a paired t test (Figure 2). We further examined whether change in BMI z score varied according gender and baseline weight categories using linear regression models by regressing changing score as a function of gender or baseline weight categories.

Spearman correlation was used to examine whether percentage of program attendance was correlated with BMI *z* score change. A McNemar matched-pair test was used to compare changes in behavioral outcomes from baseline to post-intervention (e.g., intention to “eat more foods that are good for you.”)

Data Presentation and Manuscript Preparation

We shared our work locally and presented at a national academic conference before writing this manuscript. Lori McClinton-Powell, lead after-school teacher from WCS, was the primary community partner involved in preparing and delivering these oral presentations along with academic partners. The manuscript derived from our oral presentations was drafted initially by our academic investigators, and was reviewed and edited by Ms. McClinton-Powell and our other collaborators from WCS.

RESULTS

Characteristics of Child and Parent Participants

Forty children (16 boys and 24 girls) and their 28 parents/guardians (all women) participated in the Power-Up pilot study; all participants were African American (some parents had more than one child enrolled in the study). Children’s ages ranged from 5 to 12 years (mean, 8 ± 2) in grades K to 6 (Table 1). Children’s participation was robust; three quarters of child participants attended 80% or more of the weekly Power-Up sessions. Parents’ attendance for their weekly discussions at pick-up time was less than children’s participation; only 14 parents attended more than 30% of the sessions. At baseline, 54% of children enrolled were either overweight or obese (> 85th percentile) of BMI for age, with 28% in the obese range (> 95th percentile). Post-intervention, 50% of children were either overweight or obese (23% obese; Table 1). A gender difference was apparent for changes in obesity status; the proportion of overweight or obese girls decreased from 52% (30% obese) at baseline to 46% (21% obese) post-intervention, whereas the proportion of overweight or obese boys remained unchanged at 56% (Table 1; Figure 1). At baseline, 92% of parents who participated were either overweight (BMI 25–29.9) or obese (BMI > 30; Table 2).

Child and Parent BMI Outcomes

Mean BMI *z* scores for children declined by 0.244 units from baseline to follow-up (from 1.053 to 0.809; $p < .0001$). In a stratified analysis for participants with BMI > 85th percentile, the mean BMI *z* score declined by 0.133 post-intervention ($p = .003$), but this effect was accounted for almost entirely by those in the overweight group (85–94th percentile), for whom it declined by 0.206 ($p = .01$). Post-intervention results showed a significant decrease in mean BMI *z* score for overweight children, but not for those in the obese category (Figure 2). Trends differed somewhat between boys and girls; boys decreased their mean BMI *z* score more than girls overall (-0.265 vs. -0.230 ; $p = .7$, not significant). Among boys, normal weight participants showed the most pronounced *z* score reductions whereas overweight girls showed more pronounced reductions than overweight boys (Figure 2). There were negligible outcome differences between obese girls and boys. It is important to note that whereas normal weight children decreased their mean BMI *z* score, this did not represent weight loss; rather, they decreased their rate of weight gain while continuing to grow in height. Children’s attendance at Power-Up sessions did not correlate significantly with change in BMI *z* score using Spearman correlation; attendance was quite high overall because Power-Up was embedded within regular after-school care. Parents’ mean BMI trended down from 32.2 to 31.4 ($p = .25$) over the course of the intervention, and we did not observe differences by attendance in parent outcomes. Participants’ pre- and post-intervention blood pressure readings were not significantly different.

Behavioral Intentions

The number of children planning to “eat more foods that are good for you” (77% to 90%; $p = .027$), “try more things like running or playing sports every day” (77% to 85%; $p = .030$), and “try some new sports” (80% to 88%; $p = .007$) improved post-intervention.

DISCUSSION

Childhood obesity is an emerging epidemic with long-lasting health risks. Many communities lack adequate education and guidance about healthy nutrition and exercise for children and families. Our intent was to improve the obesity-associated health risks of participants using a community based participatory approach. The Power-Up pilot program was successful in showing the beneficial effects of a family focused nutrition and exercise program in the after-school environment. Our results demonstrate a significant lowering of BMI z scores among African American school children over the 14-week program. Boys overall showed a trend toward greater mean BMI z score reduction than girls; however, this finding was driven primarily by changes among normal weight boys and was not associated with decreased prevalence of overweight/obesity among boys. We hypothesize that girls may be more self-conscious about their appearance and weight than boys even during the pre-adolescent years, driving the trend toward greater effect among overweight girls. Children’s attitudes toward healthy diet and physical activity showed significant improvement when pre- and post- questionnaires were compared; participants reported intention to eat more fresh fruit and vegetables and to participate more in sports. These attitudes are predictive of positive behavior change, which could be studied further through longitudinal follow-up of behavioral outcomes. The Power-Up pilot experience adds to the growing literature on addressing childhood obesity in school based settings. Power-Up shares some features with other recent research efforts such as the HEALTHY study,²² in that it utilized social marketing and environmental changes within the school setting to promote healthy nutrition and physical activity. The major difference and new contribution is that Power-Up is situated in the after-school setting, which lessens competition for academic time, and it builds on the strengths of the community school model, to enhance the likelihood of sustainability. We have shared our findings and pilot experience with the Power-Up project in academic and community venues. We participated in the year-end “All School Festival,” in which project experience was reviewed and celebrated with WCS students, parents, teachers, and school leadership. Project experience, outcomes, and subsequent plans were shared with the UC Community Advisory and Review Council, a body of local community leaders and representatives which interacts with research faculty to review and help shape our community-based research agenda broadly. Other local community and academic presentations have occurred, and two of us (LM and DB) co-presented the Power-Up pilot experience at a national meeting of the Society of General Internal Medicine.

Our study has several limitations. Because this was a pilot study to assess feasibility, we worked with a small group of students recruited from one school on Chicago’s South Side, did not employ a control condition, and were not able to follow participants beyond 14 weeks. Children enrolling in the Power-Up program may have differed from others within WCS with respect to BMI, level of motivation, and other characteristics. Results may not generalize to other after-school school settings. Self-reported behavioral and attitudinal responses are subject to social desirability bias; we chose to use simple self-report methods for assessing diet, physical activity, and attitudes to minimize participant burden for children of various ages in the after-school setting. Because this was a multicomponent intervention (environmental changes, curriculum addressing nutrition and physical activity, parent outreach component), it is not clear which aspects were essential for program success. Larger, more detailed studies could illuminate these issues.

One of the practical challenges we encountered was the inconsistent engagement of families. Parents found it difficult to attend the discussion groups regularly. This was not surprising; these parents have their children in the after-school program to provide day care while they are busy with other activities. We did send family materials home with children, but we would have preferred to have regular interactions with more of the parents. Alternative approaches for engaging parents are under consideration for future studies, including outreach through cell phones and text messaging, as well as evening parent events held in conjunction with scheduled PTA meetings. The after-school teachers greatly appreciated the training from our social psychologist, Dr. Michael Quinn; they found his material so helpful they invited him to speak with parents about behavior change. This parent session was specially advertised and was well attended. The after-school teachers requested more training on health topics; we are working to incorporate American Heart Association training for teachers for future studies.

We learned powerful lessons about the importance of building strong relationships with school and community leaders, parents, and teachers. We were able to successfully integrate Power-Up into school activities and culture through the active support of the WCS Principal and other school leaders, presentations at parent-teacher events, and participation in the annual All School Festival at the end of the school year. The WCS security guard became an unexpectedly important ally in terms of practical logistics; his strong relationships with WCS families and his literal keys to various rooms and resources proved invaluable throughout the program. The time and effort involved in building relationships are significant, but are crucial to successful integration of a program and study. The CBPR approach helped tremendously with the success of this project, and also greatly enhances its sustainability through lasting changes in school culture and environment. School staff and families see this work as their own. The lead after-school teacher described their on-going efforts:

Woodlawn Community School has continued to try to stay on the healthy track. We have added an agriculture component to our after school program. Here, we concentrate on life cycle of fruit, vegetables, and livestock. Because of the Power-Up program, we have continued to stay healthy and have purchased a greenhouse. We have started growing our own vegetables. Since Power-Up, we partnered with the Greater Chicago Food Depository. The program is called “Nourishment for Knowledge.” Every Thursday, the after-school kids get healthy nutritional snacks along with three different pieces of fruit. We also have a “Fruit and Veggie” program that targets the entire school. Every Tuesday and Thursday students are given a piece of fruit or a vegetable; a vegetable or fruit is also designated monthly in the school newsletter containing a fun recipe to try at home.

The physical or built environment has come to the forefront of public health research with a growing body of evidence linking aspects of the built environment to obesity.⁴⁶ As a result of the Power-Up program, WCS installed a “Fun Hoop” (AAA State of Play, Indianapolis, IN) to provide interactive fun and encourage physical activity on the playground appropriate for all ages. Studies have shown that the availability of equipment and permanent activity structures in school play areas is associated with higher physical activity.^{47,48} The school has begun participating in a local community garden, is planning to install a greenhouse that was purchased with funding from this collaborative project to foster healthy nutrition, and is exploring a WCS farmers market. Improved access to fresh fruits and vegetables and healthier snack choices are other continuing benefits within the WCS after-school program.

WCS has demonstrated behavioral and environmental changes necessary through strategies recommended by the Institute of Medicine and the Centers for Disease Control and Prevention through promoting healthier eating habits and physical activity.^{49,50} The after-

school setting proved to be a feasible venue for the Power-Up intervention, with promising changes in BMI z score for children. Children, parents, teachers, and school personnel enjoyed the Power-Up program and have worked to sustain program principles and practices beyond the research project. The Power-Up program has significant potential to improve the health of participants by introducing sustainable lifestyle and environmental changes. University investigators have continued working with WCS staff and families beyond the period of this pilot project to share findings and interpretations from this study, to identify and build relationships with other schools on Chicago's South Side, and to develop a proposal for a larger, randomized trial of the Power-Up after-school intervention involving multiple sites. As the community school concept and availability of after-school care are increasing locally and nationally,^{24,51} obesity prevention programs like Power-Up could be implemented in various schools throughout Chicago and the nation.

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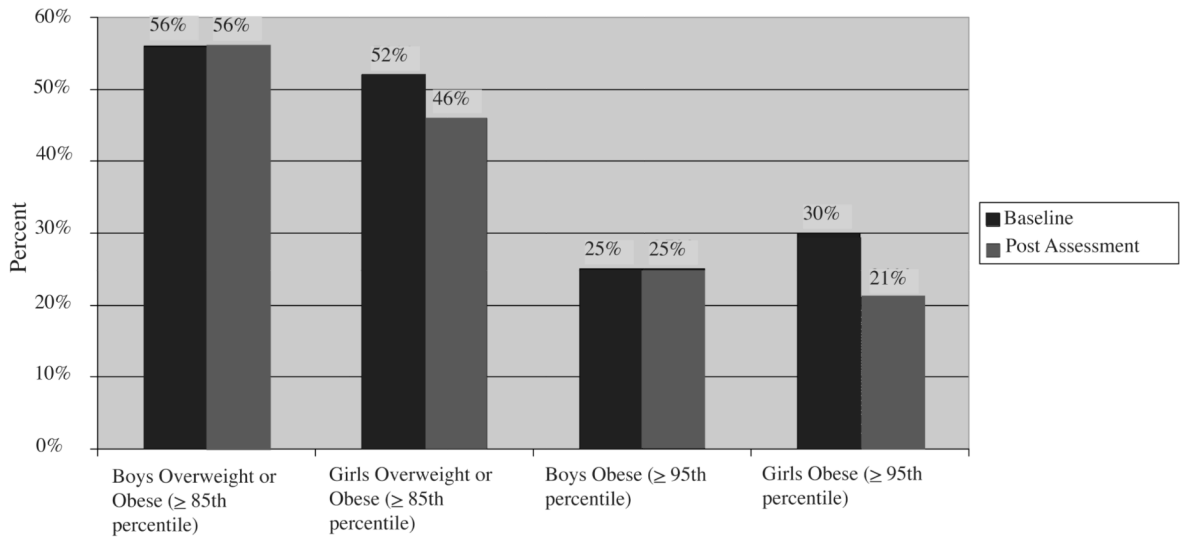


Figure 1. Pre- and Post-Intervention Prevalence of Overweight and Obesity by Gender

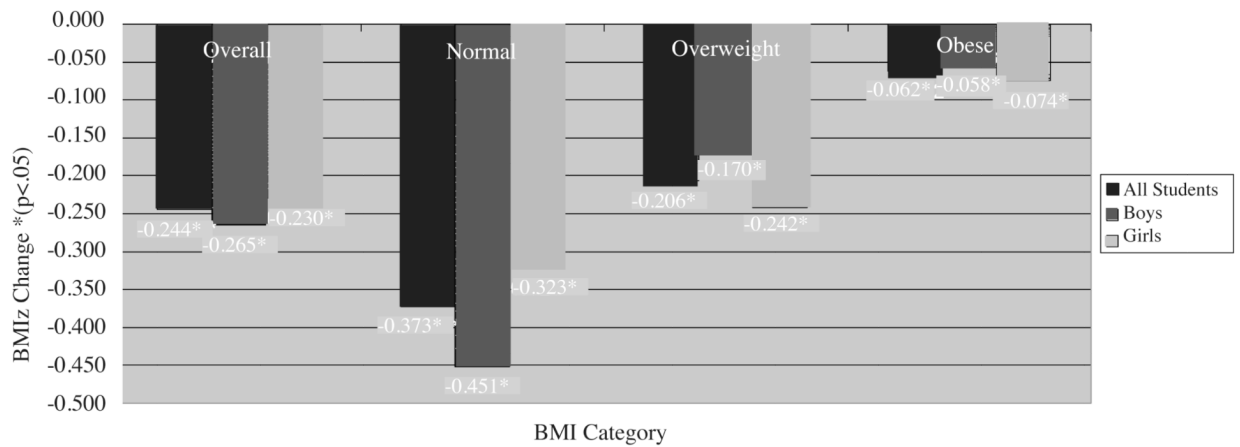


Figure 2. Change in Children's BMI z Score by Baseline Weight Strata and Gender

Change in BMI z-score units from baseline to post-intervention as calculated by paired *t* test, for all participants (bars shown at left), and stratified by weight category and by gender. A decrease in BMI z score for overweight or obese participants indicates movement in the direction of normal weight category. Children within the normal weight category also decreased their BMI z score; this did not reflect weight loss, because they continued growing in height during a period of less rapid weight gain.

Table 1

Children's Pre- and Post-Intervention Data

| Variables | Baseline Characteristics | | | Post-Intervention Characteristics | | |
|---|--------------------------|-----------------|-----------------|-----------------------------------|-------------|--------------|
| | Total, N (%) | Boys, n (%) | Girls, n (%) | Total, N (%) | Boys, n (%) | Girls, n (%) |
| Number of Children Assessed | 40 | 16 | 24 | 40 | 16 | 24 |
| Mean Age in Years \pm SD | 8.15 \pm 1.97 | 7.69 \pm 1.96 | 8.46 \pm 1.96 | — | — | — |
| Attended >80% of Sessions | — | — | — | 30 (75) | 12 (75) | 18 (75) |
| Underweight (<5th Percentile) | — | — | — | 1 (3) | — | — |
| Normal BMI (5–84th Percentile) | 18 (46) | 7 (44) | 11 (48) | 19 (47) | 6 (38) | 13 (54) |
| Overweight (85–94th Percentile)* | 10 (26) | 5 (31) | 5 (22) | 11 (27) | 5 (31) | 6 (25) |
| Obese (\geq 95th Percentile)* | 11 (28) | 4 (25) | 7 (30) | 9 (23) | 4 (25) | 5 (21) |
| Systolic BP Elevated (>90th Percentile) [†] | 5 (13) | — | 5 (21) | 2 (5) | — | 2 (8) |
| Diastolic BP Elevated (>90th Percentile) [‡] | 7 (18) | 2 (13) | 5 (21) | 2 (5) | — | 2 (8) |

Abbreviations: BMI, body mass index; BP, blood pressure; SD, standard deviation.

* Age- and gender-specific percentile for body mass index.⁴⁰

[†] Age-, gender-, and height-specific percentile for blood pressure.⁴¹

Table 2
Parents' Pre- and Post-Intervention Data

| Variables | Baseline Characteristics n (%) | Post-Intervention Characteristics n (%) |
|--|---|--|
| Parent/guardian participated—All females | 28 | 20 |
| Mean age in years \pm SD | 37.73 \pm 11.25 | — |
| Attended > 50% of sessions | — | 10 (36) |
| Normal BMI (18.5–24.9) | 2 (8) | 3 (15) |
| Overweight (25–29.9) | 7 (28) | 5 (25) |
| Obese (\geq 30) | 16 (64) | 12 (60) |
| Systolic BP elevated (140–159 mmHg) | 4 (16) | 5 (26) |
| Diastolic BP elevated (90–99 mmHg) | 2 (8) | 4 (21) |

Abbreviations: BMI, body mass index; BP, blood pressure; SD, standard deviation.