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Development, Implementation, and Effects of Community-Based Diabetes Prevention Program for Obese Latino Youth

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Abstract

Objective—Obesity and type 2 diabetes have emerged as critical health issues among Latino youth. Although both conditions manifest early in life, very few diabetes prevention programs have been developed to specifically meet the needs of this population. The authors describe the development, implementation, and metabolic impact of a culturally informed, community-based diabetes prevention program for obese Latino youth.

Methods—A lifestyle education program was developed to address the health needs of Latino youth served by a community-based medical clinic. The program consisted of group education sessions delivered to children and their families to address nutrition, physical activity, family roles and responsibilities, and self-esteem. The metabolic impact of the program was evaluated by assessing body mass index (BMI), high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, total cholesterol, triglycerides, glucose, and insulin.

Results—On entry, the prevalence of risk factors among the 102 youth (mean BMI, 30.4 ± 4.9 kg/m²) was substantial (68.6% with low HDL cholesterol, 32.1% with elevated triglycerides, 9.4% with impaired fasting glucose, 39.4% with elevated total cholesterol, 43.0% with elevated LDL cholesterol, and 60.6% with hyperinsulinemia). The 50 youth who returned after the program for follow-up measurements exhibited significant health improvements, including a 3.8% reduction in BMI; 5.4% and 8.6% decreases in total and LDL cholesterol, respectively; a 9.3% increase in HDL cholesterol; and a 24.0% decrease in fasting insulin (all *P* values < .05).

Conclusions—These promising findings suggest that a community-based diabetes prevention program for obese Latino youth is a feasible strategy for improving health in this high-risk population. Further studies are warranted to examine whether similar programs can be implemented in diverse communities and settings.

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Declaration of Conflicting Interests

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Keywords

health disparities; community health; obesity; diabetes; Latino

The prevalence of obesity among youth, defined as a body mass index (BMI) $\geq$ 95th percentile for age and gender, has dramatically increased in recent years, such that 16.3% of today's youth are considered obese.¹ Moreover, youth from ethnic minority groups, including Latinos, are disproportionately affected, thus placing them at increased risk for developing obesity-related disorders at an early age.² Clinical studies have suggested that up to 30% of overweight Latino youth have prediabetes and/or the metabolic syndrome.^{3,4} The high incidence of cardiovascular disease and type 2 diabetes (T2D) risk factors among Latino youth warrants special consideration by the health care community because this group represents the fastest growing segment of the pediatric population in the United States,⁵ and it is estimated that up to 50% of Latino youth will develop T2D in their lifetimes.⁶

The Diabetes Prevention Program established that lifestyle modification is effective in delaying or preventing T2D in high-risk adult populations.⁷ The Diabetes Prevention Program has recently been translated to the community setting, with promising results.⁸ To date, very few studies have evaluated diabetes prevention programs for high-risk youth.⁹ As such, literature regarding the translation of diabetes prevention programs to youth in community settings has been mostly theoretical.¹⁰ Therefore, in this report, we describe the development, screening, enrollment, clinical presentation, and metabolic effects of a culturally sensitive, community-based diabetes prevention program for obese Latino youth.

Methods

Addressing Community Needs: Diabetes as a Focus

The St Vincent de Paul Medical and Dental Clinic is a community-based clinic located in Phoenix, Arizona, that offers no-cost primary and specialty health care services to uninsured adults and children. On average, the clinic population lives 200% below the federal poverty limit. Services are provided to the primarily Spanish-speaking clientele by volunteer physicians and nurse practitioners who are supported by clinic staff members. Type 2 diabetes has historically represented one of the most prevalent chronic conditions treated in the clinic. As a result, a family diabetes program was developed to address the unique needs of the clinic's population.

Development of the Pediatric Program

The family diabetes program offered diabetes care through a comprehensive approach using a culturally responsive model of care. Initially, the program focused on education and self-management for newly diagnosed adults and their spouses. However, as the number of children who attended the education sessions with their parents increased, the need for a diabetes prevention component specifically targeting high-risk Latino youth became evident. In 2005, the clinic staff, led by the dietitians, worked together to develop an age-appropriate lifestyle education program called Every Little Step Counts (ELSC), intended to reach children at highest risk for developing T2D who would otherwise not receive care.

Reaching Children at Highest Risk

To identify the most appropriate children for the ELSC program, a referral form was developed in collaboration with local school nurses who could refer their students (Figure 1). Although obesity (BMI $\geq$ 95th percentile for age and gender) was a requirement for

referral, each child had to possess at least two additional risk factors to be considered for the program. These criteria were based on the American Diabetes Association's screening recommendations for T2D in youth¹¹ and would ensure that only the highest risk youth be referred to the program. To ascertain a comprehensive metabolic profile of referred children, fasting laboratory values were requested by the nurses prior to the clinical visit. Collection of biochemical measures was then coordinated by the dietitians, who were certified diabetes educators.

On entry into the program, each child underwent a comprehensive medical history and physical exam by a physician that included height, weight, and BMI calculation as well as interpretation and discussion of the laboratory values. Following the medical visit, children and their parents were invited to attend a series of culturally appropriate healthy lifestyle education classes delivered by the bilingual and bicultural registered dietitians and supported by *promotoras* (lay health workers). The program was grounded within the unique values, beliefs, traditions, and expectations specific to the Latino community, which emerged through formative work and previous experience of the dietitians with their population (Table 1). The program's core values and the cultural specificity were threaded throughout the individual classes to address key issues related to health, such as (1) knowledge about weight, health, and diabetes; (2) nutritional education to identify foods high in sugar and saturated fat traditionally consumed by Latinos and ways to modify with healthy alternatives; (3) roles and responsibilities of the children and their families around communication and health; (4) physical activity education and encouragement; (5) self-esteem and self-efficacy for making healthy decisions; and (6) personal reflection of lifestyle goals, which included an individual healthy behavior plan and strategies for behavior change. In addition, common challenges and barriers to a maintaining a healthy lifestyle, such as the cost of eating healthfully, neighborhood safety, and coping with family distress, were addressed. At the conclusion of these classes, participants returned for a one-on-one life management appointment (LMA) with the dietitian. The LMA occurred approximately 12 weeks after the last class to address challenges in maintaining behavior change. Following the LMA, children returned for follow-up sessions on problem solving, dietary adjustments, and counseling.

The present analysis represents a retrospective chart review describing the baseline characteristics of the initial cohort of youth referred to the ELSC program. Additionally, follow-up data on a subset of youth who returned to the clinic after completing the lifestyle education program were analyzed. Clinical characteristics included height, weight, and BMI, with fasting laboratory values for insulin, glucose, total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides. This study was approved by the institutional review board at Arizona State University.

Statistics

Descriptive and metabolic characteristics are presented as mean $\pm$ SE. Cardiometabolic risk factors were classified as abnormal according to pediatric definitions by the International Diabetes Federation¹² for HDL cholesterol, triglycerides, and glucose and by the National Cholesterol Education Program for total cholesterol and LDL cholesterol.¹³ Children were also classified as having hyperinsulinemia if they had fasting insulin levels $> 15 \mu\text{U/mL}$.¹⁴ Gender comparisons at baseline were evaluated by independent-samples t tests and χ^2 analysis. Paired-samples t tests were used to examine changes in BMI and cardiometabolic outcomes in response to the program. All data were analyzed using SPSS version 16.0 (SPSS, Inc, Chicago, IL), with significance set at $P < .05$.

Results

Baseline characteristics of the 102 children referred to the ELSC program are presented in Table 2. No significant gender differences were noted for age, height, weight, BMI, insulin, triglycerides, total cholesterol, LDL cholesterol, or HDL cholesterol, but boys had significantly higher fasting glucose compared to girls. When genders were pooled to examine the prevalence of selected cardiometabolic risk factors, 60.6% had elevated fasting insulin levels, 9.4% had impaired fasting glucose, 32.1% had high triglyceride levels, 39.4% had high total cholesterol, 68.6% had low HDL cholesterol, and 43.0% had high LDL cholesterol.

Fifty youth who participated in the ELSC program had follow-up cardiometabolic data available in their medical charts. A flow diagram of youth who were enrolled in the ELSC program and had follow-up cardiometabolic data compared with those who were enrolled but did not have follow-up data is presented in Figure 2. Youth with and without follow-up data did not differ significantly at baseline in absolute levels of cardiometabolic risk factors or the prevalence of individual risk factors. It was not possible to determine why certain youth had complete data, nor were we able to perform an intention-to-treat analysis, because follow-up lab testing was not a requirement of the program and therefore was not documented in the medical charts. Over a mean interval of 392 ± 38 days, returning youth reduced BMI by 3.8% (from 30.4 ± 0.5 to 29.3 ± 0.5 kg/m², $P < .01$). In addition to decreases in adiposity, significant improvements were noted in several cardiometabolic risk factors (Figure 3). Collectively, children reduced total cholesterol by 5.4% ($P < .01$) and LDL cholesterol by 8.6% ($P < .01$) and increased HDL cholesterol by 9.3% ($P < .01$). These improvements corresponded to significant reductions in the prevalence of elevated total and LDL cholesterol. A 24.0% decrease was noted for fasting insulin (from 24.8 ± 2.8 to 18.9 ± 1.7 μ U/mL, $P < .05$). Triglyceride (from 127.1 ± 7.7 to 120.1 ± 8.6 mg/dL, $P = .40$) and glucose (from 90.2 ± 1.2 to 89.6 ± 1.2 mg/dL, $P = .70$) levels did not change significantly.

Discussion

Although obesity may be explained by a simple biologic process related to energy imbalance,¹⁵ the prevention and treatment of obesity have proven to be more challenging.^{16,17} We have presented the development, implementation, and metabolic results of a community-based diabetes prevention program for high-risk Latino youth. The high proportion of youth who presented with abnormal cardiometabolic risk factors at baseline underscores the significant disease burden experienced in this population. Obesity, dyslipidemia, hyperinsulinemia or insulin resistance, and prediabetes are highly prevalent in this population but may go unaddressed, because Latino youth are less likely to receive routine health screenings and medical care.¹⁸ It should be noted that the purpose of this program was to target the highest risk youth to provide access and services to those in most need. Therefore, the sample is not meant to be representative of all Latino youth but rather reflects the extent to which high-risk youth may be identified and appropriately referred for care.

In an attempt to estimate the potential reach of our program, we identified that referrals were derived from 4 nurse practitioners who worked with approximately 35 surrounding school-based health centers. It is difficult to know how many youth would have been eligible for our program, because routine screening for overweight and obesity was not performed for all students, but a recent school-based study of 6358 sixth graders from 42 middle schools found that >50% of Latino youth were overweight or obese, about 19% exhibited impaired fasting glucose, and 8.3% had hyperinsulinemia.¹⁹ These numbers suggest that despite the clinically important and sustained improvements noted in our cohort, additional resources

may be required to increase the overall impact for a broader population of high-risk Latino youth.

To increase the impact of interventions on obesity-related health among larger populations of youth, community efforts may be necessary. The growing number of studies that examine the impact of community-based lifestyle interventions on obesity-related health among Latino youth represents a promising direction. For example, the Behavior Opportunities Uniting Nutrition, Counseling, and Exercise (BOUNCE) study found that 12 weeks of combined nutrition and exercise programming delivered to Latino mothers and their daughters in community and school settings resulted in significant increases in aerobic fitness, with a trend toward reductions in high-fat food intake and sweetened beverage consumption among Latina girls. Despite these health improvements, no significant adiposity changes were noted among youth.²⁰ The BOUNCE intervention was of relatively short duration, so changes in obesity were not necessarily expected. In contrast, Johnston et al²¹ found that 6 months of intensive school-based lifestyle education (nutrition education and physical activity sessions) resulted in adiposity as well as cholesterol (total and LDL) improvements among overweight Latino youth aged 10 to 14 years. Furthermore, the total cholesterol reductions were maintained at 1-year follow-up, and the adiposity improvements were maintained at 2 years, suggesting that longer term studies may be necessary to see improvements in obesity and cardiometabolic risk factors.²¹ Both programs specifically targeted Latino youth and were strengthened by collaborating with established community entities to facilitate intervention delivery. Additionally, both interventions recognized the importance of family relationships and interactions that are critical to working with Latino communities.²²

The ELSC lifestyle education program delivered a culturally responsive curriculum to children and their parents in their own community by bilingual and bicultural dietitians and health educators. Families were encouraged to engage in regular physical activity and educated about using low-fat alternatives when preparing traditional meals. Having an appreciation for the cultural traditions as well as the resources available within the context of the community allowed the program staff members to better facilitate opportunities for making healthy changes. Culturally specific perceptions, attitudes, and expectations about health and health behaviors were addressed and interwoven within the context of the curriculum. These concepts included preparing healthy meals as a family in the context of access and cost, the origins of diabetes and diabetes-related complications from a biologic as well as a sociocultural point of view, gender roles, fitness to encourage physical activity over exercise, and, perhaps most important, separating weight or body size from health.

By focusing on improving health behaviors and outcomes rather than weight loss, the ELSC program acknowledges that many Latino families do not consider obesity a health risk. Obese Latino children are often thought of as healthy and lovingly referred to as “Gordo” by their families. In a recent study of Latino mothers of overweight children, 61% did not recognize their children as being overweight, and approximately half reported taking no steps to control what their children ate.²³ Moreover, Latina mothers may prefer heavier children despite desiring a thinner build for themselves. When Latino mothers were asked to rate health, fitness, and attractiveness of drawings corresponding to various body size growth curves in youth, Contento et al²⁴ found that they considered the outline corresponding to a BMI between the 50th and 75th percentiles to be too thin and the outline corresponding to the 97th percentile ideal. In other words, in the eyes of some Latina mothers, their children’s “ideal” body size in terms of health, fitness, and attractiveness corresponds to a BMI at which youth experience significant weight-related health conditions. The ELSC program emphasized health behavior changes to improve cardiometabolic risk markers rather than focusing on weight loss. Our experience working

with Latino families suggests that integrating medical visits and laboratory results into the lifestyle education curriculum represents a powerful opportunity to inform families about obesity-related health risk factors that do not interfere with perceptions about body size. Many of the children had family members with T2D and observed firsthand the morbidity associated with the disease. Therefore, presenting children with laboratory findings in the context of their own health may have further supported behavior change.

The health improvements observed following the ELSC program included decreases in BMI as well as cardiometabolic risk factors over an average follow-up of >1 year. The robust time frame between enrollment and reassessment speaks to the potential sustainability of delivering lifestyle education programs in a community setting. Specifically, we propose that community-based medical clinics may represent an ideal venue to address obesity-related disease risk factors, because these clinics often fill a gap in the health care system by providing services to underserved minority populations.²⁵ Many of the barriers to health care for Latino children, such as transportation, cultural differences, language competency, trust, and cost, may be more readily overcome by community clinics.²⁶

In support of our findings, the American Dietetic Association recently recommended community-based interventions as a means to reach the greatest number of youth.²⁷ The focus on community has been reiterated to academicians by the National Institutes of Health through the implementation of the Clinical and Translational Science Award. One of the goals of this program is to reengineer the clinical research enterprise through effective partnerships between academic researchers and community stakeholders to reduce health disparities through the translation of research into practice.²⁸ We describe a community-based diabetes prevention program that was a partnership between a community-based medical clinic, schools, and an academic research institution that resulted in clinically meaningful and potentially sustainable improvements in obesity and T2D risk factors in high-risk minority youth. Similar community-based participatory approaches to improve obesity-related health in children have received increased attention by the research community.²⁹ The extent to which the ELSC program can be adapted to other populations and settings warrants further investigation, as does the long-term implications of the observed health improvements on the tempo and trajectory of disease.

Despite the strengths of the ELSC program, which included collaborating with schools, focusing on a high-risk understudied population of youth, and offering a culturally appropriate community-based program, there are limitations that stand worthy of comment. First, despite the close relationship developed with referring school nurses, it was not feasible to contact every referred child prior to enrollment. As such, some of the children identified by the school nurses never made it to the clinic and thus may have been lost to follow-up. We are also unsure of how many children may have been eligible to participate but were not screened by the school nurses. Therefore, we were unable to assess the acceptance to participation and determine a true participation rate. Second, because the blood draws for metabolic assessments at baseline were ordered by the nurses prior to coming to the clinic, some children had incomplete or non-fasting laboratory assessments that were excluded. Third, only a portion of the initial cohort returned to the clinic following the program for follow-up laboratory assessments. Although these children did not differ at baseline from those who did not have follow-up assessments available, a selection bias for highly motivated children is possible. Given the extent of the obesity epidemic among Latino youth, programs may have to focus more broadly on improving obesity-related health on a population level through social, environmental, or policy efforts that may be less dependent on individual motivation. These limitations should be taken in the context of the retrospective nature of this study, which more closely represents clinical practice in the community setting than traditional prospective, randomized controlled studies implemented

in academia, as well as the state of the science in field. As the body of literature continues to grow in this area, it is likely that multifaceted, multilevel programs will be necessary to address the complexity and breadth underlying obesity among Latino communities.

In conclusion, we have described the development, implementation, and metabolic impact of a community-based diabetes prevention program for obese Latino youth. The substantial proportion of youth presenting with elevated cardiometabolic risk factors supports the need for targeted intervention strategies, and the promising findings indicate the potential for community-based approaches to improve the health of high-risk Latino youth.

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References

1. Ogden CL, Carroll MD, Flegal KM. High body mass index for age among US children and adolescents, 2003–2006. *JAMA*. 2008; 299(20):2401–2405. [PubMed: 18505949]
2. Whitaker RC, Orzol SM. Obesity among US urban preschool children: relationships to race, ethnicity, and socioeconomic status. *Arch Pediatr Adolesc Med*. 2006; 160(6):578–584. [PubMed: 16754818]
3. Goran MI, Bergman RN, Avila Q, et al. Impaired glucose tolerance and reduced β -cell function in overweight Latino children with a positive family history for type 2 diabetes. *J Clin Endocrinol Metab*. 2004; 89(1):207–212. [PubMed: 14715851]
4. Cruz ML, Weigensberg MJ, Huang TT, Ball G, Shaibi GQ, Goran MI. The metabolic syndrome in overweight Hispanic youth and the role of insulin sensitivity. *J Clin Endocrinol Metab*. 2004; 89(1): 108–113. [PubMed: 14715836]
5. US Census Bureau. Hispanic population reaches all-time high of 38.8 million. <http://www.census.gov/Press-Release/www/releases/archives/population/011193.html>
6. Narayan KM, Boyle JP, Thompson TJ, Sorensen SW, Williamson DF. Lifetime risk for diabetes mellitus in the United States. *JAMA*. 2003; 290(14):1884–1890. [PubMed: 14532317]
7. Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*. 2002; 346(6):393–403. [PubMed: 11832527]
8. Ackermann RT, Finch EA, Brizendine E, Zhou H, Marrero DG. Translating the Diabetes Prevention Program into the community: the DEPLOY pilot study. *Am J Prev Med*. 2008; 35(4):357–363. [PubMed: 18779029]
9. Franks PW, Huang TT, Ball G. Lifestyle intervention for type 2 diabetes risk reduction: using the Diabetes Prevention Program to inform new directions in pediatric research. *Can J Diabetes*. 2007; 31(3):242–251.
10. Huang TTK, Goran MI. Prevention of type 2 diabetes in young people: a theoretical perspective. *Pediatr Diabetes*. 2003; 4:38–56. [PubMed: 14655523]
11. American Diabetes Association. Type 2 diabetes in children and adolescents. *Pediatrics*. 2000; 105(3):671–680. [PubMed: 10699131]

12. Zimmet P, Alberti G, Kaufman F, et al. The metabolic syndrome in children and adolescents. *Lancet*. 2007; 369(9579):2059–2061. [PubMed: 17586288]
13. National Cholesterol Education Program. Highlights of the report of the Expert Panel on Blood Cholesterol Levels in Children and Adolescents. *Pediatrics*. 1992; 89(3):495–501. [PubMed: 1741227]
14. McLaughlin T, Abbasi F, Cheal K, Chu J, Lamendola C, Reaven G. Use of metabolic markers to identify overweight individuals who are insulin resistant. *Ann Intern Med*. 2003; 139(10):802–809. [PubMed: 14623617]
15. Pagliassotti MJ, Gayles EC, Hill JO. Fat and energy balance. *Ann N Y Acad Sci*. 1997; 827:431–448. [PubMed: 9329773]
16. Summerbell CD, Waters E, Edmunds LD, Kelly S, Brown T, Campbell KJ. Interventions for preventing obesity in children. *Cochrane Database Syst Rev*. 2005; 3 CD001871.
17. Summerbell CD, Ashton V, Campbell KJ, Edmunds L, Kelly S, Waters E. Interventions for treating obesity in children. *Cochrane Database Syst Rev*. 2003; (3) CD001872.
18. Flores G, Fuentes-Afflick E, Barbot O, et al. The health of Latino children: urgent priorities, unanswered questions, and a research agenda. *JAMA*. 2002; 288(1):82–90. [PubMed: 12090866]
19. The HEALTHY Study Group. Risk factors for type 2 diabetes in a sixth-grade multiracial cohort: the HEALTHY study. *Diabetes Care*. 2009; 32(5):953–955. [PubMed: 19196888]
20. Olvera N, Bush JA, Sharma SV, Knox BB, Scherer RL, Butte NF. BOUNCE: a community-based mother-daughter healthy lifestyle intervention for low-income Latino families. *Obesity (Silver Spring)*. 2010; 18 suppl 1:S102–S104. [PubMed: 20107454]
21. Johnston CA, Tyler C, McFarlin BK, et al. Weight loss in overweight Mexican American children: a randomized, controlled trial. *Pediatrics*. 2007; 120(6):e1450–e1457. [PubMed: 18055663]
22. Tyler C, Johnston CA, Madhukar M, Foreyt JP. Practical strategies for treating obesity in Mexican Americans. *Obesity Manag*. 2005; 1(6):247–250.
23. Hackie M, Bowles C. Maternal perception of their overweight children. *Public Health Nursing*. 2007; 24(6):538–546. [PubMed: 17973731]
24. Contento IR, Basch C, Zybert P. Body image, weight, and food choices of Latina women and their young children. *J Nutr Educ Behav*. 2003; 35(5):236–248. [PubMed: 14521823]
25. Stettler N, Elliott MR, Kallan MJ, Auerbach SB, Kumanyika SK. High prevalence of overweight among pediatric users of community health centers. *Pediatrics*. 2005; 116(3):e381–e388. [PubMed: 16140682]
26. Flores G, Abreu M, Olivar MA, Kastner B. Access barriers to health care for Latino children. *Arch Pediatr Adolesc Med*. 1998; 152(11):1119–1125. [PubMed: 9811291]
27. Position of the American Dietetic Association: individual-, family-, school-, and community-based interventions for pediatric overweight. *J Am Diet Assoc*. 2006; 106(6):925–945. [PubMed: 16812927]
28. Zerhouni EA, Alving B. Clinical and translational science awards: a framework for a national research agenda. *Transl Res*. 2006; 148(1):4–5. [PubMed: 16887491]
29. Economos CD, Irish-Hauser S. Community interventions: a brief overview and their application to the obesity epidemic. *J Law Med Ethics*. 2007; 35(1):131–137. [PubMed: 17341221]

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Child's Name: _____ DOB: ____/____/____ Gender: ☐ Male ☐ Female Parent or Guardian's Name: _____ Address: _____ City/State/Zip: _____		Referring Provider: _____ Referral Date: ____/____/____ Referral Reason: _____ Referral Source: _____ Referral Type: _____ Referral Status: _____	
Physician's Note: (If "X" is checked, please fill in the following information) Please check "X" for the following conditions: () Allergic reaction to food or medicine () Asthma () Diabetes () Epilepsy () Heart disease () High blood pressure () Kidney disease () Liver disease () Mental health problems () Other chronic condition(s)			
Physician's Signature: _____ Date: ____/____/____			

Figure 1.
 Child referral form to the Every Little Step Counts program from school-based health care providers.
 Note: BMI = body mass index.

Figure 2.

Flow diagram of youth enrolled in Every Little Step Counts: prevalence of risk factors in the total sample (N = 102).

Note: HDL = high-density lipoprotein; LDL = low-density lipoprotein.

* $P < .05$, pre vs post.

Figure 3.

Changes in cholesterol levels among obese Latino youth.

Note: HDL-c = high-density lipoprotein cholesterol; LDL-c = low-density lipoprotein cholesterol; Total-c = total cholesterol.

* $P < .05$.

Table 1**Core Values and Cultural Aspects of the Every Little Step Counts Program**

Confianza, respeto, y personalismo (trust, respect, and personal interaction): personal connections between program staff and patients are fostered

Familismo (familism): close family relationships and bonds are emphasized and supersede any one individual's needs

Roles: embracing mother as caregiver, father as head of the family, and children as the central focus

Food: considered an integral part of culture, with traditional foods encouraged and healthy modifications presented as alternatives

Body image: celebrating all body types and emphasizing improved health over weight loss

Language: classes are delivered in a mixture of English and Spanish to engage both the children and their parents

Costs: the program is offered at no cost to families, but families are held responsible for their appointments and commitments

Table 2

Descriptive and Metabolic Characteristics of Youth

Characteristic	Boys (n = 51)	Girls (n = 51)	Total (N = 102)
Age (years)	11.6 ± 2.7	12.0 ± 3.2	11.8 ± 3.0
Height (cm)	150.2 ± 16.6	150.7 ± 14.6	150.4 ± 15.5
Weight (kg)	69.5 ± 21.2	71.5 ± 19.7	70.5 ± 20.4
BMI (kg/m ²)	30.1 ± 4.6	30.8 ± 5.2	30.4 ± 4.9
Glucose (mg/dL)	93.5 ± 7.5*	88.8 ± 8.4	91.0 ± 8.3
Insulin (μU/mL)	24.4 ± 19.5	24.1 ± 16.0	24.2 ± 17.6
Triglycerides (mg/dL)	139.0 ± 69.9	139.0 ± 93.1	139.0 ± 82.2
Total cholesterol (mg/dL)	171.3 ± 43.3	168.8 ± 44.1	170.0 ± 43.5
LDL cholesterol (mg/dL)	106.7 ± 38.9	105.5 ± 40.8	106.1 ± 39.6
HDL cholesterol (mg/dL)	38.7 ± 8.3	37.2 ± 8.8	37.9 ± 8.5

Note: Data are expressed as mean ± SD. BMI = body mass index; HDL = high-density lipoprotein; LDL = low-density lipoprotein.

* $P < .05$.