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Addressing obesity among Latino youth in a pediatrician's office: Preliminary findings of an obesity prevention program

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Abstract

Objectives: To examine whether Latino youth who participated in a clinic-based, culturally and linguistically tailored pediatric weight management program experienced changes in BMI, BMI percentile, and waist circumference from baseline to the end of the program. Design: Prospective cohort study. Setting: A clinic-based wellness center in Orange County, California. Participants: A total of 240 Latino youth who had been clinically diagnosed as overweight or obese participated in an eight-week weight management intervention. Intervention: Patients participated in the 8-week intervention program. This pediatric weight management program combined multiple approaches to intervene childhood obesity. The components included: 1) Medical Consultation, 2) Counseling, 3) Nutrition, and 4) Physical Activity. Outcome Measures: BMI, BMI percentile, and waist circumference (adiposity surrogates) of participants were measured at the baseline and at the 8th week. Psychosocial functioning of youth was reported by their parents. Results: Participants experienced significant decreases in BMI and BMI percentile after the eight-week intervention compared to baseline. Decreases in the outcome variables did not vary by youth's baseline level of psychosocial functioning. Conclusion: This study provided preliminary evidence that this culturally tailored intervention program may be successful in reducing indicators of obesity. A follow-up study is needed with a control group to further evaluate the effectiveness of this clinic-based program tailored for Latino youth, and whether program effectiveness varies according to youth's baseline level of psychosocial functioning.

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INTRODUCTION

Childhood obesity epidemic has become a U.S. significant public health concern as one in every three children and adolescents (31.7%) aged 2-19 is overweight or obese [1-3]. Obese children and youth have increased risk for many diseases, including type-2 diabetes, heart disease, some forms of arthritis, and several cancers [1,4]. In addition, obesity affects minority populations disproportionately. Obesity rates are highest among non-Hispanic Black girls and Latino boys [1-5]. According to the National Health and Nutrition Examination Survey [6], 23% of Mexican

American adolescents between ages 12 and 19 were more likely to be overweight compared to 14% of non-Hispanic White adolescents; and 22% of Mexican American children ages 6 to 11 years old were overweight compared to 14% of non-Hispanic White children. While Latino population has increased twofold since 1980 and constitutes 13% of the total U.S. population [7], Latinos comprise almost one-third of the population in Orange County, California. Therefore, it is very important to focus obesity intervention efforts on this large and at-risk population. Literature is rich with systematic reviews of obesity prevention programs, many of which provide evidence

that modifying diet and increasing physical activity is efficacious in preventing obesity for children and youth in general [8-9]. However, evidence on the effectiveness of culturally tailored programs to address poorer retention in programs and language barriers, particularly implementation of clinic-based interventions in low-income Latino youth is still limited [10]. This study was designed to evaluate a clinically based, culturally tailored pediatric weight management program for overweight and obese Latino youth in Orange County, CA.

Obesity intervention among Latino youth

Previous studies indicated that interventions focused on nutrition and physical activity may effectively promote lifestyle changes that reduce weight and other cardiovascular heart disease (CHD) risk factors among youth [11-12]. Convincing studies, including the Stanford Heart to Heart Project and the Diabetes Prevention Program, have shown efficacy of clinic-based lifestyle interventions for weight loss, sustained weight loss and CHD risk factor reduction [13-14]. Research also shows that clinic-based lifestyle interventions in groups may be as effective for achieving weight loss [15-16] and more economical compared to individual counseling [17]. However, these types of interventions have often not been implemented and evaluated in low social economic status communities that most need them, and large gaps exist between the most basic standards of clinical care for obesity prevention and treatment and current practice. For example, only 52% of primary care providers reported routinely plotting a BMI percentile for their patients in 2006 [18-10]. The US Preventive Services Task Force recently reviewed evidence for obesity screening and treatment and recommended that primary care providers screen and refer children who are 6 years and older to comprehensive multidisciplinary treatment programs that meet guidelines for treatment of obesity [10-20]. Thus, at the most basic level, primary care providers should fulfill the identification and referral role when they encounter an obese patient. The majority of pediatric providers state a desire to participate in obesity prevention and treatment, beyond mere screening and referral, and have requested resources to help them participate in these activities [21-22].

The present study

This is a preliminary study to investigate changes in obesity-related outcomes for underserved, low-income, minority youth who participated in an obesity intervention program that consisted of standard medical care, psychological counseling, nutrition class, and physical activity. This study was a response to the need for comprehensive multidisciplinary treatment

programs and evaluation of intervention programs, particularly targeting ethnic minorities. Specifically, this study examined whether Southern Californian Latino youth experienced significant improvements on indicators of obesity after they participated in a pediatric weight management program. We expected that BMI, BMI percentile, and waist circumference would significantly decrease after participating in the intervention program at post-test (eight weeks after). We also examined whether program results varied depending on levels of psychosocial functioning in order to obtain information on whether the program reaches youth who have low levels of psychosocial functioning since evidence from previous studies with a sample of Latino youth suggested that obesity was significantly associated with subclinical depressive symptoms, low self-esteem, poor coping skills, and anxiety [23-24]. If successful, this study may provide preliminary evidence for broad implementation of clinic-based obesity interventions in minority populations and guidance about the selection of strategies for relatively effective programs in reducing obesity for community-based health professionals.

METHODS

Participants

Some participants were recruited from a State funded health plan public aid program while others were recruited from other family health care plans. Both health plans referred children to the Wellness Center; the health plans provide care to children of working parents who do not have health insurance and do not qualify for no-cost State sponsored health care. The eligibility requirement was that every child or adolescent was clinically diagnosed as overweight or obese (based on CDC guidelines) [25]. Data from this study were from patients seen between 2007 and 2008, with a total of 548 children and adolescents, of whom 374 had complete psychosocial and anthropometric data at baseline. Of these participants, 64.2% (n= 240) completed the eight-week intervention program and completed the end-of-the-program assessment. The analyses presented in this study were conducted on those 240 participants.

This intervention program follows all the recommendations of the 200 Expert Guidelines [26]. This program was developed in a Wellness Center in Orange County, California by the program director, a board certified pediatrician, and his team (consisting of a psychologist, a nutritionist, and a fitness trainer), who are all bilingual and bi-cultural (English and Spanish). This program fostered supportive communication among program staff, patients, and their parents, since the program primarily targets Latino children and

adolescents whose parents are recent immigrants with low income. The Wellness Center was a federally qualified health care center. Patients' visits are compensated accordingly without incurring any additional costs. The resources of the organization are offered in kind to the program. All staff members involved in the intervention program were Hispanic; hence minimizing language and cultural barriers with patients and their families.

The intervention program

The components of this program included: 1) *Medical Consultation*. A Board Certified Pediatrician conducted a comprehensive medical consultation for each child and adolescent at baseline. The consultation included a physical examination, laboratory evaluation, medical and family history and assessment of diabetes, hypertension and other obesity-related co-morbidities. 2) *Counseling*. Participants received a group counseling session from a licensed psychologist at least once during this 8-week intervention to address emotional problems and perceived barriers associated with weight management. The group usually consisted of 10-12 people. 3) *Weekly Nutrition Class*. A registered dietician (RD) developed a culturally appropriate curriculum to increase participants' and their parents' knowledge about nutrition, the purchase, and preparation of healthy foods. Sessions, pamphlets, and brochures were bilingual and culturally specific. The nutrition curriculum consisted of one hour-long class for each group of participants and their caretakers every week during the 8-week intervention. 4) *Weekly Physical Activity Training*. During the weekly visit, after the nutrition class, each group of participants received a physical activity training. A certified fitness expert designed age appropriate activities and exercises tailored to the current physical abilities and tolerance levels of overweight and obese children and adolescents. Guidance and actual exercises that followed the guidelines for the Presidential Fitness Test and the California Board of Education FitnessGram were incorporated in the physical activity program.

Measurements

BMI and BMI percentiles. BMI measures were performed using an automated electronic scale that was calibrated on a regular basis. BMI was calculated based on height and weight: $\text{weight (kg)} / [\text{height (m)}]^2$. Although body mass index (BMI) does not measure body fat directly, it is an inexpensive and convenient method to identify individuals belonging to the overweight and obese categories, which may be linked to health problems. BMI percentiles were determined to indicate the relative position of the child's BMI index among children of the same sex and age. BMI percentiles are commonly used in the United States to

assess the size and growth patterns of individual children 2 to 19 years old.

Waist circumference. Staff members followed appropriate protocol to ensure accurate measurements of waist circumference. It was measured by locating in the upper hipbone the top of the right iliac crest; then a measuring tape was placed in a horizontal plane around the abdomen at the level of the top of the iliac crest. The measurement was taken at the end of a normal exhalation. This process was repeated twice and measurements averaged [27].

Psychosocial Functioning. The Pediatric Pictorial Symptom Checklist (PPSC) was used to measure the psychosocial functioning of children in this study [28]. The PPSC is a standardized, brief screening questionnaire that is used by pediatricians and other healthcare professionals to improve the detection and treatment of psychosocial problems in children ages 4-16 years. This free, brief questionnaire requires less than ten minutes for the parent/caretaker to complete and evaluates the functioning of the child in several psychosocial areas: feelings, behavior, family, school, and friends. The PPSC has been referenced in a large number of studies, including those using the same minority group that was used in the present study [29-30]. The parent/caretaker rates each item for how truly it describes the child (as far as the parent/caretaker knows), using the following scale: 0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true. Spanish and English language versions of this screening tool are available. The test-retest reliability of the PPSC ranges from $r = 0.84 - 0.91$ [31].

Procedures

Permission to enter and analyze data was granted by the director of the Wellness Center, who had previously collected consent forms from parents of participating youth in the intervention program for research-related purposes. In addition, this study received a formal approval from the Institutional Review Board of the first author's affiliation prior to the data analyses. A baseline demographic questionnaire and the Pictorial Symptom Checklist [31] were completed by participants' parents. Anthropometric data (height, weight, and waist circumference) were collected from all participants weekly from baseline until the conclusion of the eight-week intervention program.

Data Analysis

Statistical analysis was performed using SPSS 18.0. Descriptive statistics, specifically frequencies and percentages, were performed on the following demographic variables: ethnicity, gender, and funding source. Mean and standard deviation were calculated for age, total PPSC score, BMI, BMI percentile, and

waist circumference. Internal consistency reliability for the 35-item PPSC scale was determined by calculating Cronbach's alpha. Attrition analyses on baseline demographic characteristics, BMI, BMI percentile, and waist circumference were conducted to determine whether differences existed between those who completed both baseline and end-of-program assessments and those who did not.

Changes in the outcome variables were calculated for BMI, BMI percentile, and waist circumference by subtracting baseline scores from end-of-the program scores. Next, ANOVAs were conducted to determine whether BMI, BMI percentile, and waist circumference change scores varied according to baseline demographic characteristics, while a Pearson's correlation coefficient was conducted to determine whether the change scores varied according to psychosocial functioning (PPSC) scores. If the PPSC score or any of the baseline demographic characteristics were significantly associated with the change scores, they were included in subsequent analyses as covariates. Last, three repeated measures ANOVAs were conducted to determine whether BMI, BMI percentile, and waist circumference measurements changed significantly from baseline to the end of the eight-week program, after controlling for covariates.

RESULTS

Baseline Demographic Characteristics

Over half of the participants (n= 147, 61.3%) were

male. The majority (n= 199; 82.9%) of the participants reported being Mexican American; an additional 12 participants (5.0%) reported being Latinos from other countries. The average age was 12.78 (SD = 3.73). Possible total scores on the PPSC ranged from 0 to 35. The average score was 5.74 (SD = 10.77). Internal consistency reliability for the 35-item PPSC scale was with Cronbach's alpha = .90.

Attrition Analyses

Independent samples t-tests and chi-square analyses indicated that there were no differences between those who were not part of the analytic sample because they completed only the baseline assessment (n= 134) and those who comprised the analytic sample (n= 240) on baseline age, BMI, BMI percentile, waist circumference, ethnicity, age, and being funded by the Orange County, CA SCHIP Program. However a higher percentage of males remained in the program after eight weeks (69.7%) compared to females (57.5%).

Changes in BMI, BMI Percentile, and Waist Circumference

Table 1 presents the mean BMI, BMI percentile and waist circumference at baseline and at the eight-week program. Average change from baseline to the end of the program for these outcomes is also presented. Across the sample, BMI was reduced by 1.38 points (SD= 1.31), BMI percentile was reduced by 1.18 percent (SD= 2.02), and waist circumference was reduced by nearly one inch (M= -0.92, SD= 1.59).

Table 1. Summary of outcomes (n=240).

	Baseline	Week 8 (end of program)	Change (Week 8 – Baseline)
	Mean ± SD	Mean ± SD	Mean ± SD
BMI	29.12 ± 5.29	27.75 ± 5.27	-1.38 (1.31)*
BMI Percentile	98.91 ± 2.25	97.72 ± 3.37	-1.18 (2.02)*
Waist Circumference (inches)	38.36 ± 6.11	37.45 ± 5.93	-0.92 (1.59)

* Repeated Measures ANOVA analyses indicated that change in the outcome was statistically significant (p < .0001).

ANOVA analyses indicated that change in waist circumference varied by age, such that increasing age was associated with less change in weight circumference (β= -.245, p=.000). For this reason, age was included as a covariate in the subsequent analyses involving waist circumference change. There was a nearly-significant trend (p= 0.08) such that males experienced greater reductions in BMI (M= -1.49, SD=

1.26) compared to females (M= -1.19, SD= 1.88). For this reason, we included gender as a covariate in the subsequent analyses involving BMI change. Baseline levels of psychosocial functioning was not related to changes in BMI, BMI percentile and waist circumference. Therefore psychosocial functioning was not included as a covariate in subsequent analyses.

Repeated measures ANOVA results indicated that from

baseline to the end of the program: (1) reductions in BMI were significant after adjusting for gender ($F_{(1, 237)} = 49.55, p < .0001$), (2) reductions in BMI percentile were significant ($F_{(1, 239)} = 83.1, p < .0001$), and (3) reductions in waist circumference were not significant after adjusting for age ($F_{(1, 230)} = 1.503, p = 0.22$). Hence, reductions in waist circumference were contingent upon age (with increased age associated with less change in waist circumference). Please see Table 2.

Table 2. Repeated measures ANOVA results for outcome variables

	F ¹	p
Outcome		
BMI		
Time	260.58	0.000
Gender x Time	0.000	0.983
BMI Percentile		
Time	83.19	0.000
Waist Circumference		
Time	1.503	0.221
Age x Time	14.64	0.000

¹F-ratios derived from Greenhouse-Geiser test statistic calculations.

DISCUSSION

The purpose of this study was to evaluate a clinic-based, culturally and linguistically tailored pediatric weight management program in Orange County, in reducing BMI, BMI percentile, and waist circumference among overweight and obese Latino youth. The secondary goal was to explore whether baseline levels of psychosocial functioning were associated with changes in these obesity-related outcomes. While reduction in waist circumference was not significant, average BMI and BMI percentile decreased significantly at eight weeks compared to that of baseline. Although the analyses for this study were limited to the 8-week intervention period (due to a high attrition rate at 6-month and 12 month follow ups), these physiological changes are promising, given that the nutrition and physical activity components of the intervention was only once a week. The study also showed that it is feasible to deliver the intervention program at a pediatric clinic, run by staff of the same ethnicity of the patients, located in a low-income community. The findings of this study suggest that participation in this program is linked to reductions in obesity. Consistent with evidence from previous studies, the results of this study indicated that interventions addressing multiple components, such as physical activity, nutrition, sedentary behavior reduction, and counseling are more efficacious than those that use fewer components [32-33]. Furthermore, the findings of this study were consistent with that of

previous findings, which suggest that culturally-tailored interventions are more efficacious than those where culture is not incorporated [34-35].

Previous studies indicated that childhood obesity was associated with psychosocial functioning including anxiety, depression, and social withdrawal [9,13]. However, results from our study indicated that changes in BMI and BMI percentiles did not vary according to baseline levels of psychosocial functioning. One possible explanation could be that the measure we used was not sensitive to assess this aspect among the sample population. The other possible explanation may be that the awareness of psychosocial functioning from parent's report could not fully reflect their children's level of this aspect. On the other hand, our finding could be encouraging in that the components of the intervention were successfully reaching the youth regardless of their psychosocial level. However, further investigation is needed to determine the relationships.

Limitations

A few limitations in this study should be mentioned. First, the results of this study were based on a sample of Latino youth living in Southern California, who were the children of newly immigrated and low-income parents. Therefore, caution is needed with the generalization of these results to other Latino youth living in other geographic regions with different socioeconomic status, and to non-Hispanic ethnic groups.

Second, attrition is inevitable in a longitudinal program. The participants in this sample were a very mobile population, who do not have stabilized jobs, whose phone number change frequently, whose medical coverage change with frequent lapses. Attrition due to loss or lack of interest, lack of child care, and transportation issues add to the burden of treating and/or following up with these populations for a long period of time. There remain the possibilities that those who dropped out did so because they found the program ineffective, or that those who did not return for reassessment were embarrassed by their failure to maintain weight loss [36]. Although relatively high attrition rates were observed, our attrition analyses showed that baseline characteristics of people who dropped out of the program were not different from those who completed 6 month and 12 month follow-ups. Furthermore, those who did return for 6 and 12 month follow-ups tended to maintain their BMI and BMI percentile reductions. These findings are encouraging; however more outreach efforts in future evaluations of the program are needed to minimize attrition.

Third, data for psychosocial functioning was based on

questionnaires completed by the parents of the younger patients. Although all parents lived with their participating children, awareness of the child's psychosocial functioning may vary considerably. Therefore, interpretation of parent-reported data should be made with caution. Furthermore, the PPSC was only collected at baseline; therefore, changes in this construct after the eight-week program, as well as the extent to which it co-varies with changes in adiposity measures could not be determined.

Forth, this study was a pre-post design without a control group, therefore the results cannot offer strong evidence that the program caused the changes in BMI and BMI percentiles between baseline and after 8-week of the intervention. There may be a number of confounding variables that could have explained the changes, such as changes in availability of food in the community, health education program at schools or other public health campaigns. To clarify, the campaigns at the time of the data collection of this study were only publicity about the obesity epidemic and general information available on the websites of large medical organizations and health plans. No organized similar comprehensive medical interventions were conducted in the area at the time.

Conclusion

This study provided preliminary information for us to draw a speculation that youth, regardless of their baseline level of psychosocial functioning, may experience improvements in indicators of obesity by participating in a comprehensive, and clinic-based program. Previous studies showed that obesity interventions using multiple components were more efficacious than those that address less. In order to illustrate the importance and effectiveness of applying multiple components to affect obesity risk factors among Latino youth, a clinical trial is needed to further evaluate this program. The need for congruent efforts is particularly important for potentially effective intervention programs in low-income communities that experience disproportionate health disparities.

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