Pediatric Overweight Prevention through a Parent Training Program for 2–4 Year Old Latino Children

Wendy Slusser, MD, MS,1–3 Fred Frankel, PhD,4 Kristel Robison, MSW,1 Heidi Fischer, MPH,5 William G. Cumberland, PhD,5 and Charlotte Neumann, MD, MPH1–3

Abstract

Background: Latino preschool children in the United States are at high risk for obesity. The objective of this study was to measure over a one-year period whether a parent training based on social learning theory combined with evidence-based interventions to promote optimal nutrition and physical activity will reduce the upward trend of BMI z-scores in groups of 2–4 year old Latino children living in low-income households.

Methods: Seven weekly classes with 2 booster classes were delivered to low-income Latino parents with 2–4 year old children. A randomized controlled pilot study evaluated the effectiveness of the intervention that contrasts 61 children whose parents were randomized to receive Parent Training (PT) with 60 Wait-list (WL) subjects. Forty subjects did not attend the one-year follow up assessment, resulting in 81 subjects who have measurements for both baseline and one-year follow up assessments. To adjust for differential dropout rates and missing observations, imputation of missing data was done using a carefully constructed model that included relevant independent variables.

Results: There were no significant subject differences between groups at baseline for family characteristics and BMI categories for child and parent. Children in the intervention group decreased their BMI z-scores significantly on average by .20 (SE=.08) compared to children in the control group who increased z scores on average by .04 (SE=.09) at one year (P<.05).

Conclusions: Parent training is effective to reduce the risk of overweight in preschool Latino children living in low-income households. The findings need to be examined in a larger sample of children.

Introduction

In the past 40 years, pediatric obesity rates have tripled in the United States with high pediatric overweight and obesity rates seen as early as preschool age (21.2%, Body Mass Index (BMI) >85 percentile) and rising even higher in elementary school age (35.5%, BMI >85 percentile).1,2 Reports of overweight and obesity rates differ among preschool (2–5 year old) African-American (26.0%) and Mexican-American (27.7%) children compared to Caucasian children (17.4%).2 The ethnic and racial disparities are also evident in the higher incidence of co-morbidities associated with obesity such as type 2-diabetes, hypertension and heart disease in the Latino and African-American populations.3,4,5

Intervention programs for high-risk populations need to be introduced well before and during elementary school in order to prevent childhood obesity.6–8 Early intervention programs can foster healthy behaviors early in life, that can in turn reduce risk of obesity later in life.9,10 The Institute of Medicine (IOM)8,11 recommends parents play a key role in the promotion of healthful eating behaviors and regular physical activity for their children. Parent’s influence over their child’s eating and physical activity habits is complex, however. Parents act as important role models, for instance, while their children are forming their attitudes around physical activity by influencing both the domain of predisposing factors (self-efficacy, beliefs and enjoyment), and the enabling factors (environmental and physical abilities).12–14 Furthermore, the multifaceted role a parent plays in determining their

1Mattel Children’s Hospital, UCLA, Department of Pediatrics, University of California, Los Angeles, School of Medicine, Los Angeles, CA.
2Department of Community Health Sciences, UCLA School of Public Health, Los Angeles, CA.
3Venice Family Clinic Simms Mann Health and Wellness Center, Department of Pediatrics, Venice, CA.
4Department of Psychiatry and Biobehavioral Sciences, UCLA School of Medicine, Los Angeles, CA.
5Department of Public Health-Biostatistics, UCLA School of Public Health, Los Angeles, CA.
 Researchers agree implementing effective behavioral methods to prevent and treat childhood overweight requires proficiency in general parenting skills that include: 1) Being consistent in setting expectations for diet and exercise; 2) Effectively using praise directed at the child’s healthy behavior; and 3) Setting limits when children disobey. In addition, parents can create a supportive home environment for physical activity by regulating television-viewing behaviors.

Parents may benefit from specific programs to influence their children’s healthy eating and physical activity. The Social Learning framework is one successful approach to parent skill building and has demonstrated effectiveness enhancing parenting skills. In placebo-controlled trials, parent training based on social learning is among the most effective means of affecting children’s behavior, even benefiting untreated siblings. The parent training sessions incorporate techniques of modeling and behavioral rehearsal. Furthermore, “homework assignments” facilitate generalization from the training sessions to the home. Recent research has identified parenting strategies that are associated with increases in healthy eating and exercise among children. These strategies include parental use of positive reinforcement, appropriate discipline techniques, and parent monitoring of food intake and behavior. In contrast, parent use of food as a reward, insistence on eating everything on the plate, and trying to get the child to eat when not hungry is associated with unhealthy eating. Furthermore, helping parents to establish daily routines is associated with better compliance in medical settings. To our knowledge, however, there has not been a study that has tested introducing parenting strategies in the context of nutrition and physical activity among low-income Latino parents of preschool children and following the child’s weight and height over time.

To develop and test innovative strategies to promote physical activity and healthy eating among Latino children within the context of the health and emotional wellbeing of the family and child, we developed the Pediatric Overweight Prevention through Parent Training Program (PT). The PT program combines a social learning based Parent Training program with evidence-based interventions to promote healthy nutrition and physical activity among children in low-income Latino families.

The purpose of this randomized controlled pilot study was to examine the effects of this multi-component Parent Training Program on the prevention of overweight (BMI ≥ 85-94 percentile) and obesity (BMI ≥ 95 percentile) among Latino children ages 2–4 years old. The hypothesis was: Over a one-year period, parent training based on social learning theory combined with evidence-based interventions to promote optimal nutrition and physical activity will reduce the upward trend of BMI z-scores in groups of 2–4 year old Latino children. This paper reports on the baseline demographic characteristics of the study sample and the one-year BMI z-score outcomes. Future papers will report on the child’s food intake, healthy food preferences, and maternal child feeding characteristics.

Methods
Study Design
The study was conducted in Los Angeles at the Venice Family Clinic (VFC) Simms/Mann Health and Wellness Center, and community sites including Los Angeles Unified School District (LAUSD) preschools, Santa Monica Head Start Program, the Mar Vista Family Center and the Children’s Bureau. Each recruitment site serves low-income predominately Latino families.

The Sample
All families were recruited during health care clinic visits at VFC, or in the classrooms at the community sites between the years 2006-2009. Interested parents were screened for the following inclusion criteria: having at least one child between the ages of 2 and 4 years old living in the home; Latino as per self-stated ethnicity. Exclusionary criteria were previous diagnosis of failure to thrive and medical complications associated with their overweight status such as Prader-Willi Syndrome.

After recruitment, the parent/guardian gave written consent for themselves and their preschool child to participate in the study. Following the consent process, an assessment of the parent/guardian and child’s weight took place. All of the adult participants of the study ended up being the mother of the child participant, therefore, we will refer to the adult participant from now on as mother. Children were then stratified by BMI percentile and gender and randomly assigned through a computer program developed for this study to one of two conditions: 1) the experimental condition: participated in nine sessions of parent training based on social learning (PT) delivered over 15-17 weeks; or 2) the wait list control condition (WL): received care as usual and a standard nutritional informational pamphlet developed by the Women, Infants, and Children’s Supplemental Food Program. This study was approved by the University of California, Institutional Review Board, the VFC, the LAUSD, Santa Monica, the Mar Vista Family Center and the Children’s Bureau’s Evaluation committees.

The Intervention
The class sessions were designed to incorporate healthy nutrition and physical activity messages within existing field-tested parent training modules (developed with over 900 patients in the UCLA Parenting Program). Mothers were not given any monetary incentive to participate in the classes. The content for the healthy nutrition and physical activity messages was based on the “Bright
Examples of the nutrition and physical activity objectives for the parent-training educator sessions included the following: 1) To increase caregiver’s knowledge about yes and no foods based on the 2005 Dietary Guidelines. A list was compiled that included culturally relevant foods as well as common places where families might eat out. 2) To teach families how to practice behavior modification strategies such as self-monitoring. 3) To teach parents food strategies to increase vegetable and fruit food preferences for their children; 4) To identify barriers to healthy lifestyles and to review strategies to reduce these barriers.

The curriculum modules were tailored to Latino families. The modules were then reviewed by a Latino WIC dietician, a Latina mother and three UCLA faculty who had a specialty in Nutrition, Pediatrics and health care delivery to Latino families. At the beginning of the study we piloted the seven-session class with eight Latina mothers with preschool children and then revised the modules based on the class facilitator and mothers’ feedback. As study subjects were recruited over time they were assigned to one of 10 cohorts over the course of 17 months. Each cohort contained between 10 and 20 subjects of which approximately half of the subjects were allocated to the PT condition, and half to the WL condition.

Parenting and Nutrition Component

The modules for the PT condition were as follows:

Module 1 dealt with the effective use of praise for appropriate behavior. The nutrition objectives were a) to teach mothers not to use food as rewards or punishments, b) to discuss cultural customs around food, healthy eating, and physical activity, and c) to review simple steps for setting up healthy eating habits.

Module 2 focused on increasing the caregiver’s knowledge about yes and no foods based on the 2005 Dietary Guidelines, incorporating discussion about culturally relevant foods as well as common commercial places where families might eat out. Strategies were reviewed to help increase vegetable and fruit preferences for their children. Discussions focused on identifying barriers to healthy lifestyles and strategies to reduce these barriers. Effective communication strategies were reviewed which focused on the mother’s communication with fathers and grandparents.

Module 3 taught mothers how to give clear concise commands to their children. Nutritional objectives were: a) to teach families how to practice behavior modification strategies such as self-monitoring, b) to teach families how to increase accessibility and availability of healthy foods and c) to teach families how to read food labels and select healthier packaged foods.

Modules 4 and 5 taught mothers to implement consistent daily routines centered on eating and physical activity (i.e. family meals, no mealtimes while watching television, regular sleep, and play times with physical activity included). Strategies were reviewed on how to purchase healthier food items with their WIC food purchasing vouchers and how to select healthy beverages for their families. Recommended times for viewing TV and amount of time for physical activity were also presented.

Module 6 focused on the strategy of “ignoring” a demanding child to reduce behavior problems and tantrums. This was intended to prevent mothers from “giving in” to allowing children to revert back to earlier and less healthy eating behaviors. Families were also taught simple strategies to incorporate physical activity into daily routines.

Module 7 taught mothers how to set limits and give warnings. Types of warnings reviewed included: giving warnings of impending activity changes, and warnings of consequences for not following directions. Food demonstrations were included in order to give mothers more information about the differences between healthy and unhealthy snacks.

Module 8 (booster session 1- 1 month after the seventh class) reviewed modules 1–7 and reviewed how the strategies worked in the home. Mothers learned to practice “Time Outs” for children who were not responding to commands, praise, ignore, or warnings. Families also learned strategies to maintain healthy diets during holiday and family celebrations.

Module 9 (booster session 2- 2 months after the seventh class) Mothers reviewed their experience using “Time Outs” and proceeded to a general review of all modules.

Class Structure

All of the cohorts of mothers but one participated in classes facilitated by the same bilingual social worker who was trained to follow the outline and to maintain consistency between cohorts. One cohort participated in classes facilitated by a trained bilingual master in public health educator who had helped in classes with other cohorts. All of the parent-training sessions were held in Spanish, although we tried a number of times, unsuccessfully, to recruit for English speaking classes. Classes were held at the sites where the mothers were recruited.

Each 90-minute session (except for Session 1) began with a review of the mothers’ attempts to complete the previous homework assignment (often working out barriers to implementation through discussion with the other mothers who helped each other strategize ways to overcome the barriers in their own lives). Then the session topic was presented and discussed with the mothers. Included in the classes were demonstrations by the social worker and role playing by the mothers. Finally the homework assignment for the next session was presented and discussed. The mothers received a one-page handout
written in Spanish with the information covered during the class. Mothers were offered a healthy snack during the class time.

**Wait List Condition**

The wait list (WL) control group was not administered the parent training (PT) modules during the study period but were offered the classes after the one year follow up. The mothers did however receive care as usual and received a standard nutritional informational pamphlet developed by the Women, Infants, and Children’s Supplementation Food Program and typically given to patients at the VFC.

**Measures**

We focused our analysis on the subset of children with a BMI in the 50th or higher percentile at baseline to test our study’s hypothesis. We were most interested in preventing this group of children from increasing their BMI percentiles. Both PT and WL groups were assessed at baseline and at the following times: Baseline (T1), after 4 months (T2) and at 12 months (T3). The current paper reports the results of anthropometric assessments comparing T1 and T3 with T3 measurements administered by an assessor who was not aware of group assignment.

Measures: BMI was calculated as: BMI = kg/m², where kg is weight in kilograms and height is meters. Weight was measured on a Seco beam balance to the nearest 100 grams. Heavy clothes and shoes were removed before weighing and measuring the child and mother. Height was measured to the nearest 0.1 cm using a stadiometer. Ages were calculated from the birthdates of the children and the date on which the measurements were made. BMI percentiles and BMI z-scores were determined using the recommended CDC/NCHS tables and formulas for BMI. Recruitment and follow up took place between the years 2006–2009.

**Statistical Analysis**

Median group differences in key demographic variables were tested for significance by using the Wilcoxon Rank Sum test. To measure changes in subject BMIs over one year, the BMI z-score was chosen as the outcome to test for statistical significance rather than BMI percentiles to ensure normality for the t-test. One year BMI z-score differences were calculated for each child using data from assessments T1 and T3. Mean differences between PT and WL groups were then tested by an independent-samples t test for all subjects in the subset analysis. To adjust for differential dropout rates and missing observations, data was assumed to be missing at random. Thus, differential dropout could be accounted for through other variables in our model, allowing us to obtain unbiased results in our analysis. Imputation of missing data was done using a carefully constructed model that included relevant independent variables. The variables were chosen based on previous literature and expert recommendations, and the current analysis. The variables included: child baseline BMI z-score, mother’s baseline BMI, mother’s age, total children in subject’s family, an indicator for whether the child has a single mother, an indicator for whether the mother’s family has a history of diabetes, and the child’s baseline hours of outdoor play. The SAS procedure MI was used to perform the analysis. To minimize potential bias resulting from missing data, we employed multiple imputations, creating 40 imputed data sets. This technique corrects for the underestimation of variance that occurs in a single imputation and increased imputations were used to stabilize the variance. The data sets were analyzed separately and the results combined to calculate the estimates, significance levels, and confidence intervals.

**Results**

**Participation and Sample Characteristics**

A total of 161 subjects were recruited for the study with only one child not meeting recruitment requirements because of a BMI percentile <5%. Of the 160 subjects who qualified for the study, eighty were randomly assigned through a computer program to the PT group, and 80 to the WL group, forming 10 cohorts (each with an intervention and control). Of these subjects, 121, or approximately 76 percent, were included in the subset analysis based on their baseline BMI ≥50 percentile. The subset analysis included children whose BMIs put them in normal, overweight, and obese categories. Sixty-one of these children were in the PT group, and 60 in the WL group (please see Figure 1 for more details). Baseline subject and family characteristics in the PT and WL groups including BMI categories for the child and mother were not significantly different. Table 1 and Table 2 lists subject and family characteristics by group for the analysis subset (those children with baseline BMI ≥50 percentile). Mothers of the sixty-one children in the PT group attended a median number of six out of the nine total sessions.

Of the 121 subjects included in the subset analysis, forty subjects did not attend the T3 assessment (non-completers) resulting in 81 subjects who have measurements for both the T1 and T3 assessments (completers). Completers and non-completers showed some key demographic differences indicating a need to utilize missing data techniques to adjust for differential dropout. Specifically, differential dropout was accounted for through other variables in our model. Utilization of missing data techniques allowed us to include all 121 subjects in our final analysis.

**One-Year Outcomes**

Table 3 provides summary statistics for BMI percentile, weight, and height differences for Completers in the PT and WL groups.
Table 4 presents the analysis utilizing missing data techniques and, therefore, includes all 121 subjects. In this analysis, children in the PT group saw z scores decrease significantly on average by .20 (SE=.08) compared to children in the WL group who on average increased z scores by .04 (SE=.09) at T3 (P<0.05).

Discussion

The results of the present pilot study suggest the combination of parent training and nutrition education administered to low-income mothers of preschool Latino children can reverse the anticipated trajectory of increased z scores for at least one year after the start of treatment. In our study we couple the topics of nutrition and physical activity with building parenting skills in order to equip mothers to overcome barriers and effectively implement healthy diets and physical activity with their children. Most interventions to prevent overweight reported in the literature focus on the topics of nutrition and physical activity and not on other familial issues that might contribute to obesity. Childhood obesity experts support parent training as one of the strategies to prevent pediatric overweight, and our study results reported here support these recommendations.

This study contributes to a small but growing body of literature highlighting parenting practices and their influence over their young child’s nutritional status. New evidence is emerging that the family environment greatly contributes to the risk of pediatric overweight, in particular in the minority and low-income communities. In a large national sample of families, Latino children in nonparental childcare were “protected” from obesity compared to those children cared for by parents or relatives. This study suggests that routines and increased physical activity might play an important protective role in childhood obesity. Maternal stress has also recently been identified in a large national sample to increase the risk
of childhood overweight among children living in low-income food secure households. Furthermore, a recent report of an analysis of a large nationally representative sample of 4 year olds in the United States found a 40% lower prevalence of obesity among the children exposed to 3 household routines that included eating the evening meal regularly as a family, obtaining adequate nighttime sleep, and having limited screen-viewing time.

The present results suggest improving parenting strategies as early as possible to prevent the upward trajectory of weight is a promising intervention to reduce obesity in the high risk population of Latino children. The positive results from this parent training intervention are of significance given Latino children have a much higher prevalence of overweight early in life compared to other children, and the overweight child is at increased risk for becoming an overweight adult. In fact the risk of growing up to be an obese adult is 3 times higher for the overweight 3–5 year old compared to their healthy weight counterpart. Furthermore the persistence of childhood overweight into adulthood is associated with more severe adult weight problems and higher morbidity and mortality than adult-onset overweight.

Study Limitations
We acknowledge the limitations of the present study. Firstly, there was a high dropout rate for the families participating in the study; however, appropriate statistical analyses were used to deal with this problem. This high drop out rate reflects the challenges of engaging low-income minority mothers with young children in parenting classes. Although we do not know the reasons for the mothers dropping out of our study, competing time commitments and priorities, unstable schedules, and lack of transportation have been identified as reasons for why low-income minority parents with young children do not participate in

| Table 1. Sample Characteristics and Comparison of Parent Training (PT) and Wait List (WL) Conditions for Families of Children with Baseline BMI ≥50 Percentile |
|---------------------------------|------------------|------------------|------------------|
| Variable                        | PT (M (SD))      | WL (M (SD))      | p                |
| Maternal Age (yrs)              | 31.7 (5.2)       | 31.5 (6.1)       | .65              |
| Maternal Education (yrs)        | 9.0 (3.7)        | 9.1 (3.9)        | .87              |
| Maternal BMI:
| % Under Weight                  | 1.5              | 0                |
| % Healthy Weight                | 23.0             | 30.0             |
| % Overweight                    | 39.3             | 30.0             |
| % Obese                         | 36.1             | 40.0             | .49              |
| Child % Male                    | 44.3             | 43.3             | .87              |
| Child BMI:
| % Healthy Weight                | 44.3             | 61.7             |
| % Overweight                    | 26.2             | 16.7             | .16              |
| % Obese                         | 29.5             | 21.7             |

Table 2. Parent and Child Percentage Characteristics for Families of Children with Baseline BMI ≥50 Percentile

| Variable                        | Group          |
|---------------------------------|----------------|------------------|------------------|
|                                | PT (%) n=61    | WL (%) n=60      |
| Health Insurance                |                |                  |
| Medical/Healthy Families        | 89             | 88               |
| No insurance                    | 11             | 12               |
| Childcare                       |                |                  |
| No Childcare                    | 93             | 88               |
| Participation in Childcare      | 7              | 12               |
| WIC                             |                |                  |
| WIC Participation               | 91             | 95               |
| No WIC Participation            | 9              | 5                |
| Birthplace                      |                |                  |
| Child birthplace                |                |                  |
| Mexico or Central America       | 8              | 8                |
| United States                   | 92             | 92               |
| Mother Birthplace               |                |                  |
| Mexico                          | 82             | 78               |
| Other Central American          | 15             | 20               |
| United States                   | 3              | 2                |
| Father Birthplace               |                |                  |
| Mexico                          | 82             | 71               |
| Other Central American          | 14             | 27               |
| United States                   | 4              | 2                |
| Marital Status                  |                |                  |
| Parents’ marital status         |                |                  |
| Married                         | 74             | 70               |
| Live with partner               | 15             | 15               |
| Divorced or single              | 11             | 15               |
| Parents of Children with Diabetes |            |                  |
| Mother: Gestational Diabetes    | 8              | 12               |
| Type 2 DM                       | 2              | 2                |
| Father: Type 2 DM               | 2              | 5                |
| Child Birthweight               |                |                  |
| Low Birthweight (<5 lbs, 8 oz)  | 7              | 4                |
| Normal Birthweight              | 82             | 95               |
| High Birthweight (>8 lbs, 13 oz) | 6              | 1                |
preventive parenting interventions. Another limitation of our study is that it took place among predominately Mexican-American families and it may not be generalizable to other Latino communities. Also not generalizable is the use of a social worker as the facilitator for the classes, suggesting future models utilizing health educators or promotoras should be evaluated. Finally, since this study’s positive results are measured at one-year, it is unclear if these positive results will persist long term.

**Conclusion**

The natural development of food preferences and physical activity early in life provides a window of opportunity for implementing effective intervention programs that can result in lasting healthy eating and physical activity behaviors. Parents are in the ideal position to influence the long-term dietary and physical activity behaviors of their children. Further research needs to be conducted investigating strategies to retain families with young children in preventive parenting interventions and to see if this intervention can be incorporated into preschool’s routine parenting classes such as those at the Head Start Programs. Although confirmation of the findings need to be examined in a larger sample of children, this study supports the effectiveness of parent training in combination with nutrition education to prevent obesity in preschool Latino children living in low-income households. This intervention holds much promise in preventing obesity in Latino children living in low-income communities.

**Acknowledgments**

This pilot study was funded by the generous gifts of: Joseph Drown Foundation, Simms/Mann Family Foundation, and Venice Family Clinic. We thank the staff and administration at Venice Family Clinic, LAUSD, Santa Monica Head Start Program, Children’s Bureau, Mar Vista Family Center, and the PHFE WIC program for supporting this work.

**Author Disclosure Statement**

Fred Frankel, Wendy Slusser, and Charlotte Neumann are writing a manual aimed to train facilitators to run parent training groups based on the modules used in this study. No other authors of this article have existing competing financial interests.

**References**


Address correspondence to: 
Wendy Slusser, MD, MS 
Associate Clinical Professor 
Departments of Pediatrics and Community Health Sciences 
Fit for Health Program 
Center for Healthier Children, Families, and Communities 
UCLA Schools of Medicine and Public Health 
10990 Wilshire Boulevard, Suite 900 
Los Angeles, CA 90024

Email: wslusser@mednet.ucla.edu