



Prevention of Overweight in Preschool Minority Children: A Pilot Study

Investigators:

Marian L. Fitzgibbon, Ph.D.

Melinda R. Stolley, Ph.D.

Alan Dyer, Ph.D.

Linda Van Horn, R.D., Ph.D.

Katherine KauferChristoffel, M.D., M.P.H.

**Funded by the Consortium to Lower Obesity
in Chicago Children (CLOCC)**

Background

- Preschool years are a crucial time to alter the trajectory toward overweight.
- Rates of overweight shift dramatically as children age.
- Racial differences in overweight prevalence are observed by 6-11 years of age (NHANES 1999-2002).
 - Non-Hispanic Whites: 13.5%
 - Non-Hispanic Blacks : 19.8%
 - Mexican-Americans: 22.5%

Background (cont'd)

- Latino children are the largest ethnic minority group of children in the United States.
- 38% of Mexican-American women are obese (BMI \geq 30 kg/m²).
- When a biological parent is obese, the risk of obesity in adulthood is doubled for both overweight and non-overweight children under 10 years of age.

Why Conduct a Family-Based Intervention in a School Setting?

- School-based programs conducted in isolation may not be sufficient.
- Linkages between the school and the home could provide more continuity and allow integration of concepts and behaviors.
- Family involvement and parental modeling are important.
- The home environment is a major source of energy intake.

Rationale

- Hip-Hop to Health Jr. intervention was more successful in schools with a predominantly African-American population than in schools with a predominantly Latino population.
- Minimal family involvement was identified as a limitation.

Aims of the Study

- To test the acceptability/feasibility of a 6-week family-based overweight prevention pilot intervention with Latino families.
- To test the acceptability/feasibility of collecting 24-hour dietary recalls and physical activity data via accelerometers with Latino families.

Study Design

2 Head Start Sites



Randomization by School



Intervention Schools (N=1)

Control Schools (N=1)



Baseline Visit (N=15)

Baseline Visit (N=15)



6 Week Intervention

6 Week Control Curriculum



Post-Intervention Visit (N=14)

Post-Intervention Visit (N=14)

Child Interventions

➤ Active Intervention

- 3 classes per week for 6 weeks
- 30 minutes of developmentally appropriate nutrition education
- 20 minutes of vigorous physical activity

➤ General Health (Control) Intervention

- 1 class per week for 3 weeks
- General health and safety topics



Parent Intervention

The goal of the parent intervention was to create a supportive atmosphere for healthful eating and activity for parents and their children.

- 2 walking classes per week
- 5 skills training classes
 - Milk consumption - 1% rather than whole milk
 - Reduction in television viewing
 - Reduction of fruit juice consumption
 - Enhancing physical activity options with young children
 - Altering recipes

Measures: Children

- Demographics (parental report)
 - Age, gender, ethnicity
- Anthropometrics
 - Weight measured using Seca digital scale
 - Height measured using portable stadiometer
 - Body Mass Index (BMI) = weight in kilograms divided by the square of height in meters
 - BMI percentile for age and sex, based on CDC 2000 growth charts
- Television viewing (hours/day)

Measures: Parents

- Demographics
 - Age
 - Gender
 - Ethnicity
 - Relationship to child
 - Education
 - Income

- Acculturation
 - Birthplace
 - Time in U.S.
 - Preferred language

Measures: Parents (cont'd)

➤ Anthropometrics

- Weight
- Height
- BMI

➤ Stanford 7-Day Physical Activity Recall

➤ Other health behaviors

- Television viewing
- Smoking
- Frequency of eating at restaurants, including take-out and fast food

Measures: Dietary Intake

- Parents: 24-hour diet recall
- Children: 24-hour diet observation and parental report
- Diet data entered into the Nutrition Data System for Research (NDS-R) for analysis

24-Hour Child Dietary Intake

- In-school observation: A nutritionist observed the amount of each food taken by the child, as well as the amount of food discarded, spilled or shared with another child. Nutrient data for the day's menu was provided by the food vendor.
- Parental report: The day after the in-school observation, the parent was interviewed by a nutritionist in person or by phone. The parent reported the child's food and beverage intake outside of school for the previous 24 hours (midnight to midnight).

Measures: Accelerometer

- MTI Actigraph activity monitor
 - Small, lightweight uniaxial accelerometer
 - Worn on belt around waist
 - Measures activity counts per minute
- Worn for 3 days, including one weekend day
- Use counts to calculate minutes/day above cut-points representing moderate and vigorous activity

Measures: Accelerometer (cont'd)

Cut-points for moderate and vigorous activity:

- For children, used age-specific cut-points from regression equation for preschoolers (Sirard et al.)
 - $\text{MET}_{15 \text{ sec}} = 1.43 + 0.00399(\text{counts in 15-second interval}) - 0.14882(\text{age in years})$.
 - Potential source of error—we used 1-minute intervals, not 15-second intervals.
- For adults, used Freedson et al.'s cut-points.
 - Moderate activity (3 – 5.9 METS): 1952 – 5724 counts/min.
 - Vigorous activity (> 6 METS): > 5725 counts/min.
 - Default cut-points used by MTI in Actisoft software.
 - Other cut-points have been proposed.

Prevalence of Overweight and Risk for Overweight in Preschool Children by Sex and Ethnicity

Study	Boys			Girls		
	N	≥ 85 th (%)	≥ 95 th (%)	N	≥ 85 th (%)	≥ 95 th (%)
Blacks						
NHANES*	227	20.9	8.0	213	25.6	9.6
Hip-Hop Jr.	198	30.3	13.1	213	33.3	16.4
Latinos						
NHANES*	231	27.6	14.1	238	25.0	12.2
Hip-Hop Jr.	181	48.1	30.4	172	48.8	26.2
HHK Pilot	9	44.4	22.2	16	68.8	37.5

At risk or overweight: BMI for age and sex ≥ 85th percentile.

Overweight: BMI for age and sex ≥ 95th percentile.

*NHANES 1999-2002 data for 2-5 year old children: Hedley AA, Ogden CL, Johnson CL, et al. JAMA. 2004; 291(23):2847-2850.

Children: Demographic Characteristics and Television Viewing

	N	Mean (SD) or %
Sex (% female)	30	60.0
Race (% Latino)	30	93.3
Age (years)	28	4.7 (0.3)
Television (hours/day)	26	2.9 (1.8)

Children: Anthropometrics

	N	Mean (SD) or %
BMI (kg/m ²)	29	17.8 (2.6)
Height (cm)	29	105.7 (4.7)
Weight (kg)	29	20.0 (4.2)
BMI \geq 85 th percentile (%)	27	55.6
BMI \geq 95 th percentile (%)	27	29.6

At risk or overweight: BMI for age and sex \geq 85th percentile.

Overweight: BMI for age and sex \geq 95th percentile.

Female Parents: Demographic Characteristics

	N	Mean (SD) or %
Relationship to child	27	
Mother	24	88.9
Grandmother	2	7.4
Other	1	3.7
Race (% Latina)	27	92.6
Age (years)	26	31.7 (8.0)
Education (years)	26	9.3 (4.0)
Income (\$), median	26	20,500

Latina Parents: Acculturation

	N	Mean (SD) or %
Born in US (%)	24	20.8
Time in US (years)	19	13.2 (7.6)
Prefers to speak Spanish (%)	24	70.8

Female Parents: Anthropometrics

	Mean (SD) or % N=21
BMI (kg/m ²)	29.4 (5.2)
Height (cm)	153.5 (4.9)
Weight (kg)	69.3 (11.6)
Overweight (%)	85.7
Obese (%)	47.6

Overweight: BMI \geq 25 kg/m² Obese: BMI \geq 30 kg/m²

Female Parents: Smoking, Television, Cooking, and Eating Out

	N	Mean (SD) or %
Current smoker (%)	26	7.7
Television (hours/day)	26	2.4 (1.4)
Does most of cooking in household (%)	26	100.0
Times/week eats at restaurants, including fast food and take-out	25	1.4 (2.7)

Female Parents: Physical Activity from Stanford 7-Day Recall (N=25)

	Mean (SD)	Median
Energy expenditure (kcal/kg per day)	40.1 (9.2)	35.3
Moderate activity (kcal/kg per day)	7.3 (8.6)	3.0
Vigorous activity (kcal/kg per day)	4.7 (8.9)	0.4
Moderate activity (min/day)	109.4 (129.4)	45.0
Hard activity (min/day)	39.8 (89.5)	0.0
Very hard activity (min/day)	4.1 (10.4)	0.0

Female Parents: Physical Activity from Stanford 7-Day Recall (cont'd)

	N	Mean (SD)	Median
Sitting (hours/day)	25	4.2 (1.7)	3.4
Walking (min/day)	24	90.4 (124.1)	60.0
Stair climbing (flights/day)	25	2.4 (4.8)	1.0

24-Hour Nutrient Intake

	Children (N=19) Mean (SD)	Parents (N=19) Mean (SD)
Total energy (kcal)	1218.2 (396.5)	1342.6 (491.3)
Total fat (% kcal)	30.2 (7.6)	25.2 (8.9)
Saturated fat (% kcal)	12.0 (3.9)	9.1 (4.5)
Dietary fiber (g/1000 kcal)	8.5 (4.1)	13.3 (5.5)

Children: Nutrients Consumed In and Out of School (N=16)

	In School Mean (SD)	Out of School Mean (SD)	Total Mean (SD)
Total energy (kcal)	443.2 (308.2)	748.8 (165.9)	1192.0 (410.2)
Total fat (% kcal)	37.8 (13.3)	25.7 (8.4)	31.1 (7.6)
Saturated fat (% kcal)	16.5 (6.7)	10.1 (4.1)	12.7 (3.9)
Dietary fiber (g/1000 kcal)	4.0 (2.4)	10.2 (4.3)	8.0 (2.7)

Physical Activity from Accelerometer Counts

	Children (N=4) Mean (SD)	Parents (N=3) Mean (SD)
Moderate activity (minutes/day)	40.0 (12.4)	30.7 (25.3)
Vigorous activity (minutes/day)	4.7 (2.6)	3.2 (5.3)

Moderate activity: 3 to 5.9 METS. Vigorous activity: ≥ 6 METS.

Age-based cut-points for preschool children from Sirard et al. Med Sci Sports Exerc. 2001; 5(Suppl):S144 and Trost et al. Int J Obes. 2003;27:834-839.

Cut-points for adults from Freedson et al. Med Sci Sports Exerc. 1998;30(5)777-781.

Physical Activity: Accelerometer vs. Stanford 7 Physical Activity Recall

Parent	BMI (kg/m ²)	Moderate (min/day)		Vigorous (min/day)	
		Acc.	PAR	Acc.	PAR
1	31.0	19.0	351.4	0.0	0.0
2	34.2	13.3	218.6	0.3	154.3
3	19.8	59.7	10.7	9.3	10.7

Note: The PAR and accelerometer data are for different days.

Parent Attendance at Physical Activity Classes

9 physical activity classes were offered to parents at the intervention school. (N=15)

- Classes attended (Mean [SD]): 49% (43%)
- Classes attended (Median): 44%
- Attended \geq 50% of classes: 7 women (47%)
- Attended all nine classes: 4 women (27%)

Strengths

- The use of real-time accelerometry and 24-hour dietary recalls
- Inclusion of parents in the intervention
- Inclusion of children under six years of age
- Partnership with the third largest school district in the U.S.

Limitations

- At risk and overweight status based only on BMI percentile for age and sex ($\geq 85^{\text{th}}$ or $\geq 95^{\text{th}}$ percentile)
- Self-report methods to measure dietary intake in parents
- No direct observation to assess quantity and intensity of physical activity

Conclusions

- It is possible to collect both 24-hour dietary intake data and physical activity data in preschoolers.
- Parents are motivated to change eating patterns for themselves and their children, but have minimal experience being physically active.
- Preschoolers enjoy being physically active, but require direction to engage in sustained activity for 20 minutes.
- Teachers are eager to have parents involved in helping them model more healthful eating and activity patterns.

Future Directions

- Response to recent RFA, “Site-Specific Approaches to Prevention or Management of Pediatric Obesity.”
- To enhance the generalizability of this intervention, classroom teachers are being trained to implement the intervention, rather than specially-trained early childhood educators.

Acknowledgements

- CLOCC
- Chicago Public Schools Early Childhood Programs, with special thanks to Blanca Trevino and Fran Belmonte-Mann
- Administrators and teachers at Ortiz de Dominguez and Little Village Academy
- Participating parents and children



Thank you!