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Correlates of Adiposity among Latino Preschool Children

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Abstract

Background—Childhood obesity is at record high levels in the US and disproportionately affects Latino children. However, studies examining Latino preschool children's obesity-related risk factors are sparse. This study determined correlates of Latino preschoolers' (ages 3–5 years) adiposity to inform future obesity interventions and policies.

Methods—Latino preschoolers (n=96) from four Head Start centers in Houston, Texas were recruited. Parents reported acculturation and neighborhood safety. Children's and parents' height and weight were measured. Children's television (TV) viewing was measured by TV diaries and physical activity by accelerometers. Linear regression was used with body mass index (BMI) z-score as the dependent variable and covariates sequentially added and retained in four blocks: (1) child age, gender, parent education and BMI, (2) neighborhood safety and parent and child acculturation, (3) TV viewing, and (4) moderate-to-vigorous physical activity (MVPA).

Results—In the final model (n=96), only neighborhood disorder (beta=0.30, p=0.005) and MVPA (beta=-0.21, p=0.049) were significantly associated with BMI z-score.

Conclusions—Among Latino preschoolers, higher neighborhood disorder and lower MVPA were associated with greater children's BMI z-scores.

Keywords

Hispanic; obesity; neighborhood safety; physical activity; television viewing

INTRODUCTION

Rates of pediatric obesity are at record high levels in the US.¹ Studies among Latinos are necessary because they are the largest and fastest growing ethnic minority in the US,² have shared cultural and linguistic considerations that affect their health and behaviors,^{3, 4} have unique childhood obesity risk factors (e.g. significantly greater odds of maternal gestational diabetes and not exclusively breastfed compared to Non-Hispanic Black and White children⁵), and are disproportionately affected by childhood obesity.¹ Previous studies have

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identified correlates of children's adiposity including TV viewing,^{6, 7} physical activity,⁸ and neighborhood safety.⁹ Among Latino children, acculturation and parents' BMI were associated with children's physical activity and adiposity.^{10, 11} However, most previous studies' reflect non-Latino populations or examined correlates of obesity among older school-age Latino children and adolescents.^{10, 11} Preventing obesity among preschool-age children is important, especially before substantial numbers become obese in elementary school.¹² Formative studies among Latino preschool children are necessary to help design effective culturally appropriate interventions,¹³ which are currently lacking for Latino preschoolers.¹⁴ The objective of this study was to identify correlates of preschool children's BMI z-score among a Latino sample.

PARTICIPANTS and METHODS

A convenience sample (n=96) of preschool children and their parents from four Head Start centers in the Houston-metro area, USA, was recruited by study flyers and research coordinators from January 2009 to June 2010. Inclusion criteria included Latino or Hispanic ethnicity (parent reported), 3–5 year old child, and parent able to complete surveys in English or Spanish. Participants received a small incentive for their participation. All surveys underwent forward translation from English to Spanish and subsequent backward translation to English to assess content validity. The method of decentering,¹⁵ in which the source text itself was modified to address issues in translation or clarity, was used to maximize cultural equivalence. The Institutional Review Board of Baylor College of Medicine approved this study.

Following a standard protocol, research staff measured parents' and children's standing height using a portable stadiometer (Seca model 214, Birmingham, UK) and body weight using a digital scale (Tanita model BWB-800S, Arlington Heights, IL). The mean of two measures was calculated and used for analyses. A third measurement was taken if the difference was >0.2 cm or 0.2 kg and the closest two values were averaged and used. Height and weight were used to calculate BMI (kg/m^2), and for children, the US Centers for Disease Control and Prevention growth chart data determined age- and gender-specific BMI z-scores.¹⁶

Parents completed a demographic survey in English or Spanish that included proxy items on acculturation: [1] country of birth (non-US including Puerto Rico=0 and US=1); [2] years living in the USA (Parents: <15 years=0 and 15 years=1; Children: <4 years=0 and 4 years=1), and [3] preferred language (Spanish only/more than English=0, English and Spanish equally or English more than Spanish=1).¹⁷ The cutpoint of 15 years was chosen for the parents' "years living in the USA" due to the distribution, i.e. 47.9% had <15 years, a proxy for low acculturation in which the majority of parents were born outside of the USA. In contrast, most of the children were born in the USA. A cutpoint of four years was chosen for children's "years living in the USA" since 80.2% had 4 years, a proxy for high acculturation. Child and parent acculturation items were summed separately to provide two global measures used in analyses.¹⁷ Higher scores indicated greater acculturation.

Children's TV viewing was measured using a 7-day TV diary, since TV diaries had the highest correlation with the criterion standard of direct observation.¹⁸ Parents indicated the times when their child watched TV or videos in 15-minute increments from 6 am to 12 midnight for each day, as reported in a previous study.¹⁹ Measurements were taken over a 7-day period (Time 1) and repeated 3–4 weeks later (Time 2) for test-retest reliability (intraclass correlation=0.82, $p<0.001$, manuscript under review). Data from Times 1 and 2 were averaged to calculate daily TV viewing minutes.

Children's physical activity was measured using accelerometers (Actigraph model GT1M, Actigraph LLC, Ft. Walton Beach, FL) that recorded data in 15-second epochs and worn at the hip at Times 1 and 2. Accelerometers have provided objective and valid estimates of children's physical activity.²⁰ A valid day consisted of 8 or more hours (480 minutes) of accelerometer wear. Participants with at least one valid day were included in analyses, since the intraclass correlations for overall counts per minute and moderate-to-vigorous physical activity (MVPA) minutes/day did not change with greater numbers of valid days (data not shown). The cutpoint of 420 counts/15-sec defined moderate-to-vigorous intensity physical activity²⁰ and total minutes above the cutpoint estimated MVPA in minutes/day.

Parents perceptions of neighborhood safety were assessed by a previously validated neighborhood disorder scale.²¹ This 8-item scale measured the quality of the family's neighborhood with regard to violence, safety, drug traffic, and child victimization (Cronbach's alpha=0.95, generalizability coefficient=0.94),²¹ and distinguished between neighborhoods at low and high risk for child maltreatment.²¹ In a separate study, the scale was associated with greater TV viewing among US preschool children.²² In the present sample, the scale had good internal consistency (Cronbach's alpha=0.87) and test-retest reliability 3–4 weeks apart (ICC=0.66, $p<0.001$).

Block linear regression analysis was used with child's BMI z-score as the dependent variable. Independent variables were sequentially added, and retained, in four blocks: [1] child's age, gender, parent's education, and BMI, [2] neighborhood safety and parent and child acculturation scores, [3] TV viewing (minutes/day), and [4] accelerometer-determined MVPA (minutes/day). Family income was reported by only 70 of 96 parents and was, thereby, excluded from analyses. Parent education was provided by 91 parents and included as an indicator of socioeconomic status. SAS 9.2 (SAS Institute Inc., Cary, North Carolina) was used for analyses; standardized (std.) beta coefficients are presented for ease of comparison; and significance level of $p<0.05$ was chosen. Due to the small sample, results with $p<0.1$ are noted in the tables, which may provide an indication for further examination with larger samples.

RESULTS

The average child's age ($n=96$) was 4.7 \pm 0.5 years, the majority were of low socioeconomic status (68.7% of their parents had a high school education or less), and most children were born in the US (90.6%). For the study, mothers ($n=89$, 92.7%) were the primary respondent. Most parents were born in Mexico (58.3%) and the US (19.8%). Other demographic and baseline data are listed in Table 1.

The block linear regression Model 1 (Table 2), which included child age, gender, parent BMI and education, yielded no significant correlates of child BMI z-score. Model 2, which additionally included neighborhood disorder, child and parent acculturation, yielded significant positive effects for neighborhood disorder (std. beta=0.28, $p=0.007$). Model 3, which added average TV viewing (minutes/day), similarly yielded significant positive effects for neighborhood disorder (std. beta=0.28, $p=0.007$). Model 4, which added average MVPA (minutes/day) and accounted for 12% of the variability in BMI z-score, yielded significant effects for neighborhood disorder (std. beta=0.30, $p=0.005$ and MVPA (std. beta=-0.21, $p=0.049$). Child acculturation was not significantly related to ACS in Models 2–4 (std. beta=0.20–0.22, $p<0.1$).

DISCUSSION

Using accelerometers and a validated measure of TV viewing (TV diaries), this study extends to Latinos previous findings on correlates of preschool children's adiposity. Two correlates were significant in the final model. Greater neighborhood disorder was associated with higher BMI z-score, similar to a previous study, which lacked accelerometry and TV data.⁹ This result requires confirmation, since the measure of neighborhood disorder has not been validated among a Latino sample aside from preliminary results in this paper (Cronbach's alpha=0.87, ICC=0.66, p<0.001). As expected, greater accelerometer-determined daily MVPA was associated with lower BMI z-score, which confirms and extends similar results among a non-Latino preschool sample²³ and older Latino children.²⁴ Although child acculturation (p<0.1) was not significantly associated with BMI z-score, examination of this relationship with a larger sample of preschoolers and a more valid measure of acculturation is warranted. Similarly, the small sample size may have precluded fully examining the association between TV viewing and BMI z-score.

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Table 1

Participant characteristics (n=96)

		n	%
Child Gender	Male	53	55.2
	Female	41	42.7
Child Age	3	11	11.5
	4	54	56.3
	5	29	30.2
Parent Education	8th grade or less	32	33.3
	Some high school	22	22.9
	High school graduate or GED	12	12.5
	Some college or technical school	18	18.8
	Associates degree	1	1.0
	Bachelor's degree/Completed college	4	4.2
	Post graduate training/degree	2	2.1
Parent Country of Birth	Mexico	56	58.3
	US except Puerto Rico	19	19.8
	El Salvador	7	7.3
	Other	7	7.3
Child Country of Birth	US except Puerto Rico	87	90.6
	Mexico	3	3.1
	Cuba	1	1.0
	El Salvador	1	1.0
	Guatemala	1	1.0
		n	Mean +/- s.d.
	Neighborhood disorder*	95	12.8 +/- 4.2
	Child acculturation*	94	2.0 +/- 0.7
	Parent acculturation*	94	1.7 +/- 2.2
	Child BMI z-score	94	0.90 +/- 1.2
	MVPA (minutes/day)	96	84.9 +/- 29.6
	TV viewing (minutes/day)	96	104.9 +/- 90.8

* Higher scores indicate higher neighborhood disorder (range: 8–24), child acculturation (range 0–3), or parent acculturation (range 0–3).

Table 2

Block linear regression results for child BMI z-score.

Variable	Model 1	Model 2	Model 3	Model 4
	β	β	β	β
Age (years)	0.07	-0.03	-0.03	0.01
Gender	-0.08	-0.03	-0.03	-0.06
Parent BMI	0.19*	0.16	0.16	0.17
Parent Education	-0.12	-0.14	-0.14	-0.14
Neighborhood Disorder		0.28***	0.28***	0.30***
Child Acculturation		0.22*	0.22*	0.20*
Parent Acculturation		-0.04	-0.04	-0.03
TV view (minutes/day)			-0.02	-0.06
MVPA (minutes/day)				-0.21**
Adjusted R ²	0.02	0.10	0.09	0.12

Legend:

* p<0.1,

** p<0.05,

*** p<0.01. Independent variables were sequentially added, and retained, in four blocks: [Model 1] child's age, gender, parent's education, and BMI, [Model 2] neighborhood safety and parent and child acculturation scores, [Model 3] TV viewing (minutes/day), and [Model 4] accelerometer-determined MVPA (minutes/day).