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Before- and After-School Childcare and Children's Risk of Obesity

Parini M. Shah, MPH,

Rollins School of Public Health, Emory University

Nikkil Sudharsanan, MPH, and

Population Studies Center, University of Pennsylvania, 239 McNeil Building, 3718 Locust Walk; Philadelphia, PA 19104, Telephone: (661) 965-3471

Solveig A. Cunningham, PhD

Hubert Department of Global Health, Emory University

Abstract

Background—In the U.S., half of children are regularly cared for before or after school by someone other than a parent.

Objective—Describe the relationship between childcare arrangements and obesity among school-aged children.

Methods—Data are from the 5th grade wave of the Early Childhood Longitudinal Study-Kindergarten Cohort 1998–9, a nationally representative study of U.S. children who were in Kindergarten in 1998–1999 or first grade in 1999, collected in Spring 2004 (*analytic sample* = 9,617). We estimated survey-adjusted logistic regression models to examine the association between childcare arrangements before and after school and obesity.

Results—The prevalence of obesity was highest among 5th graders who received care from multiple sources and lowest among children who received care from non-relatives in either the child's or the caregiver's home (29.9%, 95% CI: 18.7%, 44.3%; and 17.3%, 95% CI: 12.1%, 24.0%). Childcare arrangement was not an independent risk factor for obesity for most children. However, Hispanic children who were cared for by a person who was not a relative had significantly higher odds of obesity compared to non-Hispanics in similar care arrangements (OR: 5.11, 95% CI: 2.00, 13.06).

Conclusion—Type of childcare before or after school was not an independent risk factor for obesity in most 5th graders, but implications of childcare for Hispanic children should be explored further.

Keywords

childhood obesity; childcare; non-parental childcare; relatives; center-based care

Correspondence to: Nikkil Sudharsanan.

Conflict of Interest:

The authors of this paper report no conflict of interests.

Introduction

In the United States (U.S.), 17.7% of 6-to-11-year-old children are obese. The prevalence of childhood obesity is not decreasing: mean body mass index (BMI) and the prevalence of obesity for both male and female children has been stable since the early 2000s (1).

Childhood obesity is associated with adverse health in adulthood, including conditions such as heart disease, and cancer (2). Research is needed to understand the factors that may set the stage for childhood obesity.

Childcare arrangements before and after school are an important childhood experience, as almost 50% of school-aged children in the U.S. are cared for during the hours before or after school by a person other than a parent (3). Over the last decade, the percentage of children receiving relative-provided childcare, parental care, and center-based care has remained stable (4). Understanding whether childcare is linked with obesity could provide opportunities to treat and prevent childhood obesity.

Several studies in the U.S and the United Kingdom (U.K.) have found that preschool-aged children who receive informal, non-institutional care, such as care from a relative, were more likely to be obese than children who attended childcare centers or were cared for only by their parents (5–8). In Canada, children ages 2–4 years who received either center-based care or childcare from a relative or an unrelated person were more likely to be obese at ages 4–10 years than those cared for only by parents (9, 10). In the U.S., children under the age of 6 months who were cared for primarily in a home that was not their parents' had higher weight-for-length z-scores at ages 1 and 3 years compared to children cared for primarily in their own home or in a childcare center (5). Studies in Europe and the U.S. report that infants who received care either from a relative or in a center were more likely to be obese later in infancy than children who received parental care (8, 11).

Some studies in Europe and the U.S. have found that preschool-aged children who received center-based childcare had higher odds of becoming obese in later childhood than those who did not receive center-based care (12–14), while another study in the U.S. found no relationship between childcare arrangements in preschool and obesity (15). Some studies have found that children who were cared for by a relative, particularly a grandparent, were more likely to be obese (6, 7). Among elementary and middle-school children in the U.S., about 13% are cared for by siblings and 14% by grandparents (3). In the U.S., preschool aged children who received care from family, friends, or neighbors were more likely to become obese by the start of kindergarten compared to children who were cared for only by parents (6). In the U.K., children between the ages of 9 months and 3 years who received care from persons who were not their parents were more likely to be obese than children cared for only by parents (7). In Finland, children who had multiple childcare arrangements before the age of 1 year were more likely to be overweight than children who did not (12). In Hong Kong, 11 year-olds who were cared for by grandparents and other family members were more likely to be overweight or obese than children cared for only by parents (16). In the U.S., Taiwan, and Japan children who received some childcare from grandparents had higher risks of obesity than children who were not regularly cared for by grandparents (17–19). Since diet, physical activity (20, 21) and caretaking behaviors (18) may be linked with

children's weight, the associations between relative-provided care and children's weight may be due to how strictly different caregivers monitor children's diet and physical activity behaviors. Indeed, studies have reported that children's eating habits are less carefully monitored in relatives' homes compared to their parents' home (18) and that grandparents may encourage excess eating and use food as a reward when caring for children (19, 20, 22).

Previous studies of the implications of childcare arrangements for children's weight have focused on young children. The goal of this study is to describe childcare arrangements and their links with obesity among school-aged children. Compared to younger children, school-aged children spend less time in childcare, are more independent, and receive less supervision, even when receiving care (3). This study offers a comprehensive account of the multiple forms of care before and after school among fifth graders and combines these with direct anthropometric measurements. Due to the variation in care arrangements and obesity rates among children of different race and ethnic groups in the U.S., this study also examines the relationship between care arrangements before and after school and obesity separately for children by race and ethnic group.

Methods

Data are from the Early Childhood Longitudinal Study- Kindergarten Cohort of 1998–99 (ECLS-K), a nationally representative survey of children first interviewed as kindergarteners in the 1998/1999 school year or first-graders in 1999, who were then followed through the 8th grade. The ECLS-K includes interviews with parents, children, teachers, and direct child anthropometric measurements (23). The data for this study are from the 6th wave of data collection, collected in Spring 2004, when the children were in 5th grade, with a longitudinal sample of 11,280 children. We excluded children with missing information on key variables, yielding an analytic sample of 9,617 children (85%).

The main dependent variable for this analysis was a dichotomous indicator of whether a child was obese. The ECLS-K used trained assessors to directly measure children's height in inches to the nearest 0.25 in. with a Shorr board and weight in pounds with a digital scale; both height and weight were measured twice per wave and averaged for improved accuracy (24). We used the 2000 CDC Growth Reference to calculate BMI z-scores standardized to the reference population for the child's age and sex (25). Children with BMI z-scores 95th percentile were classified as obese. Our results are consistent when overweight (BMIs 85th percentile) is the primary outcome instead of obesity (available on request).

The exposure of interest was children's primary before or after school care arrangement. The ECLS-K asked parents how many hours each week the child spent in a non-parental care arrangement before or after school. If parents answered at least one hour, the child was coded as regularly receiving non-parental care. Parents were then asked the number of hours their child received care from each provider. The person or center that provided the most care time was coded as the primary care provider. Based on the answers to these questions, we created the following mutually exclusive categories of childcare arrangements: care only by parents, care by relatives, care by an adult unrelated to the child, center-based care, and multiple care providers including homes, centers, or a combination thereof. Care provided

by a parent not residing in the household was considered parental care. For children whose primary care provider was a relative, we created a variable indicating whether the relative was a grandparent, aunt or uncle, or sibling.

The multivariate models were adjusted for child characteristics, household structure and socioeconomic characteristics that may be associated both obesity and childcare arrangements, including: sex, race and ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, Asian/Pacific Islander, American Indian, and mixed race); whether the child's parents were currently married; number of siblings in the household; number of adults in the household; whether either of the child's parents was born outside of the U.S.; mother's employment (full time, part time, looking for work, not working); mother's education (less than high school, high school graduate, college graduate, doctorate or professional degree); household socioeconomic quintile; urbanicity of school (large city, large town, small town); and U.S. Census region (Northeast, Midwest, West, South).

We first estimated the proportion of children in each childcare arrangement, both overall and stratified by child's obesity status, to determine which childcare arrangements were more common for obese compared to non-obese fifth-graders. To investigate whether childcare arrangements were associated with obesity, we then estimated a bivariate logistic regression model with type of childcare arrangement as the predictor variable. We estimated multivariate logistic regression models, including the characteristics described above to determine whether there is an association between types of childcare arrangements before or after school and obesity, net of confounding from observed characteristics.

In an additional set of models restricted to children who received care from parents or a relative as their primary before or after school care arrangement ($n=8,074$), we estimated bivariate and multivariate logistic regressions with the primary relative care provider as the main predictor variable.

Some studies have indicated that children from different race and ethnic groups experience different childcare arrangements (3, 6). To determine whether the implications of childcare arrangements also differ across these groups we re-estimated the previous regressions including interaction terms between the primary childcare variables (type of childcare and primary relative care provider) and the child's race and ethnicity.

The ECLS-K used a multistage probability sampling procedure to identify schools and children. Therefore, to make nationally representative inferences, all analyses were survey-weighted using the probability, cluster, and strata weights calculated in the ECLS-K. Data were analyzed in April and May 2015 using Stata 12 SE.

Results

Among 5th graders, 65% of children were regularly cared for before or after school by only their parents (Table 1). Other relatives cared for 19% of children (95% CI: 17.7%, 20.2%), with grandparents as the most common relative care providers (50%, 95% CI: 45.6%, 54.4%), followed by siblings (28%, 95% CI: 23.9%, 32.6%), and aunts and uncles (22%, 95% CI: 18.2%, 25.4%). Ten percent (95% CI: 8.8%, 11.3%) of children primarily received

center-based care before or after school, 4% were cared for by an adult not related to them (4.3%, 95% CI: 3.5%, 5.0%), and 1.8% received care from multiple providers. On average, children spent 4 hours per week (95% CI: 3.65, 4.25) in non-parental care before or after school; children who regularly were cared for by someone other than a parent spent on average 11.3 hours per week (95% CI: 10.67, 11.89) in non-parental care. The prevalence of obesity was highest among 5th graders who received care from multiple sources, and lowest among children who received care from non-relatives (29.9%, 95% CI: 18.7%, 44.3%; and 17.3%, 95% CI: 12.1%, 24.0%) (Appendix Table 1).

Non-obese children were more often cared for only by parents compared to obese children (65.8% Non-Obese vs. 62.1% Obese, $p=0.053$), and obese 5th graders were more often cared for by relatives compared to non-obese children (21.7% obese vs. 18.2% not obese, $p=0.039$). There were no statistically significant differences for other care arrangements.

In bivariate models, children who were cared for by a relative were more likely to be obese than children who were only cared for by parents (OR: 1.26, 95% CI: 1.03, 1.55) (Table 2), but this association was explained by differences in household characteristics (parents' marital status and number of children and adults in the household). Indeed, the number of adults in the house was also positively associated with child obesity (OR: 1.23, 95% CI: 1.10, 1.39).

To explore further the relationship between childcare provided by relatives and obesity, Model 2 in Table 2 was estimated for children who primarily received care from a relative, where the reference group is children who received care only from parents. In the bivariate model, children who were regularly cared for by siblings were more likely to be obese compared to children who were only cared for by parents (OR: 1.55, 95% CI: 1.07, 2.22). This relationship was explained by socioeconomic differences between children who were and were not obese: household socioeconomic status, and mother's education and employment. There were no significant associations between care arrangements with grandparents, aunts or uncles, and child obesity.

While parents were the only care providers before or after school for the majority of children across all race and ethnic groups, other care arrangements varied. Care from only parents was most common among non-Hispanic white 5th graders (69%) but least common among non-Hispanic black 5th graders (54%) (Appendix Table 2). Non-Hispanic white children also had the highest prevalence of care by adults not related to them, American Indians had the highest prevalence of care from relatives, Asians/Pacific Islanders had the highest prevalence of multiple sources of care, and mixed-race children had the highest prevalence of center-based care. Given these differences in care arrangements and the differences in the prevalence of obesity [1, 3], we examined the associations between childcare arrangement and obesity for children by race and ethnic group. Table 3 presents two models (all compare Hispanic children to non-Hispanics): the first model (Panel A) examines the relationship between the type of childcare and obesity and the second (Panel B) examines the relationship between the primary relative care provider and obesity (among children who only received care from parents and other relatives). For relative care, Hispanic children did not have statistically different odds of obesity compared to non-Hispanic children (Panel B).

However, Hispanic children who were cared for by an adult who was not a relative, such as a nanny or babysitter, were statistically significantly more likely to be obese compared to non-Hispanic children in similar childcare arrangements (Panel A) (OR: 5.11, 95% CI: 2.00, 13.06). This association remains significant after controlling for the other characteristics (OR: 4.45, 95%CI: 1.84, 10.77). These associations were not statistically different for non-Hispanic whites, non-Hispanic blacks, Asian/Pacific Islanders, American Indians, and mixed-race children (results available upon request).

Discussion

This study examined associations between childcare arrangements before and after school and risks of obesity among 5th graders. About one third of U.S. 5th graders regularly receive care from a person other than a parent before or after school, while one fifth receive care from other relatives. Children who were cared for before or after school by relatives, especially those who received care from siblings, were more likely to be obese than children who only were cared for by their parents. However, these relationships were explained by differences in household structure and socioeconomic status. Hispanic children who were cared for by an adult not related to them had significantly higher odds of obesity than non-Hispanic children, even after controlling for other risk-factors.

Previous studies have found positive associations between childcare from relatives, especially grandparents, and obesity among preschool-aged children (8, 11) . Our results suggest that childcare arrangements may not have these health implications for older children. Studies specifically focused on the relationship between childcare and obesity for Hispanic children have found that childcare was unrelated to obesity at age 4 for Hispanic children (15) but non-parental care may be protective for obesity at the start of kindergarten (6). In contrast, our results are for older children, who often receive less nutrition and physical activity monitoring from those caring for them compared to younger children (3). Also, unlike the previous studies, our data includes a nationally representative sample of Hispanic children, while previous studies used non-representative subnational samples.

The risk of obesity for Hispanic children who receive care from unrelated adults could be linked to care-giving practices. For example, Hispanic adults are more likely than white adults to encourage children they are caring for to watch television (26). However, differences in child care practices between Hispanic parents and non-parental caregivers have been insufficiently studied. Research to identify which childcare practices differ and which create an obesogenic environment may identify sources of obesity in Hispanic children cared for by adults other than their parents.

This study is limited by the use of cross-sectional data, whereby we cannot establish time ordering and causality. We also do not know the quality of the care being provided or characteristics of the care provider—two factors that may be linked with children's weight. Additionally, in the U.S., about 5% of elementary school children and 27% of middle school children care for themselves after-school (3)]. The relationships we found between non-parental care arrangements and obesity may be biased downward if some children who actually care for themselves are classified as only receiving parental care. Children who

were dropped for missing data were significantly more likely to live in the Midwest and West and less likely to live in the South, but our results would only be affected if children in the Midwest and West have both different childcare arrangements and obesity risks. There were no statistically significant differences between children in the analytic sample and those dropped due to missing data on the other demographic, family, or school variables. While the data for this study are from 2004, the ECLS-K is the only dataset that includes both anthropometric measurements and childcare information in a nationally representative cohort. Additionally, trends in BMI and obesity, relative-provided childcare, parental care, and center-based care have remained fairly stable since the 2000's, which allows our study findings to still be generally applicable today (1, 4).

An area for future research emerging from this study is childcare from siblings. It may be that older siblings provide less supervision when they are babysitting compared to adults, or that parents do not allow older siblings to prepare food or take younger siblings outside to play without adult supervision. While previous studies have indicated that grandparents often use childcare practices that may promote obesity, little is known about the care provided by siblings (19, 20, 22).

The relationship between informal care arrangements and obesity in Hispanic children should also be investigated further. Throughout elementary school, the prevalence of obesity in the U.S. is highest among Hispanic children in comparison to all other race/ethnic groups (27). In fact, the prevalence of obesity is almost 10 percentage points higher among Hispanic kindergarten children than non-Hispanic children (27). It will be important to understand whether childcare arrangements, may be linked with disparities in obesity (6, 27).

This study explored the implications of childcare arrangements for obesity. For school-aged children, childcare arrangements do not represent an independent risk factor for obesity, though obese children are more often cared for by relatives than are non-obese children. Childcare arrangements constitute an important decision for families not only early in childhood, but also during the elementary-school years. Recommendations that encourage care providers and childcare centers to promote healthful eating and physical activity and eliminate screen time may help to reduce childhood obesity. Health programs in communities with high use of relative-provided childcare and other types of childcare could consider outreach to these care providers to empower them to promote healthful eating and physical activity and reduce screen time during the times when they provide care. Childcare centers can also suggest to families strategies to promote healthy eating and physical activity. Evaluation research is needed to examine the scope of school-based before-and after-school programs, specifically evaluating whether these programs could be used as loci for obesity prevention, as well as whether these programs have the potential to reach children from more disadvantaged communities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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PS conceived of the study, set up the dataset, and contributed to the literature review and writing. NS contributed to the literature review, conducted the data analysis, and contributed to writing. SAC guided the study design and analysis and contributed to writing the manuscript.

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What is already known about this subject

- Half of children in the U.S. are regularly cared for before or after school by someone other than a parent.
- Studies have consistently shown associations between non-parental childcare arrangements and obesity in pre-school age children
- The associations between non-parental childcare and the risk of obesity among school-aged children are less clear.

What this study adds

- In a nationally representative study of fifth-graders in the U.S., children who were cared for before or after school by a relative were 26% more likely to be obese compared with children who only received care from parents; this relationship was explained by parents' marital status and household structure.
- Children who were cared for before or after school by siblings were more likely to be obese than children who only received care from parents, but this relationship was explained by socioeconomic differences between children, including household socioeconomic status, mother's education, and mother's employment.
- Hispanic children who were cared for before or after school by persons not related to them, either in the child's or the caregiver's home, had a higher risk of obesity than non-Hispanic children in similar care arrangements.

Table 1

Distribution of type of childcare and the number of hours spent in non-parental care for obese and non-obese 5th grade children in the U.S. (*n*=9617)

	Overall (95% CI)	Not Obese (95% CI)	Obese (95% CI)	<i>p</i> ^a
Primary type of care before and after school				
Care only by parents	64.9% (63.1%, 66.8%)	65.8% (63.7%, 67.8%)	62.14% (58.9%, 65.4%)	0.053
Care by relatives ^b	19.0% (17.7%, 20.2%)	18.2% (16.6%, 19.8%)	21.7% (19.1%, 24.4%)	0.039
Grandparents ^c	50.0% (45.6%, 54.4%)	51.1% (46.2%, 56.0%)	46.8% (38.6%, 55.0%)	0.364
Aunts or uncles ^c	21.8% (18.2%, 25.4%)	22.4% (18.7%, 26.0%)	20.2% (13.0%, 27.3%)	0.560
Siblings ^c	28.2% (23.9%, 32.6%)	26.6% (21.9%, 31.2%)	33.0% (24.5%, 41.5%)	0.164
Care by adults unrelated to the child	4.3% (3.5%, 5.0%)	4.5% (3.6%, 5.5%)	3.2% (2.2%, 4.3%)	0.091
Center-based care	10.0% (8.8%, 11.3%)	9.9% (8.5%, 11.3%)	10.5% (8.3%, 12.8%)	0.615
Multiple care providers	1.8% (1.3%, 2.3%)	1.6% (1.0%, 2.2%)	2.4% (1.2%, 3.6%)	0.259
Hours spent in non-parental care per week	3.95 (3.65, 4.25)	3.91 (3.55, 4.27)	4.13 (3.64, 4.58)	0.474
Hours spent in non-parental care by those receiving non-parental care (<i>n</i> =3338)	11.28 (10.67, 11.89)	11.42 (10.69, 12.14)	10.85 (9.83, 11.87)	0.364

Data Source: Early Childhood Longitudinal Study, Kindergarten class of 1998/99; Spring 2004

All estimates are survey adjusted to be representative of American fifth graders

^a *p*-value corresponds to a t-test testing the difference in percentage between obese and non-obese children

^b Relative-provided care is defined as care before or after school by a relative in either the child or relative's home; non-relative care is care before or after school in either the child or non-relative's home. If a child regularly receives care in multiple homes, centers, or a combination of homes and centers, they were classified under type of care varies.

^c Percentages shown are among children who received relative care

Table 2

Relationship between type of childcare arrangement ($n=9617$) and care from relatives ($n=8074$) and obesity among 5th grade children in the U.S.

Outcome: Obesity	Type of care			Relative-provided care		
	Bivariate (95% CI)	Multivariate (95% CI)	Bivariate (95% CI)	Bivariate (95% CI)	Multivariate (95% CI)	Multivariate (95% CI)
Primary type of care before and after school (reference: Care only by parents)						
Care by relatives	1.26* (1.03, 1.55)	1.03 (0.83, 1.28)	--	--	--	--
Care by an adult unrelated to the child	0.76 (0.50, 1.15)	0.68 [†] (0.44, 1.03)	--	--	--	--
Center-based care	1.12 (0.87, 1.46)	1.03 (0.78, 1.36)	--	--	--	--
Multiple care providers	1.55 (0.83, 2.88)	1.34 (0.72, 2.48)	--	--	--	--
Relative care provider (reference: Parental care)						
Grandparents	--	--	1.15 (0.89, 1.49)	0.92 (0.70, 1.21)		
Aunts or uncles	--	--	1.06 (0.70, 1.61)	0.78 (0.50, 1.20)		
Siblings	--	--	1.55* (1.07, 2.22)	1.31 (0.91, 1.91)		
Boy		1.42*** (1.19, 1.70)		1.45*** (1.21, 1.75)		
Race and ethnicity (reference: Non-Hispanic White)						
Non-Hispanic Black		0.97 (0.71, 1.315)		0.94 (0.64, 1.38)		
Hispanic		1.49* (1.10, 2.03)		1.42* (1.01, 2.00)		
Asian/Pacific Islander		1.20 (0.78, 1.86)		1.07 (0.69, 1.65)		
American Indian		1.97** (1.24, 3.14)		1.99* (1.17, 3.37)		
Mixed race		1.58 [†] (0.99, 2.52)		1.63 [†] (0.96, 2.78)		
Urbanicity of school (reference: Large and mid-size city)						
Large and mid-size suburb and large town		0.87 (0.70, 1.08)		0.90 (0.72, 1.11)		
Small town and rural		1.07 (0.79, 1.44)		1.01 (0.76, 1.35)		
Census region (reference: Northeast)						
Midwest		0.78* (0.63, 0.98)		0.77* (0.60, 0.98)		
West		0.78 [†] (0.61, 1.01)		0.79 [†] (0.61, 1.04)		
South		0.99 (0.80, 1.23)		0.96 (0.75, 1.22)		
Parents are married		0.82 [†] (0.67, 1.01)		0.80 [†] (0.62, 1.02)		
Number of siblings in household		0.85*** (0.78, 0.93)		0.84** (0.76, 0.93)		

Outcome: Obesity	Type of care		Relative-provided care	
	Bivariate (95% CI)	Multivariate (95% CI)	Bivariate (95% CI)	Multivariate (95% CI)
Number of adults in household		1.23 *** (1.10, 1.39)		1.20 ** (1.06, 1.36)
At least one parent is foreign born		1.02 (0.79, 1.30)		1.01 (0.77, 1.32)
Mother's employment status (reference: full time)				
Part time		0.81 * (0.66, 0.98)		0.73 * (0.57, 0.93)
Looking for work		0.91 (0.61, 1.35)		0.89 (0.58, 1.37)
Not working		0.84 (0.67, 1.06)		0.83 (0.65, 1.04)
Mother's education (reference: no education)				
High school graduate		1.74 † (0.98, 3.08)		1.85 * (1.01, 3.40)
College graduate		2.01 * (1.12, 3.61)		2.06 * (1.10, 3.87)
Doctorate/Professional degree		1.81 (0.89, 3.69)		1.82 (0.84, 3.94)
SES Quintiles (reference: first quintile)				
Second quintile		1.08 (0.85, 1.38)		1.16 (0.87, 1.55)
Third quintile		0.91 (0.66, 1.25)		0.92 (0.64, 1.31)
Fourth quintile		0.53 ** (0.35, 0.81)		0.56 * (0.34, 0.91)
Fifth quintile		0.55 * (0.33, 0.92)		0.55 * (0.31, 0.97)

† $p < 0.01$,

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$

Data Source: Early Childhood Longitudinal Study, Kindergarten class of 1998/99; Spring 2004

All estimates are survey adjusted to be representative of American fifth graders

Results were estimated using logistic regression models. Coefficients are presented as odds ratios with 95% Confidence Intervals in parentheses. Categorical variables were entered as dummies with one group omitted.

Estimated relationships between type of childcare arrangement and relative care provider and obesity with Hispanic interaction term for 5th grade children in the U.S.

	Unadjusted (95% CI)	Adjusted (95% CI)
Panel A: Type of childcare arrangement		
Primary type of care before and after school (<i>n</i> =9,617) ^a		
Reference: Care only by parents among Non-Hispanic children		
Hispanic	1.47 ^{**} (1.13, 1.91)	1.43 [*] (1.01, 2.03)
Care by relatives	1.23 (0.96, 1.57)	1.04 (0.80, 1.34)
Care by relatives [*] Hispanic	1.04 (0.60, 1.78)	1.00 (0.58, 1.72)
Care by an adult unrelated to the child	0.47 ^{***} (0.31, 0.72)	0.44 ^{***} (0.27, 0.71)
Care by an adult unrelated to the child [*] Hispanic	5.11 ^{***} (2.00, 13.06)	4.45 ^{***} (1.84, 10.77)
Center-based care	1.18 (0.87, 1.60)	1.09 (0.78, 1.50)
Center-based care [*] Hispanic	0.77 (0.42, 1.43)	0.82 (0.44, 1.53)
Multiple care providers	1.69 (0.86, 3.33)	1.41 (0.72, 2.79)
Multiple care providers [*] Hispanic	0.64 (0.17, 2.37)	0.66 (0.19, 2.33)
Panel B: Primary relative care provider		
Relative care provider (<i>n</i> =8074) ^a		
Reference: Care only by parents among Non-Hispanic children		
Hispanic	1.46 ^{**} (1.12, 1.90)	1.40 [†] (0.96, 2.03)
Grandparents	1.16 (0.87, 1.55)	0.93 (0.69, 1.26)
Grandparents [*] Hispanic	0.94 (0.50, 1.77)	0.94 (0.48, 1.82)
Aunt or uncle	0.95 (0.59, 1.53)	0.73 (0.44, 1.21)
Aunt or uncle [*] Hispanic	1.23 (0.47, 3.20)	1.20 (0.47, 3.10)
Siblings	1.45 (0.93, 2.26)	1.26 (0.79, 2.03)
Siblings [*] Hispanic	1.23 (0.46, 3.25)	1.17 (0.45, 3.01)

[†] *p*<0.01,
^{*} *p*< 0.05,
^{**} *p*< 0.01,

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 $p < 0.001$

Data Source: Early Childhood Longitudinal Study, Kindergarten class of 1998/99; Spring 2004

All estimates are survey adjusted to be representative of American fifth graders

Results were estimated using logistic regression models. Coefficients are presented as odds ratios with 95% Confidence Intervals in parentheses. Models are survey adjusted by weight, strata, and primary sampling unit. Categorical variables were entered as dummies with one group omitted.

Adjusted models control for sex, urban status, census region, parental marital status, whether parents were foreign born, number of siblings, number of adults in the household, number of hours spent in relative care, maternal employment status, maternal education, household poverty status, and household wealth quintiles.