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## Overweight and Underserved in Children: A Contemporary American Paradox

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## INTRODUCTION

- Childhood overweight and obesity trends are serious problems placing children at greater risks for adverse health outcomes and developmental issues.
- Between 2011 and 2014, obesity prevalence hovered near 17% for children 6-12 years.
- As of 2014, an estimated 14% of U.S. households were labeled food insecure, with 7.9 million children living within these underserved domains. In recent years, there has been growing concern that food insecurity and overweight and obesity conditions may be associated with each other, especially amongst children.

## OBJECTIVE

Using a nationally representative sample, this study sought to examine whether food insecure children 6-12 years of age had higher BMIs in order to assess a plausible association between food security and a child's weight.

## DATA & METHODS

### Data Source:

- Weighted 2013-2014 National Health and Nutrition Examination Survey (NHANES), conducted by the Centers for Disease Control and Prevention (CDC), is representative of the U.S. non-institutionalized population in all 50 state, and DC;

### Sample:

- a complex multistage sampling technique was used; N=2927

### Data items:

- child's BMI, their food security category, race, physical activity, grade level, and family income to poverty ratio.

### Statistical analyses:

- descriptive statistics to describe the sample;
- bivariate analysis used to identify differences between the groups, and test the association between weight and food security, and between weight and each of the confounding variables: education, race, gender, physical activity, and the ratio of family income to poverty.
- a multivariate regression was used to test the relationship between a child's weight and their food security while controlling for education, race, physical activity, and the ratio of family income to poverty.

## RESULTS

**Table 1: Respondents' Characteristics by Food Security Category**

		FSDHH Household Food Security Category							
		Full Security		Marginal Security		Low Security		Very Low Security	
		N	%	N	%	N	%	N	%
Gender	Male	994	50.9	173	53.9	238	56.5	116	55.5
	Female	958	49.1	149	46.1	183	43.5	93	44.5
Race	Caucasian	1137	58.2	150	46.6	131	31.1	88	42.4
	African-American	219	11.2	65	20.2	84	19.9	42	20.2
	Hispanic	111	5.7	9	2.8	8	1.8	3	1.4
	Asian	104	5.3	17	5.3	23	5.4	12	5.9
	Other	380	19.5	81	25.1	176	41.8	63	30.1
Grade Level	Elementary	1709	87.6	291	90.4	369	87.7	193	92.6
	Middle	241	12.3	31	9.6	52	12.3	16	7.4
	High School	2	0.1	0	0.0	0	0.0	0	0.0
Physical Activity	Never	54	2.8	15	4.6	31	7.5	7	3.5
	1-2 days	140	7.2	42	12.9	25	6.0	15	7.2
	3-4 days	272	14.0	52	16.3	41	9.8	28	13.5
	5-7 days	1471	76.0	213	66.2	322	76.8	158	75.9
Child Overweight	No	1651	84.6	264	82.0	314	74.5	155	74.5
	Yes	301	15.4	58	18.0	107	25.5	53	25.5

### Logistic Regression

**Unadjusted model** ( $\chi^2 (1) = 30.77, p < .001$ ):

- Children with low or very low food security are about 87% more likely to be overweight.
- Children with marginal food security are not significantly different in their weight from those with full food security.

**Adjusted model** ( $\chi^2 (15) = 150.1, p < .001$ ): explained 8.7% (Nagelkerke  $R^2$ ) of the variation, and correctly classified 82% of cases.

- African-American, Hispanic and children of other race, including multiracial, are significantly more likely to be overweight than Caucasian children.
- Hispanic and children of other race, including multiracial, are 2.5 times more likely to be overweight than Caucasians
- African-American children are 39.1% more likely than Caucasian children to be overweight
- Asian children do not differ in their likelihood to be overweight from Caucasian children
- Children in families with income to poverty ratios between 1.5-2.49 were more likely to be overweight than children at any other poverty level ( $p = .007$ ).
- Children who exercises 1-2 days per week do not differ in their weight status from the children who never exercise; children should exercise at least 3 days per week to note an improvement in their weight.

### Descriptive Statistics

- The sample includes 1530 (52.3%) boys and 1397 (47.7%) girls; 52% are Caucasian, 14.1% African-American, 24.1% Hispanic, 4.5% Asian, and 5.4% other race/multiracial.
- The proportion of African American and Hispanic children is greater in the low security and very low security categories.
- 47.7% of all children were in elementary school, 52.3% in middle school
- 88.7% of all children had at least 5 days of physical activity per week
- 18% of all children were overweight
- There was no significant difference between genders, or between grade levels in the proportion of overweight children

**Table 2: Relationship between Children Weight and Food Security**

		Unadjusted				Adjusted			
		OR	Sig.	95%CI Lower	95%CI Upper	OR	Sig.	95%CI Lower	95%CI Upper
Race	Caucasian						<.001		
	African-American					1.391	.041	1.014	1.908
	Asian					1.168	.577	.677	2.015
	Other					2.501	<.001	1.659	3.771
	Hispanic					2.449	<.001	1.906	3.148
Physical Activity	Never						<.001		
	1-2 days					.761	.314	.447	1.294
	3-4 days					.576	.030	.351	.947
	5-7 days					.364	<.001	.233	.567
Family Income to Poverty Ratio	0- 0.5* poverty level						<.001		
	0.51-1.49* poverty level					1.145	.479	.787	1.668
	1.5- 2.49* poverty level					1.772	.007	1.166	2.694
	2.5-3.49* poverty level					1.102	.690	.685	1.772
	3.5-4.49 * poverty level					.585	.067	.330	1.039
	>4.5* poverty level					1.462	.103	.926	2.309
Food security	Full						.003		
	Marginal	1.202	.245	.882	1.638	1.056	.760	.743	1.503
	Low	1.872	<.001	1.456	2.406	1.569	.003	1.166	2.111
	Very Low	1.874	<.001	1.341	2.619	1.748	.004	1.198	2.551
	Constant	.183	<.001			.254	<.001		

- Children with physical activity of 3+ days/ week are less likely to be overweight
- Children with low food security are about 56.9% more likely to be overweight than children with full food security.
- Children with very low food security are about 74.8% more likely to be overweight than children with full food security.
- Children in families that are below or at poverty level do not differ in the proportion of overweight children.
- Children in families that are 50% to 150% above poverty are 77.2% more likely to be overweight than those below or at poverty level.
- Children in higher income families and than those below or at poverty level are just as likely to be overweight.

## CONCLUSIONS

- The findings highlight a disconcerting gap in federal aid for food insecure children, ineligible for government supported food assistance programs due to their family's income being slightly above the poverty level.
- The difference in the proportion of overweight children between the low and very low food security category illustrates the shortcomings of the government funded supplemental nutrition assistance programs.
- Additional analyses showed that youth from low income families are more likely to consume unhealthy foods, low in nutrients, but high in fats, empty calories, and artificial ingredients. Subsequently, these children are more apt to gain unhealthy amounts of weight.
- Federal poverty guidelines should be revised to include families in poverty unable to qualify for food subsidies in order to prevent childhood obesity, which can lead to adverse health conditions and high healthcare costs over the life course.
- The complex nature of the food security continuum and its impact on society may be intensifying health disparities in children.
- Inconsistencies in the results of studies on food security and its relation to child weight suggest that more research is needed, especially when considering the health, social, economic, and political implications these issues pose to the well-being of future generations.

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