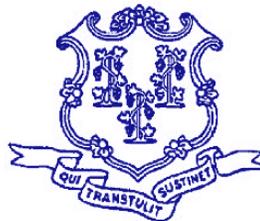


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Overweight and Obesity Among Kindergarten and Third Grade Children in Connecticut

2010 - 2011



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Introduction

Data from the National Health and Nutrition Examination Study (NHANES) are used to monitor the prevalence of overweight and obesity among children and adolescents in the United States. A NHANES report by Ogden and Carroll described the trend in obesity, comparing data from 1976-1980 and 2007-2008. Obesity increased in children 2-5 years (from 5.0% to 10.4%), children 6-11 years (from 6.5% to 19.4%) and adolescents age 12-19 years (from 5.0% to 18.1%).¹

A systematic review of recent research supports the assertion that childhood obesity and overweight are risk factors for the development of heart disease, diabetes, arthritis, cancer and other chronic conditions which affect both the quality and length of life.² If obesity manifests in younger people, there is more time during the lifespan to develop complications that involve multiple organ systems. Long-term costs include direct care and projected costs of early disability and death. The association of increased body mass index (BMI) in young adulthood and middle age with higher medical care expenditures for cardiovascular disease, diabetes and total cumulative health costs in older age was demonstrated in a prospective study by Daviglius et al.³

The Centers for Disease Control and Prevention (CDC) defines children aged 2 to 19 years as overweight if their BMI is at or above the 85th percentile, but below the 95th percentile for children of the same sex and age. Obesity is defined as BMI at or above the 95th percentile for children of the same sex and age.

According to Healthy People 2020 data, from 2005-2008 16.2% of U.S. children and adolescents age 2 to 19 years met the criteria for obesity. The target is 10% improvement, reducing the overall childhood obesity rate to 14.6%.⁴

From 2005-2008, 10.7% of children age 2 to 5 years were considered obese. The target is 9.6%.

From 2005-2008, 17.4% of children age 6 to 11 years were considered obese. The target is 15.7%.

From 2005-2008, 17.9% of adolescents age 12 to 19 years were considered obese. The target is 16.1%.

DPH Every Smile Counts and Obesity Survey

In 2010-2011, the Office of Oral Health of the Connecticut Department of Public Health (DPH) conducted Every Smile Counts, a statewide oral health survey among public and charter schools with twenty-five or more students in kindergarten and third grade. In collaboration with the DPH Nutrition, Physical Activity and Obesity (NPAO) Program, the Office of Oral Health collected height and weight data in the Every Smile Counts survey. Unlike the Connecticut Youth Risk Behavior Survey (YRBS), which is self-report from grades 9 through 12, the Every Smile Counts survey directly measured the height and weight of each child in the sample. This analysis provides needed baseline data on the prevalence of obesity and overweight in younger Connecticut children.

Methods

The sampling frame for this survey was 634 public and charter schools with 25 or more students in kindergarten and/or grade 3, for a total of 39,844 kindergarten and 41,848 third grade students. Schools were ordered by District Reference Group (DRG)⁵ and within DRG by the percentage of children that participate in the National School Lunch Program, which funds free or reduced price school lunch. Systematic sampling using random numbers was employed to select 79 schools to represent Connecticut kindergarten and third grade public school children.⁶

If a school declined to participate, a replacement school within the same sampling stratum was selected. Seventy-four of 79 schools contributed data for 8,410 children. Records with age, sex, height and weight (8,359) were further reduced to 8,080 records with BMI values in a plausible range. Records that contained apparent data entry errors such as misplacement of the decimal point were also excluded. BMI-for-age was collapsed into three categories: Obese, Overweight, and Not Overweight or Obese. The data were adjusted to account for the complex sampling method. Survey analyses were done with Statistical Analysis System (SAS) 9.2 (PROC SURVEYFREQ) and also utilized the CDC BMI-for-age analysis program, which calculates an age and sex specific percentile for children that takes into account changes in body composition as children grow as well as differences in growth between boys and girls.⁷

Results

The demographic profile of the study sample is shown in **Table 1**. With respect to sex and race/ethnicity, it was similar to the 2009 Census profile of five to nine year old Connecticut residents.⁸

The prevalence of obesity was significantly higher in grade 3 children (18.2%; 95% confidence interval [CI]: 15.8% to 20.5%) than in kindergarten children (13.9%; CI: 12.2% to 15.6%). Third grade girls (17.2%; CI: 14.5% to 19.9%) were more likely to be obese when compared to kindergarten girls (13.0%; CI: 11.0% to 15.0%). Similarly, third grade boys (19.0%; CI: 16.3% to 21.8%) were more likely to be obese when compared to kindergarten boys (14.8%; CI: 12.9% to 16.7%). (**Tables 2 and 3**)

Overall, obesity prevalence in non-Hispanic Blacks (22.5%; CI: 19.8% to 25.3%) and Hispanics (25.0%; CI: 22.3% to 27.7%) was significantly higher than non-Hispanic Whites (12.4%; CI: 11.1% to 13.7%). (**Table 4**)

Almost one third (32%) of all the students in the sample were either overweight or obese. The prevalence was similar when compared by sex. Third-graders (33.6%) were more likely to be either overweight or obese than children in Kindergarten (29.8%), but the difference was not statistically significant. However, the non-Hispanic Black (40.8%) and Hispanic (43.3%) children in the sample were significantly more likely to be overweight or obese than non-Hispanic White (26.8%) children. (**Table 5**)

The percentage of all students who were eligible for Free or Reduced Price School Lunch (FRPL) Program, also known as National School Lunch Program, was used as a proxy marker for income. Students from schools where more than one half of the school population were eligible for free or reduced price school lunch were twice as likely to be obese as students from schools where less than one quarter of students were FRPL eligible (24% obese vs. 12 % obese). (**Table 6**)

Discussion

About one third of all children in the representative sample are either overweight or obese. Previous work suggests that children who are obese are more likely to have severe obesity as adults.⁹ The DPH survey is primarily of children who are 8 years and younger (79%). As overweight and obesity develop earlier in life, there is more time to accumulate chronic disease risks.¹⁰

The DPH Every Smile Counts and Obesity survey used direct measurements of height and weight. In the most recent Connecticut Youth Risk Behavior Survey (YRBS 2009) results, approximately 25% of students in grade 9 through 12 gave responses which categorized them as overweight (14.5%) or obese (10.4%). The fact that direct measurement in even younger children yielded higher estimates for both BMI categories raises the possibility that self-report surveys may underestimate the problem among high school students. Younger cohorts such as the ones in this study may be part of a future wave of overweight or obese high school students and adults.

The percentage of children in each school who are eligible for free or reduced price school lunch is not an income measure that can be applied to each child's record, but it serves as a proxy income measure for children from each school. Low income by itself does not cause obesity, but it can be related to other factors which affect the probability of becoming overweight or obese, such as limited availability of affordable healthy food, living in neighborhoods where outdoor physical activity may be dangerous, and less access to convenient and affordable health care.^{11, 12}

Conclusions

In all, these findings suggest that obesity intervention and prevention must begin early in life. Racial and ethnic minorities and those who are poor are at higher risk of being overweight or obese, according to these survey results. Children who are already overweight or obese early in life have increased risk of developing early and severe chronic disabilities. Public health goals are focused on reducing the prevalence of obesity. However, the prevalence of overweight in young children of Connecticut provides evidence to support a broader scope of interventions and measurable outcomes targeted at reducing rates of overweight. Future surveys that assess interventions aimed at reducing overweight and obesity among Connecticut's elementary school children could serve as an important step.

Tables

Table 1: Demographic Characteristics for the Study Population

Demographics	Kindergarten	Grade 3	Total
	n = 3,925	n = 4,155	n = 8,080
Race (% of children)			
White	77.48	76.37	76.91
Black	13.48	14.1	13.8
Asian	4.89	5.32	5.11
American Indian	0.23	0.41	0.32
Pacific Islander	0.25	0.26	0.26
Missing/Unknown	3.29	3.73	3.51
Ethnicity (% of children)			
Not Hispanic	78.88	81.71	80.33
Hispanic	21.12	18.29	19.67
Race/Ethnicity (% of children)			
Non-Hispanic White	60.5	62.6	61.6
Non-Hispanic Black	11.4	11.9	11.6
Hispanic (any race)	21.1	18.3	19.7
Missing/Unknown	7.0	7.2	7.1
Gender (% of children)			
Male	50.98	52.32	51.67
Female	49.02	47.68	48.33
Age in years (% of children)			
4	0.28	--	0.14
5	67.29	--	32.69
6	31.59	--	15.35
7	0.84	0.19	0.51
8	--	58.84	30.26
9	--	37.98	19.53
10	--	2.84	1.46
11	--	0.14	0.07

Table 2: Distribution of Overweight and Obesity in Kindergarten Children

	Not Overweight or Obese			Overweight			Obese		
	N	%	95% CI	N	%	95% CI	N	%	95% CI
Total	2757	70.24	67.88 - 72.60	622	15.85	14.47 - 17.22	546	13.91	12.19 - 15.64
<i>by Sex</i>									
Boys	1410	70.46	67.88 - 73.05	295	14.74	13.02 - 16.46	296	14.79	12.86 - 16.73
Girls	1347	70.01	67.31 - 72.71	327	17.00	15.32 - 18.67	250	12.99	11.01 - 14.98
<i>by Race/Ethnicity</i>									
NH White*	1779	74.94	72.63 - 77.24	355	14.95	13.40 - 16.51	240	10.11	8.64 - 11.58
NH Black*	274	61.16	56.18 - 66.14	92	20.54	15.89 - 25.18	82	18.30	14.35 - 22.26
Hispanic	503	60.68	57.67 - 63.68	139	16.77	13.24 - 20.30	187	22.56	19.98 - 25.14

*NH denotes Non-Hispanic.

Table 3: Distribution of Overweight and Obesity in Grade 3 Children

	Not Overweight or Obese			Overweight			Obese		
	N	%	95% CI	N	%	95% CI	N	%	95% CI
Total	2758	66.38	63.07 - 69.68	642	15.45	13.95 - 16.95	755	18.17	15.80 - 20.54
<i>by Sex</i>									
Boys	1440	66.24	62.67 - 69.81	320	14.72	12.84 - 16.60	414	19.04	16.34 - 21.75
Girls	1318	66.53	62.85 - 70.21	322	16.25	14.43 - 18.08	341	17.21	14.53 - 19.90
<i>by Race/Ethnicity</i>									
NH White	1862	71.59	68.53 - 74.64	362	13.92	12.16 - 15.67	377	14.49	12.45 - 16.54
NH Black	283	57.40	52.55 - 62.26	80	16.23	13.14 - 19.32	130	26.37	22.54 - 30.19
Hispanic	398	52.37	48.27 - 56.47	152	20.00	16.90 - 23.10	210	27.63	23.63 - 31.64

*NH denotes Non-Hispanic.

Table 4: Distribution of Overweight and Obesity in Kindergarten and Grade 3 Children

	Not Overweight or Obese			Overweight			Obese		
	N	%	95% CI	N	%	95% CI	N	%	95% CI
Total	5515	68.26	65.85 - 70.65	1264	15.64	14.51 - 16.77	1301	16.10	14.37 - 17.83
<i>by Sex</i>									
Boys	2850	68.26	65.74 - 70.79	615	14.73	13.40 - 16.06	710	17.01	15.09 - 18.92
Girls	2665	68.25	65.63 - 70.86	649	16.62	15.23 - 18.01	591	15.13	13.26 - 17.01
<i>by Race/Ethnicity</i>									
NH White*	3641	73.19	71.04 - 75.33	717	14.41	13.06 - 15.76	617	12.40	11.06 - 13.74
NH Black*	557	59.19	55.15 - 63.24	172	18.28	15.12 - 21.44	212	22.53	19.77 - 25.29
Hispanic	901	56.70	54.14 - 59.27	291	18.31	16.09 - 20.53	397	24.98	22.25 - 27.72

*NH denotes Non-Hispanic.

Table 5: Comparison of Overweight OR Obese by Sex, Grade and Race/Ethnicity

	Not Overweight or Obese			Overweight OR Obese		
	N	%	95% CI	N	%	95% CI
Total	5515	68.26	65.86 - 70.65	2565	31.75	29.35 - 34.14
<i>by Sex</i>						
Boys	2850	68.26	65.74 - 70.79	1325	31.74	29.21 - 34.27
Girls	2665	68.25	65.63 - 70.86	1240	31.75	29.14 - 34.37
<i>by Race/Ethnicity</i>						
NH White*	3641	73.19	71.04 - 75.33	1334	26.81	24.67 - 28.96
NH Black*	557	59.19	55.15 - 63.24	384	40.81	36.76 - 44.85
Hispanic	901	56.70	54.14 - 59.27	688	43.30	40.73 - 45.86
<i>by Grade</i>						
Grade 3	2758	66.38	63.07 - 69.68	1397	33.62	30.32 - 36.93
Kindergarten	2757	70.24	67.88 - 72.60	1168	29.76	27.40 - 32.12

*NH denotes Non-Hispanic.

**Table 6: Comparison of Obesity Prevalence in Schools by Student Population Income Proxy
(Percent of students who are income eligible for Free or Reduced Price School Lunch [FRPL] Program)**

% of students eligible for FRPL Program	Not Overweight or Obese			Overweight			Obese		
	N	%	95% CI	N	%	95% CI	N	%	95% CI
< 25%	3351	73.86	71.58 - 76.14	638	14.06	12.58 - 15.54	548	12.08	10.64 - 13.51
25 - 49%	928	66.67	62.89 - 70.44	232	16.67	14.40 - 18.93	232	16.67	13.74 - 19.59
50 - 74%	587	58.64	53.74 - 63.54	168	16.78	13.68 - 19.89	246	24.58	20.64 - 28.51
>= 75%	649	56.43	52.36 - 60.51	226	19.65	16.36 - 22.95	275	23.91	21.47 - 26.36

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