Obesity and Childhood Asthma: Is There a Relationship?



Winston C. Liao¹ and Robert L. Woldman²

¹North Carolina Division of Public Health and ²Conceptual MindWorks, Inc.





Abstract

Increase in the prevalence of both asthma and obesity has been observed in recent years. However, there is still contradictory research as to possible contributing factors to the relationship and the effect of obesity on asthma management outcomes. This study investigates the relationship between obesity and childhood asthma, while controlling for physical activity, television watching, and selected demographic characteristics. Data from the 2006 North Carolina Child Health Assessment and Monitoring Program (CHAMP) Survey were analyzed for children ages 10 to 17 for whom BMI could be calculated. Logistic regression models were used to test the significance of the relationship between obesity in asthmatic children and asthma management and behavior outcomes. There were about twice as many children with asthma who were obese than those who were of normal weight (lifetime asthma: 28.1% vs. 15.5%, current asthma: 18.3% vs. 9.4%). Obesity was significantly related to lifetime asthma [aOR=1.44 (aCI=1.94-2.61) p<.01] and current asthma [aOR=1.97 (aCI=1.38-2.83) p<.01]. No significant relationship was found between obesity and use of daily asthma medication, use of rescue medication, or emergency room/urgent care clinic visit. Although the results indicate a strong relationship between obesity and childhood asthma, further studies, including prospective investigations, are needed to explore the onset/ timing of these two conditions, as well as explanatory mechanisms or causal processes for the relationship.

Background

"Obesity is associated with a higher prevalence of asthma."

Office of the Surgeon General, 2008

"Obese children are almost <u>six times</u> more likely than children with healthy weights to have an impaired quality of life – equal to that of children undergoing treatment for cancer."

- Journal of the American Medical Association, 2008

Introduction

Obesity is the most common chronic disease among children. In 2007, North Carolina had the **5**th **highest rate** of overweight children in the U.S. For ages 10-17, 31% were overweight or obese. In 2007, 9.8% of N.C. children under the age of 18 had current asthma versus 7.8% of adults 18 and older.

■ **Study objective:** To investigate the relationship between obesity and childhood asthma, while controlling for physical activity, television watching, and selected demographic characteristics

Methods

- **Sources of data:** 2005 and 2006 North Carolina Child Health Assessment and Monitoring Program (CHAMP) Surveys
- Variables of interest:
- * Prevalence: lifetime prevalence, current prevalence
- * **Body mass index:** recommended range (normal)=BMI 18.5-24.9, overweight=BMI 25.0-29.9, obese=BMI>30.0
- * Asthma-related outcomes: use of daily asthma medication, use of rescue medication, emergency room/urgent care clinic visit
- Analysis:
- * Bivariate and multiple logistic regression: to determine predictors of three asthma management behaviors
- * Control for: physical activity, television watching time, age, gender, race

TABLE 1: Descriptive Statistics 2005 & 2006 CHAMP Survey CHILDREN 10-17 N = 2,809 Lifetime Asthma N Weighted %

CHILDREN 10-17 N = 2,809						
Lifetime Asthma	N	Weighted %				
Yes	514	18.1				
No	2,295	81.9				
Current Asthma	N	Weighted %				
Yes	297	11.3				
No	2,500	88.7				
Weight Category	N	Weighted %				
Normal	1,971	70.4				
Overweight	388	13.1				
Obese	450	16.4				
Daily Physically Active Play < 1 hr	N	Weighted %				
Yes	1,074	36.4				
No	1,735	63.6				
Daily TV Time >/= 2 hrs	N	Weighted %				
Yes	1,668	59.9				
No	1,141	40.1				
Age of Child	N	Weighted %				
10 to 13	1,095	44.5				
14 to 17	1,714	55.5				
Sex of Child	N	Weighted %				
Male	1,454	50.5				
Female	1,355	43.5				
Race of Child	N	Weighted %				
White	2,000	66.4				
African American	572	27.0				
Other	237	6.6				

TABLE 2: Independent And Control Variables Cross-Tabulated with Dependent Variables

2005 & 2006 CHAMP Survey								
CHILDREN 10-17								
		N = 2 8 0 9	N = 2 7 9 7					
	Life	etime Asthma	Current Asthma					
Weight Category	N	Weighted %	N	Weighted %				
Normal	322	15.5	177	9.4				
Overweight	76	20.1	47	12.6				
Obese	116	28.1	73	18.3				
Daily Physically Active Play < 1 hr	N	Weighted %	N	Weighted %				
Yes	323	18.3	189	11.6				
No	191	18.0	108	10.6				
Daily TV Time >/= 2 hrs	N	Weighted %	N	Weighted %				
Yes	220	19.3	128	11.8				
No	294	17.4	169	10.9				
Age of Child	N	Weighted %	N	Weighted %				
10 to 13	223	19.6	136	12.5				
14 to 17	291	17.0	161	10.3				
Sex of Child	N	Weighted %	N	Weighted %				
Male	313	21.8 170		12.7				
Female	201	14.4	127	9.8				
Race of Child	N	Weighted %	N	Weighted %				
White	350	17.1	193	10.1				
African American	117	20.7	73	14.1				
Other	190	17.7	31	11.8				

TABLE 3: Logistic Regression Results 2005 & 2006 CHAMP Survey

2005 & 2006 CHAMP Survey											
CHILDREN 10-17											
	Lifetime Asthma				Current Asthma						
	Unadjusted OR	Unadjusted 95 %CI	Adjusted OR		Adjusted 95% CI	Unadjusted OR		Unadjusted 95 %CI	Adjusted OR		Adjusted 95% CI
Weight Category											
Normal/Overweight	1.00		1.00			1.00			1.00		
Obese	2.03 **	1.51 - 2.72	1.94	**	1.44 - 2.61	2.05	**	1.42 - 2.92	1.97	**	1.38 - 2.83
Daily Physically Active Play < 1 hr											
No	1.00		1.00			1.00			1.00		
Yes	0.98	0.77 - 1.25	1.08		0.84 - 1.40	0.90		0.66 - 0.51	0.94		0.69 - 1.30
Daily TV Time >/= 2 hrs											
No	1.00		1.00			1.00			1.00		
Yes	0.88	0.70 - 1.12	0.79	+	0.62 - 1.01	0.92		0.68 - 1.24	0.81		0.60 - 1.11
Age of Child											
10 to 13	1.00		1.00			1.00			1.00		
14 to 17	0.84	0.66 - 1.06	0.82		0.65 - 1.05	0.81		0.60 - 1.09	0.82		0.61 - 1.11
Sex of Child											
Male	1.00		1.00			1.00			1.00		
Female	0.60 **	0.47 - 0.77	0.60	**	0.46 - 0.77	0.75	+	0.56 - 1.01	0.77	+	0.56 - 1.04
Race of Child											
White/Other	1.00		1.00			1.00			1.00		
African American	1.26 +	0.96 - 1.65	1.26		0.95 - 1.68	1.44	*	1.03 - 2.01	1.43	*	1.01 - 2.02
* P < .05											

Conclusions

- There were about twice as many children with asthma who were obese than those who were of normal weight
- Obesity was significantly related to lifetime asthma and current asthma, even after controlling for physical activity, television watching time, age, gender, and race
- No significant relationship was found between obesity and use of daily asthma medication, use of rescue medication, or emergency room/urgent care clinic visit
- Although the results indicate a strong relationship between obesity and childhood asthma, further studies, including prospective investigations, are needed to explore the onset/timing of these two conditions, as well as explanatory mechanisms or causal processes for the relationship

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** P < .01

+ p < .10

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The authors dedicate this presentation in memory of Janet Reaves.

Lead author contact: Winston Liao | Phone: (919)707-5210 | Email: winston.liao@ncmail.net