

Obesity in early childhood is associated with atopic dermatitis later in childhood and adolescence in the United States

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Introduction

Atopic dermatitis (AD) is a chronic, inflammatory skin disease affecting approximately 9.6 million U.S. children under the age of 18.¹

The identification of modifiable risk factors for AD is important to further our understanding of the prevention and treatment of AD in the pediatric population.

Previous cross-sectional studies demonstrated associations between obesity and AD in childhood.

Few longitudinal studies have examined the temporal relationship between obesity and AD, i.e. does obesity cause AD or vice versa.²

Research Objectives

We investigated the following associations:

1. Overweight ($\geq 85^{\text{th}}$ BMI-percentile) or obesity ($\geq 95^{\text{th}}$ BMI-percentile) with AD during childhood overall
2. Overweight or obesity at age 5 years and the subsequent development of AD at ages 9 or 15 years, and
3. AD at age 5 years and subsequent development of overweight or obesity at ages 9 or 15 years.

Methods

- We used data from the Fragile Families and Child Wellbeing Study, a longitudinal US birth cohort study consisting of 4898 children born in 20 large cities.
- The presence of AD was determined by a positive response to “In the past 12 months, has (child) had eczema or skin allergy?” assessed at the 5, 9 and 15 year follow up surveys.
- Obesity was defined as $\geq 95^{\text{th}}$ percentile BMI and overweight was defined as $\geq 85^{\text{th}}$ percentile BMI.
- Statistical analysis was completed using SAS 9.4 (SAS Institute, Cary, NC).
- Multivariable logistic regression models were constructed to assess the association between obesity or overweight and the presence of childhood AD as well as the association between AD at age 5 and being obese and/or overweight later in childhood.

Results

Table 1. Associations between overweight or obesity at 5 years and the presence of Atopic Dermatitis at ages 9 or 15.

$\geq 85^{\text{th}}$ percentile BMI	No AD	AD	Crude OR (95% CI)	P	aOR (95% CI)	P
No	944 (85.2%)	164 (14.8%)	1.00 (ref)		1.00 (ref)	
Yes	467 (80.7%)	112 (19.3%)	1.38 (1.06-1.80)	0.0348	1.38 (1.06-1.80)	0.0348
$\geq 95^{\text{th}}$ percentile BMI						
No	1190 (84.5%)	218 (15.5%)	1.00 (ref)		1.00 (ref)	
Yes	221 (79.2%)	58 (20.8%)	1.43 (1.04-1.98)	0.0481	1.43 (1.03-1.97)	0.0481

Multivariable logistic regression models were constructed with $\geq 85^{\text{th}}$ or $\geq 95^{\text{th}}$ percentile BMI as the independent variable. History of AD at age 9 or 15 was the binary dependent variable. Those with AD at age 5 were excluded. Covariables included sex and race/ethnicity. Odds Ratios (OR) were estimated.

AD, atopic dermatitis; aOR; adjusted odds ratio; CI, confidence interval; OR, odds ratio.

Bolded values indicate statistical significance.

Table 2. Associations between Atopic Dermatitis at age 5 and overweight or obesity at ages 9 or 15.

AD	Not Overweight/ Obese	Overweight/Obese	Crude OR (95% CI)	P	aOR (95% CI)	P
No	1036 (67.4%)	501 (32.6%)	1.00 (ref)		1.00 (ref)	
Yes	193 (64.8%)	105 (35.2%)	1.13 (0.87-1.46)	0.3934	1.11 (0.85-1.44)	0.4430
	Not Obese	Obese				
No	1490 (81.7%)	333 (18.3%)	1.00 (ref)		1.00 (ref)	
Yes	273 (79.1%)	72 (20.9%)	1.18 (0.89-1.57)	0.3125	1.16 (0.87-1.54)	0.3450

Multivariable logistic regression models were constructed with history of AD as the independent variable. $\geq 85^{\text{th}}$ or $\geq 95^{\text{th}}$ percentile BMI was the binary dependent variable. Those with $\geq 85^{\text{th}}$ or $\geq 95^{\text{th}}$ percentile BMI at age 5 were excluded. Covariables included sex and race/ethnicity. Odds Ratios (OR) were estimated.

AD, atopic dermatitis; aOR; adjusted odds ratio; CI, confidence interval; OR, odds ratio.

Conclusions

- In conclusion, there was an association between obesity and the presence of AD later in childhood, however AD during early childhood was not associated with the development of obesity later in childhood.
- These results support that the association between obesity and AD is driven by obesity causing AD, rather than AD causing obesity.
- Additional research is necessary to investigate whether weight loss could potentially reduce the risk of AD development in later childhood.

References

1. Association NE. Eczema Stats. <https://nationaleczema.org/research/eczema-facts/>. Published 2021. Accessed May 26, 2021.
2. Zhang, A., & Silverberg, J. I. (2015). Association of atopic dermatitis with being overweight and obese: a systematic review and metaanalysis. *Journal of the American Academy of Dermatology*, 72(4), 606-616.